SOIL SURVEY OF

Cleburne County, Alabama

United States Department of Agriculture
Soil Conservation Service and Forest Service
in cooperation with
Alabama Agricultural Experiment Station and
Alabama Department of Agriculture and Industries

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1971–73. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1974. This survey was made cooperatively by the Soil Conservation Service and Forest Service, the Alabama Agricultural Experiment Station, and the Alabama Department of Agriculture and Industries. It is part of the technical assistance furnished to the Cleburne County Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Cleburne County, Alabama, are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Index to Mapping Units" on page iii lists all of the soils in the county by map symbol and shows the page where each soil is described. The capability unit and woodland group to which each soil has been assigned are specified at the end of the soil description.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation for a given use can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the woodland suitability groups.

Foresters and others can refer to the section "Woodland" where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and for recreation areas in the section "Town and Country Planning."

Engineers and builders can find, under "Engineering," tables that contain test data and estimates of soil properties that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Cleburne County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given at the beginning of the publication.

Cover picture: **Landscape in foreground is typical of Holston-Allen association, rolling. Landscape in background is typical of Cheaha association, steep.**

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Soil Survey of Cleburne County, Alabama

E R R A T U M

1. Several entries in Table 1, which begins on page 4 are transposed. The correct entries for Association 7, 8, and 9 are as follows:

Soil associations	Wildlife habitat	Community and industrial development	Major roads, utility lines, and pipelines	Resource materials (sand, gravel, road fill, topsoil, clay, and stone)
Associations 7 and 8: steep, well drained soils on strongly dissected uplands.	Suited to woodland wildlife. Has potential for moderate densities of wildlife.	Most areas unsuited; steep slopes.	Poorly suited; steep slopes and depth to rock; severe hazard of erosion and severe restrictions to right-of-way maintenance.	Poorly suited to most resources.
Association 9: steep, well drained, stony soils on strongly dissected mountains.	Suited to woodland wildlife; few sources of water; potential for moderate densities of wildlife.	Unsuited; steep slopes, stones, and depth to rock.	Unsuited; steep slopes and depth to hard bedrock; severe hazard of erosion and restrictions to right-of-way maintenance.	Suitable for building and construction uses in some areas; hard bedrock or weathered surface stones.

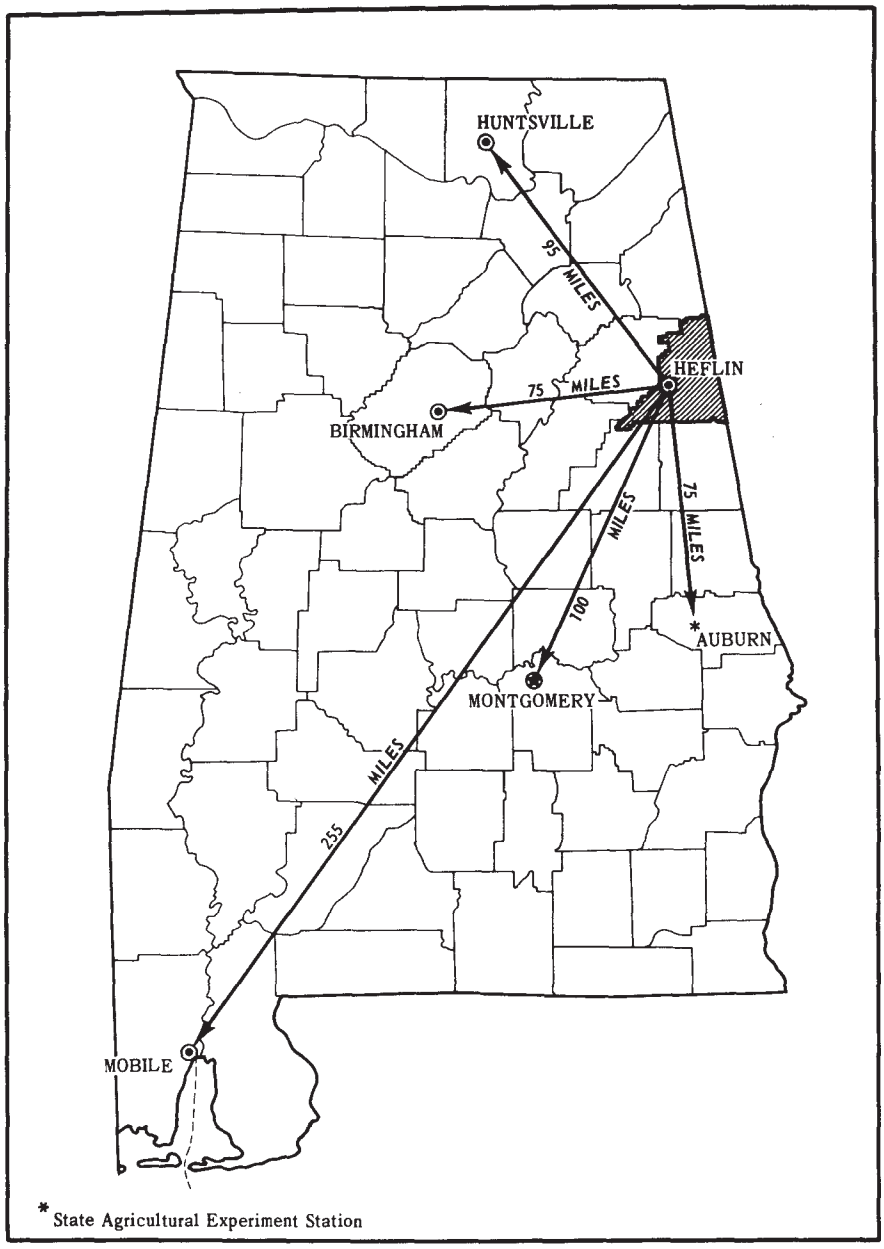
2. In Table 5, page 29, the designation of quantity in the last column of the boxhead should be "Acres per animal unit[1/]." Footnote 1 on page 28 should be "1/Animal-unit. One cow, steer, or horse, or seven sheep or goats."

3. In Table 9, page 40, the entry under Sewage lagoons for the Riverview mapping unit (Rs), Sylacauga part, should be "Severe: floods; wetness."

4. In Table 11, page 46, the entries under Sand should not be footnoted for the Holston mapping unit (HAR), Holston part, and the Riverview mapping unit (Rs), Riverview part and State part. The map symbol HAR should be deleted from footnote 2 and Rs deleted from footnote 3.

Index to Mapping Units

Summary of Tables



Location of Cleburne County in Alabama.

SOIL SURVEY OF CLEBURNE COUNTY, ALABAMA

BY LAWSON D. SPIVEY, JR., SOIL CONSERVATION SERVICE

SOILS SURVEYED BY LAWSON D. SPIVEY, JR., SOIL CONSERVATION SERVICE, AND JARRELL S. AUSTIN, FOREST SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE ALABAMA AGRICULTURAL EXPERIMENT STATION AND THE ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

CLEBURNE COUNTY is in east-central Alabama (see facing page). It has a land area of 367,400 acres, or about 574 square miles. It is almost midway between Birmingham, Alabama, and Atlanta, Georgia, which are important centers of trade and industry in the Southeastern United States. Many railroads, U.S. and interstate highways, natural gas and petroleum pipelines, and electricity, telephone, and telegraph lines that connect Birmingham and Atlanta pass through Cleburne County. The population of the county was 10,996 in 1970.

Settlement of Cleburne County began in the 1830's by farmers from South Carolina and Georgia. Farm and forest production have had the greatest effect on the economy of the county since settlement. Industrial production has become a significant component of the economy in recent years. The economy has been influenced at various periods of time by gold mining near Arbocoochee and Chulafinnee, mica mining near Micaville, fruit and wine vineyards near Fruithurst, and small areas of iron and copper mining.

Cleburne County is along the northwestern edge of the Piedmont Plateau. The eastern section is a hilly plateau.The western section consists of steep, dissected plateau edges and mountains. The Tallapoosa River flows through the southern part of the county. Elevation ranges from about 800 feet above sea level along the Tallapoosa River to about 2,400 feet above sea level on Cheaha Mountain. Temperatures are mild during most of the year. Rainfall is generally adequate in amount and distribution for most crops grown in the county.

More than 75 percent of the land area in Cleburne County is presently used for woodland. The soils in steep wooded parts of the county are highly contrasting in yield potential and suitability for specific systems of management. Yields, however, can be significantly increased above present levels if management is designed to take advantage of the ease of planting and harvest on the moderately productive soils on ridge tops and the highly productive but hard to manage soils in stream bottoms and drainageways and on toe slopes. The soils on side slopes are moderately productive. Site preparation, planting, and harvesting techniques must be adapted to the steep slopes of these soils. The most significant fact about high-yield woodland management on these soils is that individual areas suited to similar management are very narrow, but long.

A large part of the hilly area used for woodland is also suited to pasture. Many areas presently used for pasture and woodland are also suited to small grain. Areas suited to cultivated crops are mostly on flood plains and terraces along rivers and creeks. Management of these areas is complicated by flooding, by somewhat poor internal drainage in some areas, by numerous waterways from upland areas, and by areas too narrow for fieldwork. The hazard of flooding along many creek bottoms has been reduced by the installation of flood control structures. Many sites in the county are suitable for impoundment of water.

How This Survey Was Made

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

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Hiwassee

and Madison, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Madison gravelly sandy loam, 6 to 10 percent slopes, is one of several phases within the Madison series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of other phases or series.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Cleburne County. These units are called soil complexes and soil associations.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. The Riverview-State-Sylacauga complex is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Tatum-Fruithurst association, hilly, is an example.

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

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows the soil associations in Cleburne County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and several minor soils, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in Cleburne County, who want to compare different parts of Cleburne County, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

Soil associations and delineations on the general soil map of Cleburne County are not in complete agreement with general soil maps of adjacent counties in Alabama and Georgia that were published at an earlier date. There are several reasons for these discrepancies. The major reason is that, as the knowledge of soils improves, there are refinements and modifications of soil series concepts. Also, the manner in which soils are grouped into associations depends to some extent on probable use of the general soil map in a specific county. This fact is reflected in the size of delineations and the range in slope of associations. Another reason, which applies mainly to Cleburne and Cherokee Counties, is that the boundaries of soil provinces, or major land resource areas, is near the county boundaries. Generally, soil series in associations in Cleburne and adjacent counties are recognized in the adjoining county as the same series, as a similar soil series with a different name, or as a minor series in the association.

The soil associations in Cleburne County have been combined into five groups that have similar landscape

features and potential uses. Suitability interpretations of these soil association groups for selected general use are shown in table 1. The names and characteristics of each soil association in these groups are discussed in the following pages. Soil texture terms used in the brief description of each soil association apply to the texture of the surface layer. For example, in the title of association 1, the word "loamy" refers to the texture of the surface layer.

Nearly Level to Sloping, Well Drained and Somewhat Poorly Drained Soils on Flood Plains and Stream Terraces

The well drained and somewhat poorly drained soils in this group are deep.

About 70 to 75 percent of the acreage is cleared and used for pasture, hay, and cultivated crops. The potential is generally good for developing campsites, riding or hiking trails, and hunting preserves. The hazard of flooding for most of the areas is a major deterrent to urban development.

Soil association 1, the only one in this group, makes up 4 percent of the county.

1. Riverview-State-Sylacauga association

Deep loamy soils formed in recent and old stream sediments

This association is on flood plains and low stream terraces and on high stream terraces. It occurs as narrow areas adjacent to the Tallapoosa River, the Little Tallapoosa River, and several creeks.

This association makes up about 4 percent of the county. It is about 21 percent Riverview soils, 18 percent State soils, 15 percent Sylacauga soils, and 46 percent soils of minor extent.

Riverview soils are nearly level, well drained, and moderately permeable. They generally have a loam surface layer and a silt loam subsoil. They are on flood plains.

State soils are nearly level, well drained, and moderately permeable. They generally have a loam surface layer and a loam, silt loam, or silty clay loam subsoil. They are on low stream terraces.

Sylacauga soils are nearly level, somewhat poorly drained and slowly permeable. They generally have a silt loam surface layer and a clay loam subsoil. They are in depressions on low stream terraces.

Of minor extent in this association are the Holston, Ochlockonee, and Waynesboro soils. The Holston and Waynesboro soils are gently sloping and sloping. They are on high stream terraces. The nearly level Ochlockonee soils are on flood plains.

This association is used mostly for pasture, hay crops, and cultivated crops.

Rolling and Hilly, Well Drained Soils on Moderately Dissected Valley Uplands

The well drained soils in this group are deep and moderately deep. They are chiefly on uplands.

About 65 to 75 percent of the acreage is woodland. The rest is in cultivated crops or pasture and hay crops. The potential is generally good for campsites, riding or hiking trails, and hunting preserves and good to fair for urban development. The clayey nature of some of the soils and the strong slopes are deterrents to urban development.

Soil associations 2, 3, and 4 are in this group. They make up 6 percent of the county.

2. Hiwassee-Gwinnett association

Deep and moderately deep loamy soils formed in material weathered from hornblende schist and similar basic rocks

This association, known locally as "the red lands," occurs as two long, narrow, distinct valleys in the southern part of the county. The slope range is mostly 2 to 15 percent.

This association makes up about 2 percent of the county. It is about 54 percent Hiwassee soils, 16 percent Gwinnett soils, and 30 percent soils of minor extent.

Hiwassee soils are gently sloping to strongly sloping, deep, well drained, and moderately permeable. They generally have a clay loam surface layer and a clay subsoil. They are on uplands.

Gwinnett soils are sloping to steep, moderately deep, well drained, and moderately permeable. They generally have a silty clay loam surface layer and a clay subsoil. They also are on uplands.

Of minor extent in this association are Madison, Riverview, State, and Sylacauga soils. Madison soils are on uplands, and State, Riverview, and Sylacauga soils are along narrow drainageways, on flood plains, and on low stream terraces.

This association is used extensively for woodland.

3. Mecklenburg association

Moderately deep loamy soils formed in material weathered from chloritic schist

This association is in poorly defined, irregularly shaped valleys in the southern part of the county. The slope range is mostly 2 to 10 percent.

This association makes up about 2 percent of the county. It is about 60 percent Mecklenburg and other upland soils and 40 percent soils of minor extent.

Mecklenburg soils are gently sloping to sloping, moderately deep, well drained, and slowly permeable. They generally have a surface layer of silt loam and a subsoil of silty clay loam. They are on uplands.

Of minor extent in this association are Riverview, State, and Sylacauga soils. These soils are along drainageways, on flood plains, and on low stream terraces.

This association is used mainly for woodland and pasture. A small acreage is cultivated.

4. Holston-Allen association

Deep loamy soils formed in material weathered from old colluvial sediments

This association is in narrow valleys near the base of mountains in the northern and southwestern parts of the county. The slope range is mostly 2 to 15 percent.

This association makes up about 2 percent of the county. It is about 30 percent Holston and similar soils, 12 percent Allen and similar soils, and 58 percent soils of minor extent. Almost 1 percent is impounded water.

Holston and Allen soils are gently sloping to strongly

TABLE 1.—*Suitability of county, by*

[Information in this table is for general, countywide

Soil associations	Cultivated crops	Close growing grain crops	Pasture and hay crops	Orchard crops	Timber crops
Association 1: nearly level to sloping, well drained and somewhat poorly drained soils on flood plains and stream terraces.	Most areas well suited; high yield potential; drainage needed in some areas; many areas subject to flooding.	Most areas well suited; high yield potential; drainage needed in some areas; many areas subject to flooding.	Most areas well suited; high yield potential; drainage needed in some areas.	Most areas suited; high yield potential; air drainage poor; many areas subject to flooding.	Well suited to pines and hardwoods; high yield potential; some areas wet.
Associations 2, 3, and 4: rolling and hilly, well drained soils on moderately dissected valley uplands.	Some areas suited; medium yield potential; many areas restricted by gradient and shape of slope, degree of erosion, coarse fragments on surface, or shallow depth to rock.	More than half the area suited; medium yield potential; other areas restricted by slope, degree of erosion, coarse fragments on surface, or shallow depth to rock.	Most areas suited; moderately high yield potential; some areas restricted by degree of erosion or coarse fragments on surface.	Many areas suited; medium yield potential; air drainage fair; some areas restricted by degree of erosion or coarse fragments on surface.	Suited to pines; Holston-Allen and Hiwassee-Gwinnett associations suited to hardwoods; medium yield potential.
Associations 5 and 6: hilly, well drained soils on moderately dissected plateau uplands.	Some areas suited; medium yield potential; restricted by slope, degree of erosion, and hazard of erosion.	About 70 percent of area suited; medium yield potential; restricted by slope and degree of erosion.	Most areas suited; medium yield potential; some areas restricted by slope and degree of erosion.	Most areas suited; medium yield potential; good air drainage; some areas restricted by degree of erosion.	Suited to pines and hardwoods; medium yield potential.
Associations 7 and 8: steep, well drained soils on strongly dissected uplands.	Most areas unsuited; steep slopes.	Most areas unsuited; steep slopes.	Small areas suited; unsuited because of steep slopes in other areas.	Most areas unsuited; steep slopes.	Suited to pines; some areas suited to hardwoods; medium to moderately low yield potential; planting and harvesting restricted by steep slopes.

soil associations, for selected uses

planning and does not apply to areas of less than 1,000 acres]

Wildlife habitat	Community and industrial development	Major roads, utility lines, and pipelines	Resource materials (sand, gravel, road fill, topsoil, clay, and stone)	Recreation	Water impoundments	Watershed characteristics
Well suited to openland and woodland wildlife; some areas suited to wetland wildlife; potential for high densities of wildlife.	A few areas suited; flood hazard or poor internal drainage in others.	Poorly suited; flood hazard; poor drainage in some areas.	Many areas suitable sources of sand, gravel, road fill, and topsoil.	Many areas subject to flooding; poor internal drainage in some; high traffic tolerance when dry.	Suited to large impoundments only.	Many areas subject to flood sedimentation and floodwater erosion; slow to moderate stream-flow rates.
Suited to openland and woodland wildlife; potential for moderately high densities of wildlife.	Suitability variable; Mecklenburg and Hiwassee-Gwinnett associations restricted by clayey texture, slow permeability, or depth to rock.	Suited; small areas shallow over rock; moderate hazard of erosion and restrictions to right-of-way maintenance.	Small areas of Mecklenburg association sources of montmorillonitic clay; many areas of Hiwassee-Gwinnett association sources of kaolinitic clay; many areas of Holston-Allen association sources of road fill.	Area suited to medium and low traffic uses; moderate hazard of erosion for high traffic uses.	Many areas on Mecklenburg and Holston-Allen associations suited to small impoundments.	Medium runoff rates because of slope; Mecklenburg association slowly permeable; others are moderately permeable; moderate hazard of erosion and sedimentation; moderate stream-flow rates.
Suited to openland and woodland wildlife; potential for moderate densities of wildlife.	More than half of area suited; soils moderately restricted by depth to rock, slope, clayey texture, and soil strength.	Suited; small areas shallow over rock; moderate hazard of erosion and restrictions to right-of-way maintenance.	Poorly suited to most resources except road fill.	Area suited to medium and low traffic uses; moderate hazard of erosion for high traffic uses.	Many areas suited to small and medium impoundments.	Medium runoff rates because of slope; moderate infiltration and permeability; moderate hazard of erosion and sedimentation; moderate stream-flow rates.
Most areas unsuited; steep slopes.	Poorly suited; steep slopes and depth to rock; severe hazard of erosion and severe restrictions to right-of-way maintenance.	Poorly suited to most uses.	Suited to woodland wildlife. Has potential for moderate densities of wildlife.	Area suited to low traffic uses; severe hazard of erosion for medium and high traffic uses.	Many areas in Tatum-Tallapoosa-Fruithurst association suited to small and medium impoundments; few suitable sites on Madison-Louisa association.	Rapid runoff rates because of slope; moderate infiltration and permeability; severe hazard of erosion; high sedimentation; rapid stream-flow rates.

TABLE 1.—*Suitability of county, by soil*

Soil associations	Cultivated crops	Close growing grain crops	Pasture and hay crops	Orchard crops	Timber crops
Association 9: steep, well drained, stony soils on strongly dissected mountains.	Unsuited; stones and steep slopes.	Unsuited; stones and steep slopes.	Unsuited; stones and steep slopes.	Unsuited; stones and steep slopes.	Suited to pines; moderately low yield potential; planting and harvesting severely restricted by stones and steep slopes; fire protection and control difficult.

sloping, deep, well drained, and moderately permeable. These soils generally have a surface layer of loam and a subsoil of loam, sandy clay loam, and clay loam. They are on uplands.

Of minor extent in this association are Fruithurst, Riverview, State, Sylacauga, Tallapoosa, and Tatum soils. Fruithurst, Tallapoosa, and Tatum soils are on uplands, and Riverview, State, and Sylacauga soils are along drainageways, on flood plains, and on low stream terraces.

This association is used chiefly for pasture and woodland. A small acreage is cultivated.

Hilly, Well Drained Soils on Moderately Dissected Plateau Uplands

The well drained soils in this group are moderately deep. They are on uplands.

About 75 to 80 percent of the acreage is woodland. The rest is about equally divided between cultivated crops and pasture and hay crops. The potential is generally good for campsites, riding or hiking trails, and hunting preserves and fair to poor for urban development. The strong slopes are a major deterrent to urban development.

Soil associations 5 and 6 are in this group. They make up 45 percent of the county.

5. Madison association

Moderately deep loamy soils formed in material weathered from mica schist

This association is on hilly plateaus in the southern part of the county. The slope range is mostly 6 to 15 percent.

This association makes up about 11 percent of the county. It is about 65 percent Madison and similar soils and 35 percent soils of minor extent. Almost 1 percent is impounded water.

Madison soils are sloping to strongly sloping, moderately deep, well drained, and moderately permeable. They generally have a surface layer of gravelly sandy loam and a clayey subsoil. They are on uplands.

Of minor extent in this association are Louisa soils on uplands and Riverview, State, and Sylacauga soils along drainageways, on flood plains, and on low stream terraces.

This association is used chiefly for pasture and hay crops and woodland. A significant acreage in the vicinity of Ranburne is used for cultivated crops.

6. Tatum-Fruithurst association

Moderately deep loamy soils formed in material weathered from slate

This association is on hilly plateaus throughout the county. The slope range is mostly 6 to 15 percent.

This association makes up about 34 percent of the county. It is 30 percent Tatum soils, 30 percent Fruithurst soils, and 40 percent soils of minor extent.

Tatum and Fruithurst soils are sloping to strongly sloping, moderately deep, well drained, and moderately permeable. They are on uplands. Tatum soils generally have a surface layer of loam and a subsoil of clay loam. Fruithurst soils generally have a surface layer of loam and a subsoil of loam and clay loam. They are on uplands.

Of minor extent in this association are Tallapoosa soils on uplands and Riverview, State, and Sylacauga soils along drainageways, on flood plains, and on low stream terraces.

This association is used chiefly for woodland. Small acreages are in pasture and hay crops and cultivated crops.

Steep, Well Drained Soils on Strongly Dissected Uplands

The well drained soils in this group are moderately deep and shallow. They are on uplands.

About 85 to 90 percent of the acreage is woodland. The potential generally is good for camp sites, riding or hiking trails, and hunting preserves. The steep slopes are a major deterrent to urban development.

Soil associations 7 and 8 are in this group. They make up 36 percent of the county.

associations, for selected uses—Continued

Wildlife habitat	Community and industrial development	Major roads, utility lines, and pipelines	Resource materials (sand, gravel, road fill, topsoil, clay, and stone)	Recreation	Water impoundments	Watershed characteristics
Unsuited; steep slopes, stones, and depth to rock.	Unsuited; steep slopes and depth to hard bedrock; severe hazard of erosion and restrictions to right-of-way maintenance.	Suitable for building and construction uses in some areas; hard bedrock or weathered surface stones.	Suited to woodland wildlife; few sources of water; potential for moderate densities of wildlife.	Area suited to low traffic uses; restricted by steep slopes and stones; severe hazard of erosion resulting in exposure of bedrock for medium and high traffic use.	Suited to small impoundments in a few areas.	Rapid runoff rates because of long, steep slopes; moderate infiltration and permeability; severe hazard of erosion; high sedimentation; rapid stream-flow rates.

7. Madison-Louisa association

Moderately deep and shallow loamy soils formed in material weathered from mica schist

This association is on steep uplands, on strongly dissected plateau edges, and on low mountains in the southern part of the county. The slope range is mostly 10 to 35 percent.

This association makes up about 6 percent of the county. It is about 55 percent Madison soils, 27 percent Louisa soils, and 19 percent soils of minor extent.

Madison soils are sloping to steep, moderately deep, well drained, and moderately permeable. They generally have a surface layer of gravelly sandy loam and a subsoil of clay. They are on uplands.

Louisa soils are strongly sloping to steep, shallow, well drained, and moderately rapidly permeable. They have a surface layer of gravelly sandy loam and a subsoil of gravelly loam. They also are on uplands.

Of minor extent in this association are Riverview, State, and Sylacauga soils. They are along drainageways, on flood plains, and on low stream terraces.

This association is used extensively for woodland.

8. Tatum-Tallapoosa-Fruithurst association

Moderately deep and shallow loamy soils formed in material weathered from slate

This association is on steep uplands on strongly dissected plateau edges throughout the county. The slope range is mostly 15 to 45 percent.

This association makes up about 30 percent of the county. It is about 31 percent Tatum soils, 30 percent Tallapoosa soils, 20 percent Fruithurst soils, and 19 percent soils of minor extent.

Tatum and Fruithurst soils are strongly sloping to steep, moderately deep, well drained, and moderately permeable. Tatum soils generally have a surface layer of loam and a subsoil of clay loam. Fruithurst soils generally have a surface layer of loam and a subsoil of loam and clay loam. These soils are on uplands.

Tallapoosa soils are steep, shallow to rock, well drained, and moderately permeable. They generally have a surface layer of gravelly silt loam and a subsoil of silt loam. They are on uplands.

Of minor extent in this association are Riverview, State, and Sylacauga soils. They are along drainageways, on flood plains, and on low stream terraces.

This association is used extensively for woodland.

Steep, Well Drained Stony Soils on Strongly Dissected Mountains

The well drained stony soils in this group are moderately deep. They are dominantly on uplands.

About 95 percent of the acreage is woodland. The potential is generally good for camp sites, riding or hiking trails, and hunting preserves. The steep to very steep slopes are a major deterrent to urban development. All areas have high scenic and esthetic value.

Soil association 9, the only one in this group, makes up 9 percent of the county.

9. Cheaha association

Moderately deep loamy soils formed in material weathered from sandstone

This association is in mountainous areas in the northern and western parts of the county. The slope range is mostly 25 to 65 percent.

This association makes up about 9 percent of the county. It is about 46 percent Cheaha soils, 14 percent rockland, and 40 percent soils of minor extent.

Cheaha soils are steep, stony, moderately deep, well drained, and moderately permeable. They generally have a silt loam surface layer and a silt loam or clay loam subsoil. They are on mountaintops and upper mountainsides.

The rockland part of this association consists of sandstone outcrop, cliffs, and colluvial piles of broken rock. It occurs at mid slope on mountainsides.

Of minor extent in this association are Allen, Fruithurst, Holston, Riverview, State, Tallapoosa, and Tatum soils. Allen and Holston soils are on foot slopes at the base of mountains. Fruithurst, Tatum, and Tallapoosa soils are at mid slope and on the lower

mountainsides. Riverview and State soils are along drainageways near the base of mountains.

This association is used for woodland and recreation.

Descriptions of the Soils

This section describes the soil series and mapping units of Cleburne County. The approximate acreage and proportionate extent of each mapping unit are given in table 2. The location of each mapping unit is shown on the soil map at the back of this survey.

The procedure in this section is to describe the soil series first and then the mapping units in the series. Thus, to get complete information on any one mapping unit, it is necessary to read the description of that unit and the description of the series to which it belongs. The description of the soil series mentions features that apply to all of the soils in a series. Differences among the soils of one series are pointed out in the description of the individual soils or are indicated in the soil name.

A profile representative of each series is described in two ways. Many prefer to read the short description in the second paragraph of the series description. The technical description of the profile is mainly for soil scientists, engineers, and others who need to make thorough and precise studies of soils. Unless otherwise stated, the profile described is that of a moist soil.

Preceding the name of each mapping unit is a symbol. This symbol identifies the mapping unit on the soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group to which the mapping unit has been assigned.

TABLE 2.—*Approximate acreage and proportionate extent of soils*

Soils	Acres	Percent
Cheaha association, steep	30,474	8.3
Hiwassee-Gwinnett association, hilly	5,985	1.6
Holston loam, 2 to 6 percent slopes	1,307	.4
Holston-Allen association, rolling	4,732	1.3
Madison gravelly sandy loam, 6 to 10 percent slopes	4,776	1.3
Madison association, hilly	31,914	8.7
Madison-Louisa association, steep	26,370	7.2
Mecklenburg association, rolling	9,705	2.6
Ochlockonee loamy fine sand	1,197	.3
Riverview loam	1,220	.3
Riverview-State-Sylacauga complex	20,321	5.5
State fine sandy loam	1,496	.4
Sylacauga silt loam	972	.3
Tatum-Fruithurst complex, 6 to 10 percent slopes	2,030	.6
Tatum-Fruithurst association, hilly	106,063	28.9
Tatum-Tallapoosa-Fruithurst association, steep	115,259	31.4
Waynesboro fine sandy loam, 10 to 25 percent slopes	590	.2
Waynesboro-Holston complex, 2 to 10 percent slopes	1,329	.4
Impounded water	1,660	.5
Total	367,400	100.0

Descriptions, names, and delineations of soils in this soil survey do not always agree fully with soil maps in adjacent counties published at a different date. Differences are brought about by better knowledge of soils, modifications in series concepts, intensity of mapping, and the extent of soils within the survey. Sometimes it is more feasible to combine under a single name small acreages of similar soils that respond to use and management in much the same way rather than to separate them under different names.

Many terms used in the soil descriptions and other sections are defined in the Glossary at the back of this survey and in the "Soil Survey Manual" (*9*).[1]

Allen Series

The Allen series consists of deep, well drained soils on foot slopes at the base of mountains. These soils formed in old colluvial sediments derived from sandstone and slate. Slopes range from 2 to 15 percent.

In a representative profile the surface layer is dark brown loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 31 inches is yellowish red clay loam, and the lower 24 inches is mottled strong brown, yellowish red, and red sandy clay loam.

Allen soils have moderate permeability and high available water capacity.

Native forests were mixed hardwoods and pines. Most areas are still wooded. Many areas that were cleared for cultivation have been reforested with loblolly pines. Some are used mainly for pasture and hay crops.

The Allen soils in Cleburne County are mapped only with Holston soils.

Representative profile of Allen loam in an area of Holston-Allen association, rolling, in a forest approximately 1 mile northwest of Borden Springs in sec. 33, T. 12 S., R. 11 E.

A1—0 to 5 inches; dark brown (10YR 3/3) loam; moderate medium granular structure; friable; common fine medium and large roots; few sandstone cobbles; very strongly acid; clear wavy boundary.

B21t—5 to 36 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine medium and large roots; few fine pores; thin clay films on surfaces of some peds; few sandstone cobbles; very strongly acid; gradual smooth boundary.

B22t—36 to 60 inches; mottled strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and red (2.5YR 4/6) sandy loam; weak medium and coarse subangular blocky structure; firm; few fine roots; thin clay films on surfaces of some peds; few sandstone cobbles; very strongly acid.

The A1 horizon is dark brown, dark yellowish brown, or yellowish brown and is 4 to 8 inches thick. Texture is sandy loam or loam. Some pedons have cobbles or gravel in and on the A1 horizon. Some pedons have a B1 horizon, 5 to 10 inches thick, that is yellowish brown or strong brown and has loam, sandy loam, or sandy clay loam texture. The B2t horizon is yellowish red or red and is generally mottled in the lower part in shades of red, brown, and yellow. Texture of the B2t horizon is clay loam or sandy clay loam. The B2t horizon is 2 to 15 percent sandstone cobbles and gravel. Reaction ranges from strongly acid to very strongly acid in all horizons except in the A horizon in places that have been limed. Solum thickness is 60 to 80 inches.

[1] Italic numbers in parentheses refer to Literature Cited, page 53.

Allen soils are associated with Holston soils. They have redder colors in the B2t horizon than Holston soils.

Cheaha Series

The Cheaha series consists of moderately deep, well drained, stony soils on mountains. These soils formed in material weathered from micaceous sandstone. Slopes range from 15 to 60 percent.

In a representative profile the surface layer is dark brown stony silt loam about 4 inches thick. The subsoil is about 31 inches thick. The upper 19 inches is yellowish brown silt loam, and the lower 12 inches is strong brown clay loam. Hard sandstone bedrock is at a depth of 35 inches.

Cheaha soils have moderate permeability and medium available water capacity.

Native forests were mixed hardwoods and pines. Practically all areas are still wooded.

Representative profile of Cheaha stony silt loam in an area of Cheaha association, steep, in a forest approximately ½ mile southeast of Cheaha Park in the SE¼SE¼, sec. 9, T. 18 S., R. 8 E.

O1—1 inch to 0; pine leaf residue.
A1—0 to 4 inches; dark brown (10YR 3/3) stony silt loam; moderate medium granular structure; friable; 25 percent by volume sandstone cobbles and stones; many fine medium and large roots; extremely acid; clear wavy boundary.
B21t—4 to 23 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; 25 percent by volume sandstone cobbles and stones; common fine medium and large roots; common fine root pores; thin discontinuous clay films on surfaces of peds; very strongly acid; gradual irregular boundary.
B22t—23 to 35 inches; strong brown (7.5YR 5/8) clay loam; weak medium subangular blocky structure; friable; 25 percent by volume sandstone cobbles and stones; few fine and medium roots; common fine root pores; thin discontinuous clay films on surfaces of peds; very strongly acid; abrupt irregular boundary.
R—35 inches; hard sandstone bedrock.

The A1 horizon is very dark grayish brown, dark grayish brown, dark brown, dark yellowish brown, or yellowish brown and is 3 to 5 inches thick. Texture is silt loam, loam, or sandy loam. The B21t and B22t horizons are yellowish brown, brownish yellow, strong brown, or reddish yellow. Texture is loam, silt loam, clay loam, or sandy clay loam. Coarse fragment content ranges from 15 to 35 percent in all horizons. Reaction ranges from strongly acid to extremely acid in all horizons. Solum thickness ranges from 24 to 40 inches.

Cheaha soils are associated with Fruithurst soils. In contrast they are stony and overlie hard bedrock.

CES—Cheaha association, steep. This mapping unit is on mountains (fig. 1). Slopes range from 6 to 75 percent but on more than 75 percent of this mapping unit they are 25 to 65 percent. This mapping unit has the profile described as representative of the series.

Figure 1.—**Landscape in the background is typical of the Cheaha association, steep.**

About 50 percent of the unit is Cheaha and closely similar soils. About 15 percent is sandstone outcrops, cliffs, and piles of broken rock. About 35 percent is Allen, Fruithurst, Holston, Riverview, State, Tallapoosa, and Tatum soils.

Each area contains Cheaha soils and one or more of the minor soils. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area.

Cheaha soils are on mountaintops and on mid and upper mountainsides. Sandstone outcrop is common. Sandstone cliffs are at mid slope on mountainsides. Piles of broken rock are at the base of cliffs and in many drainageways. Fruithurst, Tallapoosa, and Tatum soils are generally on the lower mountainsides. Allen and Holston soils are on mountain foot slopes. Riverview and State soils are in narrow drainageways.

This unit is not suited to cultivated crops and pasture because of steep slopes, stones, and rock outcrop. It is used mainly for timber production and recreation.

Trees on north-facing mountainsides are mostly deciduous. Those on mountaintops and south-facing mountainsides are coniferous and deciduous. There is very little effect of aspect on the site index of similar soils on similar topography. Trees on Cheaha and associated soils on mountaintops are subject to severe winter and summer climatic extremes. Most of these trees show evidence of ice damage. Minor soils on the lower mountainsides, foot slopes, and drainageways have the higher site index, and ice damage is much less evident.

Some soils on mountaintops, lower mountainsides, foot slopes, and drainageways are suited to machine site preparation, planting, and harvesting. The stony surfaces of Cheaha soils and associated rocky areas adversely affect these operations on the mountaintops. Locating access roads and fire lanes is difficult because of the long steep slopes, the erosion hazard, the surface stones and underlying bedrock of Cheaha soils, and the associated bedrock outcrops and cliffs. Wildfire control is difficult because of the long steep slopes.

Recreational uses are adversely affected by slope, depth to bedrock, surface stones and rock, and the erosion hazard. Capability unit VIIs–6; woodland suitability group 4x2.

Fruithurst Series

The Fruithurst series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from slate. Slopes range from 6 to 35 percent.

In a representative profile the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is about 34 inches thick. The upper 13 inches is yellowish brown loam, the next 11 inches is strong brown clay loam, and the lower 10 inches is yellowish red clay loam. The underlying material is highly weathered slate to a depth of 50 inches.

Fruithurst soils have moderate permeability and high available water capacity.

Native forests were mixed hardwoods and pines. Most areas are still wooded. Many areas that were cleared have been reforested with loblolly pines. Some are used for cultivated crops, pasture, and hay crops.

The Fruithurst soils in Cleburne County are mapped only with Tatum soils.

Representative profile of Fruithurst loam in an area of Tatum-Fruithurst association, hilly, in a forest about 2 miles north-northeast of Arbocoochee in NW¼SE¼ sec. 29, T. 16 S., R. 11 E.

O1—1 inch to 0; pine leaf residue.

A1—0 to 5 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; many fine and medium and few large roots; few quartz and slate fragments; very strongly acid; clear smooth boundary.

B1—5 to 10 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; very strongly acid; gradual wavy boundary.

B21t—10 to 18 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine pores; thin continuous clay films on surfaces of peds; very strongly acid; diffuse wavy boundary.

B22t—18 to 29 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine pores; thin continuous clay films on surfaces of peds; very strongly acid; gradual irregular boundary.

B23t—29 to 39 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine pores; thin continuous clay films on surfaces of peds; thin lenses with relict rock structure; very strongly acid; gradual irregular boundary.

C—39 to 50 inches; highly weathered slate saprolite with relict rock structure; very strongly acid.

The A1 and Ap horizons are dark yellowish brown, dark brown, or yellowish brown and are 3 to 6 inches thick. They are loam, silt loam, or gravelly loam. The content of slate and quartz fragments on and in the A horizon ranges from 5 to 25 percent. Some pedons have a B1 horizon of loam or silt loam that is 3 to 8 inches thick. The B2t horizon is yellowish brown, strong brown, or yellowish red clay loam or loam. Reaction ranges from strongly acid to very strongly acid in all horizons but the Ap horizon in limed areas. Solum thickness ranges from 20 to 40 inches.

Fruithurst soils are geographically associated with Cheaha, Tallapoosa, and Tatum soils. In contrast with Cheaha soils, they are not stony and do not overlie hard bedrock. They have a thicker solum than Tallapoosa soils. They are not so red or so clayey in the B2t horizon as Tatum soils.

Gwinnett Series

The Gwinnett series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from hornblende schist and other basic rocks. Slopes range from 6 to 25 percent.

In a representative profile the surface layer is dark reddish brown silty clay loam about 4 inches thick. The subsoil is about 32 inches thick. The upper 18 inches is dark red clay, and the lower 14 inches is red clay loam. The underlying material is reddish yellow, highly weathered schist to a depth of about 44 inches and slightly weathered schist to a depth of 50 inches.

Gwinnett soils have moderate permeability and medium available water capacity.

Native forests were mixed hardwoods and pines. Most areas are still wooded. Many areas that were cleared for cultivation have been reforested with loblolly pines.

The Gwinnett soils in Cleburne County are mapped only with Hiwassee soils.

Representative profile of Gwinnett silty clay loam in an area of Hiwassee-Gwinnett association, hilly, in a pine plantation about one-half mile north of Micaville in SE¼NE¼ sec. 36, T. 17 S., R. 10 E.

A1—0 to 4 inches; dark reddish brown (5YR 3/4) silty clay loam; moderate medium granular structure; friable; few quartz and schist fragments; common fine and medium roots; strongly acid; clear smooth boundary.

B2t—4 to 22 inches; dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; friable; few quartz schist fragments; common fine and medium roots; thin continuous clay films on surfaces of peds; strongly acid; diffuse wavy boundary.

B3—22 to 36 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few quartz and schist fragments; few fine and medium roots; thin discontinuous clay films on surfaces of peds; strongly acid; gradual wavy boundary.

C1—36 to 44 inches; reddish yellow (5YR 6/6) highly weathered schist saprolite with relict rock structure and black manganese concretions; strongly acid.

C2—44 to 50 inches; slightly weathered schist saprolite.

The A1 horizon is dark reddish brown or dark red and is 4 to 6 inches thick. It is clay loam, silty clay loam, gravelly clay loam, or gravelly loam that is 5 to 25 percent quartz and schist fragments that are generally less than 3 inches long. The B2t horizon is dark red or dark reddish brown clay. Some pedons have a B3 horizon of dark red, dark reddish brown, or red clay loam or loam. Most pedons have black manganese concretions or strains. Reaction is medium acid or strongly acid in all horizons. Solum thickness ranges from 20 to 40 inches.

Gwinnett soils are geographically associated with Hiwassee soils. They have a thinner solum than Hiwassee soils.

Hiwassee Series

The Hiwassee series consists of deep, well drained soils on uplands. These soils formed in material weathered from hornblende schist and other basic rocks. Slopes range from 2 to 25 percent.

In a representative profile the surface layer is dark reddish brown clay loam about 3 inches thick. The subsoil is dark red clay about 48 inches thick. The underlying material is red gravelly loam to a depth of 57 inches.

Hiwassee soils have moderate permeability and medium available water capacity.

Native forests were mixed hardwoods and pines. Most areas were cleared for cultivation but have been reforested with loblolly pines.

Representative profile of Hiwassee clay loam in an area of Hiwassee-Gwinnett association, hilly, in a pine plantation about 1½ miles northeast of Micaville in SE¼NE¼ sec. 31, T. 17 S., R. 11 E.

A1—0 to 3 inches; dark reddish brown (2.5YR 3/4) clay loam; moderate medium granular structure; friable; few quartz and schist fragments; common fine and medium roots; strongly acid; clear wavy boundary.

B2t—3 to 51 inches; dark red (10R 3/6) clay; moderate fine and medium subangular blocky structure; friable; few quartz and schist fragments; few fine and medium roots; common fine pores; thin continuous clay films on surfaces of peds; strongly acid; diffuse wavy boundary.

C—51 to 57 inches; red (2.5YR 5/8) gravelly loam; massive; few fine distinct yellowish brown mottles; strongly acid.

The A1 horizon is dark reddish brown or dark red and is 3 to 7 inches thick. It is clay loam or loam that is 5 to 15 percent angular quartz and schist fragments mostly less than 3 inches long. The B2t horizon is dark red or dark reddish brown clay. Some pedons have black manganese concretions or stains. Reaction ranges from medium acid to very strongly acid in all horizons but the A horizon in limed areas. Solum thickness ranges from 40 to 70 inches.

Hiwassee soils are geographically associated with Gwinnett soils. They have a thicker solum than Gwinnett soils.

HGH—Hiwassee-Gwinnett association, hilly. This mapping unit is in valleys. It is part of an area known locally as "the red lands." Slopes range from 0 to 35 percent, but on more than 80 percent of the mapping unit they are 2 to 15 percent. Each mapped area contains Hiwassee and Gwinnett soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. Each of the dominant soils has the profile described as representative of the respective series.

The deep Hiwassee soil makes up about 65 percent of the unit, and the moderately deep Gwinnett soil 20 percent (fig. 2). The rest is soils of minor extent, including Madison, Riverview, State, and Sylacauga soils and soils that are somewhat similar to the Gwinnett soil but are less than 20 inches deep over weathered rock.

The gently sloping to strongly sloping Hiwassee soil is on uplands. The strongly sloping to steep Gwinnett soil and the similar but shallower soils also are on uplands. Madison soils are generally on the upland fringes of the association. Riverview, State, and Sylacauga soils are on flood plains, terraces, and drainageways.

The soils in this unit have been extensively cultivated in the past, but most of the acreage is now used as woodland. A few areas are used for pasture and cultivated crops. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

These soils are not well suited to cultivation with modern equipment because of the numerous small areas where slope is unfavorable. Tillage methods and yields are also affected by the erosion incurred during past cultivation. A plant cover is needed at least three-fourths of the time in areas of 15 percent slope or less that are used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways.

In most areas slopes are suited to pasture and hay crops. Yields, however, are somewhat affected by the erosion incurred in the past.

The soils are suited to coniferous and deciduous trees, and there are no serious soil-related management problems. The woodland on the upland is mostly southern pine. The woodland on bottom land is mostly hardwoods. The soils in drainageways and on stream bottoms have higher site indexes than the soils on uplands. Capability unit IVe–1; woodland suitability group 3o7.

Holston Series

The Holston series consists of deep, well drained soils on river terraces and foot slopes at the base of

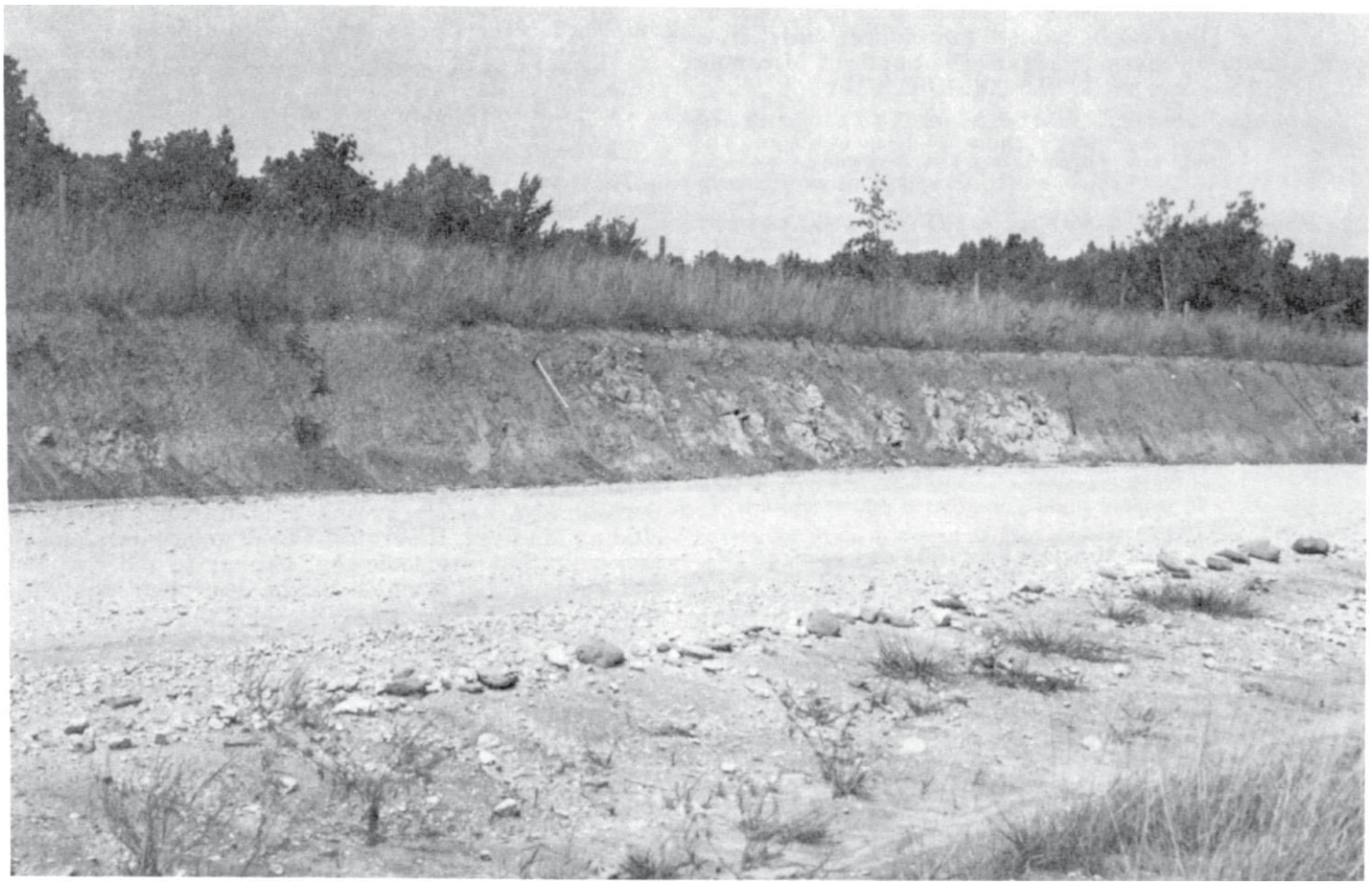


Figure 2.—**Roadbank showing Hiwassee soils on left and Gwinnett soils on right. The greater depth of Hiwassee soils over weathered rock is one of the properties that differentiate them from Gwinnett soils.**

mountains. These soils formed in old colluvial and alluvial sediment. Slopes range from 2 to 15 percent.

In a representative profile the surface layer is dark brown loam about 5 inches thick. The subsoil extends to a depth of 65 inches or more. The upper 28 inches is yellowish brown loam, and the lower 32 inches is mottled yellowish brown, strong brown, yellowish red, and very pale brown clay loam.

Holston soils have moderate permeability and medium to high available water capacity.

Native forests were mixed hardwoods and pines. Most areas were cleared. Cleared areas are used mainly for cultivated crops, pasture, and hay crops. Some have been reforested with loblolly pines.

Representative profile of Holston loam, 2 to 6 percent slopes, in a pasture near the Tallapoosa River about three-fourths of a mile southeast of Oak Grove Church in NE¼NW¼ sec. 6, T. 16 S., R. 12 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) loam, weak medium granular structure; friable; common fine and medium roots; medium acid; clear smooth boundary.

B21t—5 to 20 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; clay bridgings between sand grains; strongly acid; diffuse smooth boundary.

B22t—20 to 33 inches; yellowish brown (10YR 5/6) loam; moderate medium and coarse subangular blocky structure; friable; few fine roots; common fine pores; clay bridgings between sand grains; very strongly acid; gradual smooth boundary.

B23t—33 to 65 inches; mottled yellowish brown (10YR 5/6 and 5/4), strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and very pale brown (10YR 7/3) clay loam; moderate medium and coarse subangular blocky structure; friable; thin clay films on surfaces of peds; very strongly acid.

The Ap and A1 horizons are dark brown, dark yellowish brown, yellowish brown, olive brown, or light olive brown and are 5 to 10 inches thick. They are fine sandy loam, gravelly fine sandy loam, loam, or silt loam. The B2t horizon is yellowish brown or strong brown and has mottles in shades of yellow, brown, and red in the lower part. Some pedons are yellowish red in the lower part of the B2t horizon. The B2t horizon is loam or clay loam. Reaction is strongly acid or very strongly acid in all horizons except in the Ap horizon in limed areas. Solum thickness ranges from 60 to 80 inches.

Holston soils are geographically associated with Allen and Waynesboro soils. They lack the red colors in the B2t horizon that are common to those soils.

HoB—Holston loam, 2 to 6 percent slopes. This soil is on river terraces, known locally as "bench land." It has the profile described as representative of the series.

Included in mapping are small areas of Sylacauga and Waynesboro soils. Also included are small areas of moderately well drained soils that are similar to Hols-

ton soils, some areas where the surface layer is fine sandy loam, and small narrow areas, or "bench sides," where slopes are 6 to 15 percent.

A plant cover is needed at least one-half of the time on this soil. Terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue utilization, and grassed waterways are needed to control erosion. Tillage methods are affected by included areas of soils that have slopes of more than 6 percent. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

This soil is well suited to irrigation and to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops (fig. 3). Crop response to lime and fertilizer is good. Capability unit IIe–2; woodland suitability group 3o7.

HAR—Holston-Allen association, rolling. This mapping unit is on foot slopes at the base of mountains. Slopes range from 0 to 35 percent, but on more than 80 percent of the mapping unit they are 2 to 15 percent. Each mapped area contains Holston and Allen soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. The Holston soil has a profile similar to the one described as representative of the Holston series. The Allen soil has the profile described as representative of the Allen series.

Holston and Allen soils make up 30 and 20 percent, respectively, of the unit. The rest is soils of minor extent, including Fruithurst, Riverview, Sylacauga, Tallapoosa, and Tatum soils and soils that are somewhat similar to Holston and Allen soils but are not so thick or contain many cobblestones.

The gently sloping and sloping Holston, Allen, and somewhat similar minor soils are on the broader parts of uplands. The more sloping Fruithurst, Tallapoosa, and Tatum soils are on uplands. Riverview and Sylacauga soils are on flood plains and drainageways.

Most of the acreage in this unit is used for pasture and hay crops and woodland. Some areas are cultivated. Crop response to lime and fertilizer is good. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

The soils have been extensively cultivated in the past. They are not well suited to cultivation with modern equipment because of the numerous small areas that have unfavorable slopes or cobblestones in and on the surface. A plant cover is needed at least two-thirds of the time in areas of 10 percent slopes or less that are used for cultivated crops, close-growing grain crops,

Figure 3.—**Pasture on Holston loam, 2 to 6 percent slopes, in the foreground and on Waynesboro-Holston complex, 2 to 10 percent slopes, in the background.**

and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways.

In most areas slopes are suited to pasture and hay crops. Management, however, is affected by the numerous small areas with cobblestones in and on the surface layer.

The soils of the association are suited to coniferous and deciduous trees. There are no serious soil-related woodland management problems on most of the upland soils. Management of small areas is affected by steep slopes. The woodland is mostly southern pine. The woodland on flood plains and drainageways is mostly hardwoods. Management in these areas is affected by soil wetness. Capability unit IIIe–2; woodland suitability group 3o7.

Louisa Series

The Louisa series consists of shallow, well drained soils on uplands. These soils formed in material weathered from mica schist. Slopes range from 10 to 40 percent.

In a representative profile the surface layer is dark brown gravelly sandy loam about 4 inches thick. The subsoil is about 15 inches thick. The upper 9 inches is dark yellowish brown gravelly sandy loam, and the lower 6 inches is dark brown gravelly loam. The underlying material is slightly weathered mica schist to a depth of 25 inches.

Louisa soils have moderately rapid permeability and very low available water capacity.

Native forests were mixed hardwoods and pines. Practically all areas are still wooded.

The Louisa soils in Cleburne County are mapped only with Madison soils.

Representative profile of Louisa gravelly sandy loam in an area of Madison-Louisa association, steep, in a forest about 3 miles northeast of Micaville in the SE¼NW¼ sec. 28, T. 17 S., R. 11 E.

O1—1 inch to 0; partly decomposed oak leaf litter.
A1—0 to 4 inches; dark brown (10YR 4/3) gravelly sandy loam; weak medium granular structure; very friable; many fine and medium and few large roots; common fine mica flakes; very strongly acid; clear wavy boundary.
B1—4 to 13 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; many fine pores; common fine mica flakes; very strongly acid; clear wavy boundary.
B2—13 to 19 inches; dark brown (7.5YR 4/4) gravelly loam; weak medium subangular blocky structure; friable; common fine and medium roots; many fine pores; common fine mica flakes; very strongly acid; clear irregular boundary.
C—19 to 25 inches; slightly weathered mica schist saprolite.

The A1 horizon is dark brown or dark yellowish brown and is 3 to 5 inches thick. It is sandy loam, gravelly sandy loam, or gravelly loam. The B horizon is dark brown or dark yellowish brown. It is gravelly sandy loam, sandy loam, gravelly loam, or loam. Most pedons have a discontinuous B2t horizon of yellowish red or strong brown clay loam, sandy clay loam, or loam. Most horizons are 5 to 30 percent angular schist fragments. All have few to many fine mica flakes. Reaction is strongly acid or very strongly acid in all horizons. Solum thickness ranges from 10 to 20 inches.

Louisa soils are geographically associated with Madison soils. They contain less clay and have a thinner solum than Madison soils.

Madison Series

The Madison series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from mica schist. Slopes range from 2 to 25 percent.

In a representative profile the surface layer is dark yellowish brown gravelly sandy loam about 5 inches thick. The subsoil is red clay about 33 inches thick. Below this is slightly weathered mica schist bedrock to a depth of 80 inches.

Madison soils have moderate permeability and medium available water capacity.

Native forests were mixed hardwoods and pines. Some areas are still wooded. Many areas of these soils are used mainly for cultivated crops, pasture, and hay crops. Some areas that were cleared have been reforested with loblolly pines.

Representative profile of Madison gravelly sandy loam in an area of Madison association, hilly, in a pine forest about 2 miles northeast of Micaville in NW¼-SE¼ sec. 29, T. 17 S., R. 11 E.

A1—0 to 5 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak medium granular structure; friable; common fine and medium roots; common fine mica flakes; common angular schist fragments; strongly acid; clear smooth boundary.
B2t—5 to 38 inches; red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; friable; few fine roots; common pores; thin continuous clay films on surfaces of peds; common fine mica flakes; few angular schist fragments; strongly acid; clear irregular boundary.
C—38 to 80 inches; slightly weathered mica schist saprolite.

The A1 horizon is dark yellowish brown or dark brown and is 3 to 8 inches thick. It is gravelly sandy loam or gravelly loam that is 5 to 20 percent quartz and schist fragments. The B2t horizon is red or yellowish red clay or clay loam. Most pedons have few to common fine mica flakes in all horizons. Reaction is strongly acid or very strongly acid in all horizons except in the Ap horizon in limed areas. Solum thickness ranges from 21 to 40 inches.

Madison soils are geographically associated with Louisa and Mecklenburg soils. They contain more clay and have a thicker solum than Louisa soils. They contain mica, which is lacking in the Mecklenburg soils.

MaC—Madison gravelly sandy loam, 6 to 10 percent slopes. This soil is on intermediate and broad upland ridgetops. It has a profile similar to the one described as representative of the series, but the surface layer is dark brown.

Included in mapping are small areas of soils that are similar to Madison soils but have a yellower or mottled subsoil or are more than 50 inches deep over weathered rock. Also included are small areas of Louisa soils and soils that are severely eroded, cobbly, or gently sloping or strongly sloping.

This soil is suited to all crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops (fig. 4). Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when moisture is less than adequate for optimum plant growth.

A plant cover is needed at least two-thirds of the time where this soil is used for cultivated crops, close-

Figure 4.—**Pasture on Madison gravelly sandy loam, 6 to 10 percent slopes.**

growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways. Special tillage at optimum soil moisture ranges is needed for satisfactory seedbed preparation. Tillage methods and crop yields are affected by past erosion and by the small areas of included cobbly soils.

This soil is suited to pasture and hay crops. Yields are somewhat affected by past erosion. Capability unit IIIe–5; woodland suitability group 3o7.

MAH—Madison association, hilly. This mapping unit is on broad ridges and in narrow stream valleys. Slopes range from 0 to 35 percent, but on more than 70 percent of the acreage they are 6 to 15 percent. Each mapped area contains Madison soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. This soil has the profile described as representative of the Madison series.

Madison soils and closely similar soils make up about 70 percent of the unit. The rest is soils of minor extent, including Louisa, Riverview, State, and Sylacauga soils and soils that are somewhat similar to this Madison soil but have a yellower subsoil or are more than 50 inches deep over weathered rock.

The Madison and closely similar soils are on uplands. Riverview, State, and Sylacauga soils are on flood plains, terraces, and drainageways.

Most of the acreage is used for pasture and hay crops and woodland. Some areas are cultivated. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

The soils have been extensively cultivated in the past. They are not well suited to cultivation with modern equipment because of the numerous small areas that have unfavorable slopes. A plant cover is needed at least three-fourths of the time in areas of 15 percent slope or less that are used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways.

In most areas slopes are suited to pasture and hay crops. Yields are somewhat affected by past erosion.

The soils are suited to coniferous and deciduous trees. There are no serious soil-related woodland management problems on most of the upland soils. Management in some areas is affected by steep slopes. The woodland is mostly southern pines. Woodland on flood plains, terraces, and drainageways is mostly hardwoods. The bottom land soils have a higher site index than the upland soils. Capability unit IVe–5; woodland suitability group 3o7.

MLS—Madison-Louisa association, steep. This mapping unit is on narrow ridges and narrow stream val-

leys. Slopes range from 0 to 65 percent, but on more than 75 percent of the acreage they are 10 to 35 percent. Each mapped area contains Madison and Louisa soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. The Madison soil has a profile similar to the one described as representative of the Madison series, but the upper part of the subsoil is yellowish red clay loam. The Louisa soil has the profile described as representative of the Louisa series.

Madison and Louisa soils make up about 45 and 30 percent, respectively, of the unit. The rest is soils of minor extent, including Hiwassee, Riverview, State, Sylacauga, and Tallapoosa soils. Other minor soils are loamy upland soils somewhat similar to Madison and Louisa soils but have a significantly higher site index.

The sloping to steep Madison and closely similar soils and Hiwassee soils are on ridgetops. The steep Louisa and Tallapoosa soils are generally on side slopes. Riverview, State, and Sylacauga soils are on flood plains, terraces, and drainageways. The steep soils similar to Madison and Louisa soils that have a higher site index are on narrow toe slopes adjacent to drainageways.

These soils are used extensively for woodland. The woodland on ridges, upper slopes, and lower south-facing slopes is pines and hardwoods. Woodland on lower north-facing slopes, toe slopes, and drainageways is mostly hardwoods. The soils on toe slopes and drainageways have a higher site index than other soils in the mapping unit.

Narrow tracts of Madison and minor soils on ridgetops have no serious soil-related woodland management problems. Woodland management on Madison and Louisa soils on ridge sides is moderately to severely affected by steep slopes. Soils on toe slopes and drainageways do not have serious soil-related management problems, but they are generally separated from primary roads by steep slopes. Consequently, it is difficult to locate access roads to these soils.

These soils are not suited to cultivated crops because of steep slopes. On some ridgetops, slopes are suitable for pasture and hay crops, but these areas are small. Capability unit VIe–5; woodland suitability group 3r8.

Mecklenburg Series

The Mecklenburg series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from chloritic schist. Slopes range from 2 to 10 percent.

In a representative profile the surface layer is reddish brown silt loam about 4 inches thick. The subsoil is red silty clay loam about 20 inches thick. The underlying material is weathered chloritic schist to a depth of 60 inches.

Mecklenburg soils have slow permeability and low available water capacity.

Native forests were mixed hardwoods and pines. Most areas of these soils were cleared for cultivation. Many have been reforested with loblolly pine. The rest are used for cultivated crops, pasture, and hay crops.

Representative profile of Mecklenburg silt loam in an area of Mecklenburg association, rolling, in a forest near Chulafinnee in SE¼NW¼ sec. 13, T. 17 S., R. 9 E.

A1—0 to 4 inches; reddish brown (5YR 4/4) silt loam; moderate medium granular structure; friable; many fine and medium roots; few schist fragments; medium acid; clear wavy boundary.

B2t—4 to 24 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine pores; few weathered schist fragments; moderately thick continuous clay films on surfaces of peds; slightly acid; gradual irregular boundary.

C—24 to 60 inches; chloritic schist saprolite.

The A1 and Ap horizons are dark yellowish brown, dark brown, or dark reddish brown and are 4 to 7 inches thick. They are loam or silt loam. The A horizon is 5 to 15 percent quartz and schist fragments. The B2t horizon is red, yellowish red, or reddish brown. It is clay, clay loam, or silty clay loam. Some pedons contain black manganese concretions or stains in the B2t and C horizons. Reaction ranges from medium acid to slightly acid in all horizons. Solum thickness is 20 to 40 inches.

The clay content of the B2t horizon is slightly less than is defined as the range for the series, but this difference does not alter the usefulness and behavior of these soils.

Mecklenburg soils are geographically associated with Madison and Tatum soils. They are less acid throughout the solum than those soils.

MRR—Mecklenburg association, rolling. This mapping unit is in valleys. Slopes range from 0 to 25 percent, but on more than 75 percent of the acreage they are 2 to 10 percent. Each mapped area contains Mecklenburg soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. The Mecklenburg soil has the profile described as representative of this series.

About 60 percent of this unit is Mecklenburg and closely similar soils. About 40 percent is Fruithurst, Hiwassee, Holston, Madison, Riverview, Sylacauga, and Tatum soils and moderately well drained soils that have a clayey subsoil, slow permeability, and hard bedrock at depths ranging from 10 to 40 inches.

The gently sloping and sloping Mecklenburg and minor soils underlain by bedrock are on uplands. Fruithurst, Hiwassee, Madison, and Tatum soils are generally in the more sloping parts. Holston soils are on foot slopes near some edges of the unit. Riverview and Sylacauga soils are on flood plains and drainageways.

The soils in this unit have been extensively cultivated in the past, but most of the acreage is now used for pasture and hay crops and woodland. Some areas are cultivated. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

The soils are not well suited to cultivation with modern equipment because of the numerous small areas that have unfavorable slopes. Tillage is also affected by the small areas of shallow or eroded soils. A plant cover is needed at least two-thirds of the time in areas of less than 10 percent slope that are used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways.

In most areas slopes are suited to pasture and hay crops. Yields are somewhat affected in the areas of soils

that are shallow over rock.

The upland soils are suited to southern pines, and there are no serious soil-related woodland management problems. The soils on flood plains and drainageways have a higher site index than the upland soils, but management is affected by soil wetness. The woodland is mostly hardwoods. Capability unit IIIe–5; woodland suitability group 4o1.

Ochlockonee Series

The Ochlockonee series consists of deep, well drained soils on river flood plains. These soils formed in sandy alluvial sediment. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown loamy fine sand about 9 inches thick. Below this is 11 inches of dark yellowish brown fine sandy loam, 17 inches of brown fine sandy loam that has yellowish brown mottles, 43 inches of strong brown fine sandy loam that has pale brown mottles, and 24 inches of mottled reddish yellow and light yellowish brown fine sandy loam.

Ochlockonee soils have moderately rapid permeability and medium available water capacity. They are subject to flooding.

Native forests were mostly hardwoods. Most areas have been cleared and are used for cultivated crops, pasture, and hay crops.

Representative profile of Ochlockonee loamy fine sand in a hardwood forest near the Tallapoosa River about 2 miles south of Muscadine in SW¼NW¼ sec. 21, T. 15 S., R. 12 E.

A1—0 to 9 inches; brown (10YR 4/3) loamy fine sand; fine granular structure; loose; many fine medium and large roots; few fine pores; many fine mica flakes; strongly acid; gradual wavy boundary.

C1—9 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; single grained; loose; common fine and medium roots; few fine pores; many fine mica flakes; very strongly acid; gradual wavy boundary.

C2—20 to 37 inches; brown (7.5YR 4/4) fine sandy loam; few fine faint yellowish brown (10YR 5/4) mottles; single grained; loose; common fine and medium roots; few fine pores; many fine mica flakes; very strongly acid; diffuse wavy boundary.

C3—37 to 80 inches; strong brown (7.5YR 5/6) fine sandy loam; few fine faint pale brown (10YR 6/3) mottles; single grained; very friable; few fine and medium roots; common fine pores; many fine mica flakes; very strongly acid; diffuse wavy boundary.

C4—80 to 104 inches; mottled reddish yellow (7.5YR 6/6) and light yellowish brown (10YR 6/4) fine sandy loam; single grained; very friable; very strongly acid.

The A1 horizon is dark yellowish brown or dark brown and is 6 to 12 inches thick. The C horizon is dark yellowish brown, dark brown, yellowish brown, or strong brown. Some pedons have mottles in shades of brown or yellow at depths of more than 40 inches. The texture of the C horizon is mostly fine sandy loam, but some subhorizons are loam or loamy fine sand. There are few to common fine mica flakes in most horizons. Reaction is strongly acid or very strongly acid in all horizons except in the A1 horizon in limed areas.

Ochlockonee soils are geographically associated with Riverview, State, and Sylacauga soils. They contain more sand in most horizons than Riverview soils. They contain more sand and less clay in horizons below the A1 horizon than State and Sylacauga soils.

Oc—Ochlockonee loamy fine sand. This soil is on river flood plains. It has the profile described as representative of the series. Slopes are 0 to 2 percent. Included in mapping are small areas of Riverview and State soils. Also included are small areas where the surface layer is fine sandy loam and a few small areas of overwashed sand.

This soil is well suited to irrigation and to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is good. Shallow-rooted crops incur drought injury during some years.

Wetness limits the use of this soil for cultivated crops. In some places surface drainage is needed to remove runoff from adjacent uplands. Some areas need diversions to reduce floodwater erosion and sedimentation. The selection of crops should be based on their susceptibility to damage by flooding.

This soil is well suited to pasture and hay crops, but yields are somewhat affected by flooding. Capability unit IIw–4; woodland suitability group 1o7.

Riverview Series

The Riverview series consists of deep, well drained soils on flood plains. These soils formed in loamy alluvial sediment. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown loam about 10 inches thick. The subsoil is brown silt loam about 29 inches thick. The underlying material to a depth of 71 inches is 25 inches of brown sandy loam and 7 inches of mottled olive and yellowish brown silt loam.

Riverview soils have moderate permeability and very high available water capacity. They are subject to flooding.

The native vegetation was mostly hardwoods. Some areas are still wooded. Many areas are used for cultivated crops, pasture, and hay crops.

Representative profile of Riverview loam, in an area of Riverview-State-Sylacauga complex, in a hardwood forest near Terrapin Creek in NW¼SW¼ sec. 8, T. 13 S., R. 11 E.

A1—0 to 10 inches; brown (10YR 4/3) loam; weak medium granular structure; friable; common fine and medium roots; many fine pores; very strongly acid; gradual smooth boundary.

B2—10 to 39 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine and medium roots; many fine pores; very strongly acid; gradual smooth boundary.

C1—39 to 64 inches; brown (7.5YR 4/4) sandy loam; few medium distinct yellowish brown (10YR 5/4) mottles; friable; very strongly acid; gradual smooth boundary.

C2—64 to 71 inches; mottled olive (5Y 5/4) and yellowish brown (10YR 5/4) silt loam.

The A1 horizon is brown, dark brown, or yellowish brown and is 4 to 10 inches thick. It is silt loam, loam, or fine sandy loam. The B horizon is dark brown, dark yellowish brown, or yellowish brown or very dark grayish brown. Some pedons have brown mottles in the lower part of the B horizon. This horizon is silt loam or loam. The C horizon has colors similar to those in the B horizon. It is silt loam, loam, sandy loam, or gravelly sandy loam. The C horizon in many pedons has mottles in shades of brown and gray. Reaction is strongly acid or very strongly acid in all horizons except in the A horizon in limed areas. Thickness of the solum ranges from 26 to 40 inches.

Riverview soils are geographically associated with Ochlockonee, State, and Sylacauga soils. They contain less sand in most horizons than Ochlockonee soils. They contain less clay below the A1 horizon than State and Sylacauga soils.

Re—Riverview loam. This soil is on river flood plains. Slopes are 0 to 2 percent. Included in mapping are small areas of Ochlockonee, State, and Sylacauga soils and areas where the surface layer is silt loam or fine sandy loam.

Drainage is needed to remove the ponded water and the runoff from adjacent uplands. In some areas diversions are needed to reduce floodwater erosion and sedimentation. The selection of crops is based on the susceptibility of the crop to damage by flooding.

This soil is well suited to irrigation and to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is good. Yields of pasture and hay crops are somewhat affected by flooding. Capability unit IIw–2; woodland suitability group 1o7.

Rs—Riverview-State-Sylacauga complex. This mapping unit is on creek flood plains and terraces. Slopes are 0 to 2 percent. The Riverview and State soils have the profiles described as representative of the respective series. The Sylacauga soils have a profile similar to the one described as representative of the series, but the solum is thinner.

The Riverview soil makes up about 35 percent of the unit, the State soil 25 percent, and the Sylacauga soil 10 percent. The rest is soils of minor extent. Included in mapping are small areas on flood plains of Ochlockonee soils and somewhat poorly drained soils that are somewhat similar to the Riverview soils. Also included are small areas on terraces of moderately well drained soils that are somewhat similar to State soils.

The Riverview soil and the less extensive Ochlockonee and somewhat poorly drained soils are on flood plains. The State soil and the less extensive moderately well drained soils are on low stream terraces. The Sylacauga soil is in depressions in stream terraces.

Drainage is needed to remove the ponded water and the runoff from adjacent uplands. Subsurface drainage is needed to lower the seasonal water table. The selection of crops is based on the susceptibility of the crop to damage by flooding.

The soils in this unit are well suited to irrigation and to crops commonly grown in the county. They are well suited to pasture and hay crops. Most of the acreage is used for cultivated crops, pasture and hay crops, and woodland. Crop response to lime and fertilizer is good.

This mapping unit is suited to coniferous and deciduous trees. There are no serious soil-related management problems. Management of the Sylacauga soil, however, is limited by wetness. Capability unit IIw–2; woodland suitability group 1o7.

State Series

The State series consists of deep, well drained soils on stream terraces. These soils formed in loamy alluvial sediment. Slopes are 0 to 2 percent.

In a representative profile the surface layer is loam about 6 inches thick. The upper 2 inches is brown, and the lower 4 inches is dark yellowish brown. The subsoil is about 49 inches thick. The upper 21 inches is yellowish brown loam; the next 13 inches is mottled yellowish brown, strong brown, and light yellowish brown silt loam; and the lower 15 inches is mottled yellowish brown silty clay loam. The underlying material is mottled yellowish brown sandy loam to a depth of 60 inches.

State soils have moderate permeability and medium to high available water capacity. They are subject to flooding.

Native forests were mostly hardwoods. Some areas are still wooded. Many areas are used for cultivated crops, pasture, and hay crops.

Representative profile of State loam in an area of Riverview-State-Sylacauga complex in a hardwood forest near Shoal Creek, about one-fourth mile east of Pine Glen Recreational Area in SE¼NW¼ sec. 16, T. 15 S., R. 10 E.

A11—0 to 2 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; many fine and medium and few large roots; common fine pores; very strongly acid; gradual smooth boundary.

A12—2 to 6 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; many fine and medium and few large roots; common fine pores; very strongly acid; clear smooth boundary.

B21t—6 to 27 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine pores; thin clay films on surfaces of some peds; very strongly acid; gradual wavy boundary.

B22t—27 to 40 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and light yellowish brown (10YR 6/4) silt loam; moderate coarse and medium subangular blocky structure; friable; common fine and medium roots; common fine pores; thin clay films on surfaces of some peds; very strongly acid; gradual wavy boundary.

B3—40 to 55 inches; mottled yellowish brown (10YR 5/6 and 5/4) silty clay loam; weak coarse subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

C—55 to 60 inches; mottled yellowish brown (10YR 5/6 and 5/4) sandy loam; friable; very strongly acid.

The A1 horizon is yellowish brown, dark yellowish brown, or dark brown and is 6 to 12 inches thick. It is silt loam, loam, or sandy loam. The B2t horizon is yellowish brown or strong brown and is generally mottled in the lower part in shades of yellow, brown, and red. It is loam, silt loam, clay loam, sandy clay loam, or silty clay loam. Some pedons contain a B3 horizon that has colors and textures similar to those of the B2t horizon. The C horizon is sandy loam or gravelly sandy loam. Reaction is strongly acid or very strongly acid in all horizons except in the A1 horizon in limed areas. Solum thickness is 40 to 60 inches.

State soils are geographically associated with Ochlockonee, Riverview, and Sylacauga soils. They contain less sand and more clay in most horizons than Ochlockonee soils. They contain more clay below the A1 horizon than Riverview soils. They lack the gray colors in the B2t horizon that are common to Sylacauga soils.

St—State fine sandy loam. This soil is on low river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is fine sandy loam and the subsoil is sandy clay loam. Slopes range from 0 to 2 percent. Included in mapping are small areas of Ochlockonee, Riverview, and Sylacauga soils. Also included are small areas of soils that are similar to State soils but have a subsoil that is 20 to 40 inches thick.

This soil is well suited to irrigation and to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is good.

Occasional flooding is a slight limitation to the use

of this soil for cultivated crops in some areas. The soil is well suited to pasture and hay crops. Capability unit IIw–6; woodland suitability group 1o7.

Sylacauga Series

The Sylacauga series consists of deep, somewhat poorly drained soils in depressions in stream terraces. These soils formed in loamy alluvial sediment. Slopes are 0 to 2 percent.

In a representative profile the surface layer is about 7 inches thick. It is dark yellowish brown silt loam that has reddish brown mottles. The subsoil extends to a depth of 65 inches or more. The upper 9 inches is mottled light brownish gray and yellowish brown clay loam, and the lower 49 inches is mottled gray and yellowish brown clay loam.

Sylacauga soils have slow permeability and medium to high available water capacity. They are subject to flooding.

Native forests were mostly hardwoods. A few areas are still wooded. Most areas are used for pasture and hay crops.

Representative profile of Sylacauga silt loam in a pasture near the Tallapoosa River about 1½ miles northwest of Lecta in SW¼NW¼ sec. 26, T. 16 S., R. 11 E.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam that has few reddish brown (5YR 4/4) mottles; moderate medium granular structure; friable; common fine and medium roots; many fine pores; very strongly acid; clear smooth boundary.

B21t—7 to 16 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; many fine pores; moderately thick clay films on surfaces of peds; very strongly acid; gradual smooth boundary.

B22t—16 to 65 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) clay loam; moderate angular blocky and prismatic structure; firm; few fine roots; many fine pores; moderately thick brown (7.5YR 5/4) clay films on surfaces of peds; very strongly acid.

The Ap and A1 horizons are dark yellowish brown, dark brown, dark grayish brown, or grayish brown and are 4 to 20 inches thick. The A1 horizon in some places has red, brown, or gray mottles. It is silt loam, loam, or fine sandy loam. Some pedons contain a B1 horizon that is silt loam or fine sandy loam. The B2t horizon is mottled yellowish brown or strong brown and gray or light brownish gray. It is clay loam, silty clay loam, or silt loam. There are few to common fine mica flakes in the B2t horizon in most pedons. Reaction ranges from medium acid to very strongly acid in all horizons. Solum thickness ranges from 40 to 70 inches.

Sylacauga soils are geographically associated with Ochlockonee, Riverview, and State soils. They contain less sand and more clay than Ochlockonee soils. They contain more clay below the A1 horizon than Riverview soils. They have gray colors in the B2t horizon that are lacking in State soils.

Sy—Sylacauga silt loam. This soil is on river terraces in depressions. It has the profile described as representative of the series. Slopes are 0 to 2 percent.

Included in mapping are small areas of Holston and State soils. Also included are small areas of soils that are somewhat similar to Sylacauga soils but have a subsoil of silt loam or are moderately well drained and small areas of soils that have a surface layer of loam or sandy loam.

The use of this soil for cultivated crops and woodland is limited by wetness. Surface drainage is needed to remove ponded water and the runoff from adjacent uplands, and subsurface drainage is needed to lower the seasonal water table. Only crops that tolerate wetness should be selected.

If adequately drained, this soil is well suited to cultivated crops and pasture and hay crops commonly grown in the county. It is suited to coniferous and deciduous trees. Most of the acreage is used for pasture and hay crops or woodland. Crop response to lime and fertilizer is good. Capability unit IIIw–2; woodland suitability group 2w8.

Tallapoosa Series

The Tallapoosa series consists of shallow, well drained soils on uplands. These soils formed in material weathered from slate. Slopes range from 10 to 55 percent.

In a representative profile the surface layer is dark yellowish brown gravelly silt loam about 4 inches thick. The subsoil is strong brown silt loam about 9 inches thick. The underlying material is weathered slate to a depth of about 40 inches.

Tallapoosa soils have moderate permeability and very low available water capacity.

Native forests were mixed hardwoods and pines. Practically all areas are still wooded.

The Tallapoosa soils in Cleburne County are mapped only with Tatum and Fruithurst soils.

Representative profile of Tallapoosa gravelly silt loam in an area of Tatum-Tallapoosa-Fruithurst association, steep, in a pine plantation about 2½ miles north of Five Points in SE¼SW¼ sec. 23, T. 16 S., R. 9 E.

O1—1 inch to 0; hardwood leaf residue.

A1—0 to 4 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; moderate medium granular structure; friable; common fine medium and large roots; common quartz and slate fragments; very strongly acid; clear smooth boundary.

B2t—4 to 13 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine medium and large roots; common pores; thin clay films on surfaces of peds; few slate fragments; very strongly acid; clear irregular boundary.

C1—13 to 20 inches; highly weathered slate saprolite that has yellowish red (5YR 5/6) clay loam in cracks; very strongly acid.

C2—20 to 40 inches; slate saprolite.

The A1 horizon is dark yellowish brown, dark brown, or yellowish brown and is 2 to 5 inches thick. It is gravelly loam, gravelly sandy loam, or gravelly silt loam. The B2t horizon is yellowish red, strong brown, or yellowish brown and is 4 to 10 inches thick. It is clay loam, silt loam, or loam. The A1 and B2t horizons are 10 to 30 percent quartz and slate fragments. Reaction is strongly acid or very strongly acid in all horizons. Solum thickness ranges from 6 to 20 inches. These soils contain less mica than is defined as the range for the series, but this difference does not alter their usefulness and behavior.

Tallapoosa soils are geographically associated with Fruithurst and Tatum soils. They have a thinner solum than those soils.

Tatum Series

The Tatum series consists of moderately deep, well drained soils on uplands. These soils formed in mate-

rial weathered from slate. Slopes range from 6 to 30 percent.

In a representative profile the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is red clay loam about 21 inches thick. The underlying material is highly weathered slate to a depth of about 40 inches.

Tatum soils have moderate permeability and low to medium available water capacity.

Native forests were mixed hardwoods and pines. Most areas are still wooded. Many areas were cleared for cultivation but have been reforested with loblolly pines. Cleared areas are used mainly for cultivated crops, pasture, and hay crops.

Representative profile of Tatum loam in an area of Tatum-Tallapoosa-Fruithurst association, steep, in a forest about 1 mile north of Five Points in NE¼SE¼ sec. 27, T. 16 S., R. 9 E.

A1—0 to 5 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; common fine medium and large roots; few quartz and slate fragments; strongly acid; clear smooth boundary.

B2t—5 to 26 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common pores; few slate fragments; moderately thick continuous clay films on surfaces of peds; strongly acid; gradual wavy boundary.

C—26 to 40 inches; highly weathered slate saprolite.

The A1 horizon is dark yellowish brown, dark brown, or very dark grayish brown and is 3 to 5 inches thick. It is loam, silt loam, gravelly loam, or gravelly silt loam. The Ap horizon is generally redder and has more clay than the A1 horizon. The A1 and Ap horizons are 5 to 25 percent quartz and slate fragments. The B2t horizon is red clay, clay loam, silty clay, or silty clay loam. Reaction is strongly acid or very strongly acid in all horizons except in the Ap horizon in limed areas. Solum thickness ranges from 25 to 50 inches.

Tatum soils are geographically associated with Fruithurst, Mecklenburg, and Tallapoosa soils. They are not so yellow as Fruithurst soils. They are more acid throughout the solum than Mecklenburg soils. They have a thicker solum than Tallapoosa soils.

TfC—Tatum-Fruithurst complex, 6 to 10 percent slopes. This mapping unit is on intermediate to broad ridgetops. These soils were mapped together because individual tracts were too small to be delineated on soil maps. The Tatum soil has a profile similar to the one described as representative for the Tatum series, but the subsoil is clay. The Fruithurst soil has a profile similar to the one described as representative of the Fruithurst series, but the surface layer is silt loam.

Tatum and Fruithurst soils each make up about 40 percent of the unit. The rest is soils of minor extent, including small areas of Riverview and Sylacauga soils in narrow drainageways and small areas of Tallapoosa soils on the side slopes. Also included are small areas of soils that are gently sloping or strongly sloping.

These soils are suited to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

A plant cover is needed at least two-thirds of the time in areas that are used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways. Special tillage at optimum soil moisture ranges is needed for satisfactory seedbed preparation. Crop yields are affected by past erosion.

These soils are suited to pasture and hay crops. Yields are somewhat affected by past erosion. Capability unit IIIe–5; woodland suitability group 3o1.

TFH—Tatum-Fruithurst association, hilly. This mapping unit is on broad ridges and in narrow stream valleys. Slopes range from 0 to 35 percent, but on more than 60 percent of the acreage they are 6 to 15 percent. Each area contains Tatum and Fruithurst soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but the proportionate extent of each soil differs somewhat in each area. The Tatum soil has a profile similar to the one described as representative of the Tatum series, but depth to weathered rock is about 44 inches. The Fruithurst soil has the profile described as representative of the Fruithurst series.

Tatum and Fruithurst soils each make up about 35 percent of the acreage. The rest is soils of minor extent, including Riverview, State, Sylacauga, and Tallapoosa soils.

Tatum and Fruithurst soils are on uplands. The Riverview, State, and Sylacauga soils are on flood plains, terraces, and drainageways. Tallapoosa soils are on the more sloping parts of the mapping unit.

Most of the acreage is used for pasture and hay crops and woodland. Some areas are cultivated. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

The soils in this unit have been extensively cultivated in the past. They are not well suited to cultivation with modern equipment because of the numerous small areas that have unfavorable slopes. Tillage is also affected by past erosion. A plant cover is needed at least three-fourths of the time in areas of less than 15 percent slope for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways.

These soils are suited to coniferous trees. There are no serious soil-related woodland management problems on most of the upland soils. Management of some areas is affected by steep slopes. Woodland on the upland is mostly southern pines. Soils on flood plains, terraces, and drainageways have a higher site index than the upland soils. Woodland on these soils is mostly hardwoods.

Most areas of these soils have slopes that are suited to pasture and hay crops. Yields are somewhat affected by past erosion. Capability unit IVe–5; woodland suitability group 3o1.

TTS—Tatum-Tallapoosa-Fruithurst association, steep. This mapping unit is on narrow ridges and in stream valleys. Slopes range from 2 to 65 percent, but on more than 70 percent of the acreage they are 15 to 45 percent. Each mapped area contains Tatum, Tallapoosa, and Fruithurst soils and one or more soils of minor extent. The pattern of these soils is fairly uniform, but

the proportionate extent of each soil differs somewhat in each area. Tatum and Tallapoosa soils have the profiles described as representative of Tatum and Tallapoosa series. The Fruithurst soil has a profile similar to the one described as representative of the Fruithurst series, but the subsoil is yellowish red.

Tatum and Tallapoosa soils each make up about 30 percent of the acreage, and Fruithurst soils about 20 percent. The rest is soils of minor extent, including Riverview, State, and Sylacauga soils and soils that are somewhat similar to Tatum, Tallapoosa, and Fruithurst soils but have a significantly higher site index.

Tatum and Fruithurst soils are on ridgetops and the upper parts of ridge side slopes. Tallapoosa soils are generally on lower parts. Riverview, State, and Sylacauga soils are on flood plains, terraces, and drainageways. The soils similar to Tatum, Tallapoosa, and Fruithurst that have a high site index are on steep, narrow toe slopes.

These soils are used extensively for woodland. Woodland on the ridges and the upper and lower south-facing slopes is pines and hardwoods. Woodland on the north-facing slopes, toe slopes, and drainageways is mostly hardwoods.

Narrow tracts of Tatum and Fruithurst soils on ridgetops have no serious soil-related woodland management problems. Woodland management on the sides of ridges is moderately to severely affected by steep slopes (fig. 5). Soils on toe slopes and drainageways do not have serious soil-related management problems, but they are generally separated from main roads by steep slopes. Consequently, it is difficult to locate access roads to these soils.

These soils are not suited to cultivated crops because of steep slopes. Soils on some ridgetops have slopes suitable for pasture and hay crops, but these areas are small. Capability unit VIe–5; woodland suitability group 4r2.

Waynesboro Series

The Waynesboro series consists of deep, well drained soils on high stream terraces. These soils formed in old alluvial sediment. Slopes range from 2 to 25 percent.

In a representative profile the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is about 70 inches thick. The upper 20 inches is yellowish red clay loam, and the lower 50 inches is dark red clay that has yellowish red mottles. The underlying material, to a depth of about 96 inches, is red sandy clay loam that has strong brown mottles. Below this to a depth of 110 inches it is red gravelly clay loam that has strong brown mottles.

Waynesboro soils have moderate permeability and medium to high available water capacity.

Native forest was mixed hardwoods and pines. Most areas are used for cultivated crops, pasture, and hay crops. Some areas that were cleared have been reforested with loblolly pines.

Representative profile of Waynesboro fine sandy loam in an area of Waynesboro-Holston complex, 2 to 10 percent slopes, in a pine plantation near the Tallapoosa River about 1¼ miles southeast of Bell Mills in SW¼NE¼ sec. 26, T. 16 S., R. 11 E.

Ap—0 to 5 inches; brown (7.5YR 4/4) fine sandy loam; moderate medium granular structure; friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

B21t—5 to 25 inches; yellowish red (5YR 4/6) clay loam; moderate fine subangular blocky structure; friable; few fine and medium roots; common fine pores; thin continuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

B22t—25 to 75 inches; dark red (10YR 3/6) clay that has yellowish red (5YR 4/6) mottles; strong fine and medium subangular blocky structure; friable; few fine roots; thick continuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

C1—75 to 96 inches; red (2.5YR 4/8) sandy clay loam that has strong brown (7.5YR 5/6) mottles; friable; very strongly acid; gradual wavy boundary.

Figure 5.—**Stand of pines at midslope on Tatum-Tallapoosa-Fruithurst association, steep. Steep slope affects management in a large part of the woodland in Cleburne County.**

C2—96 to 110 inches; red (2.5YR 4/8) gravelly sandy clay loam that has strong brown (7.5YR 5/6) mottles; friable; very strongly acid.

The Ap horizon is brown, dark yellowish brown, or yellowish brown and is 4 to 6 inches thick. It is fine sandy loam or loam. The B21t horizon is yellowish red and is 5 to 25 inches thick. It is clay or clay loam. The B22t horizon is red or dark red clay. The B22t horizon in some pedons has yellowish red, strong brown, or yellowish brown mottles. Reaction is strongly acid or very strongly acid in all horizons but the Ap horizon in limed areas.

Waynesboro soils are geographically associated with Holston soils. They have redder colors in the B2t horizon than Holston soils.

WaD—Waynesboro fine sandy loam, 10 to 25 percent slopes. This soil is on high stream terraces, known locally as "bench land." It has a profile similar to the one described as representative of the Waynesboro series, but the upper part of the subsoil is clay. Included in mapping are small areas of Fruithurst, Hiwassee, Holston, and Tatum soils. Also included are small areas where the surface layer is loam.

This soil is suited to pasture and hay crops. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is moderate. The hazard of erosion is moderate to high. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

A plant cover is needed at least three-fourths of the time in areas used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways. Capability unit IVe–1; woodland suitability group 3o7.

WhC—Waynesboro-Holston complex, 2 to 10 percent slopes. This mapping unit is on high stream terraces, locally known as "bench land." These soils are mapped together because individual areas are too small to be delineated on soil maps. The Waynesboro soil has the profile described as representative of the Waynesboro series. The Holston soil has a profile similar to the one described as representative of the Holston series, but the subsoil is clay loam.

Waynesboro and Holston soils each make up about 35 percent of the acreage. The rest is soils of minor extent, including small areas of Fruithurst, Hiwassee, Sylacauga, and Tatum soils. Also included are small narrow areas, or bench sides, where slopes are 10 to 25 percent.

These soils are suited to irrigation and to crops commonly grown in the county. Most of the acreage is used for cultivated crops, pasture, and hay crops. Crop response to lime and fertilizer is good. The hazard of erosion is moderate. There are periods during the growing season when soil moisture is less than adequate for optimum plant growth.

A plant cover is needed at least two-thirds of the time in areas used for cultivated crops, close-growing grain crops, and orchard crops. Also needed for erosion control are terraces, contour stripcropping, contour farming, cover crops, minimum tillage, plant residue, and grassed waterways. Capability unit IIIe–1; woodland suitability group 3o7.

Crops and Pasture [2]

About 10 percent of the acreage of Cleburne County is used for crops and pasture (*12*). Corn is the principal crop (*2*). Fescue and bermudagrass are the principal pasture grasses.

This section explains the capability classification system, in which soils are grouped according to their suitability for most kinds of farming. It defines the capability groups in Cleburne County and suggests the management needed for crops and pasture. It also shows the predicted average annual yields for the principal crops.

Specific management needs for individual soils are given for each mapping unit in the section "Descriptions of the Soils."

Capability Grouping

Some readers, particularly those who farm on a large scale, may find it practical to use and manage some of the different kinds of soil on their farms. These readers can make good use of the capability classification system, a grouping that shows, in a general way, the suitability of soils for most kinds of farming.

The grouping is based on limitations of soils when used for field crops, the risk of damage when they are farmed, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels, the class, the subclass, and the unit. The eight classes in the capability system and the subclasses and units in Cleburne County are described in the list that follows. The unit designation for each soil is given in the section "Descriptions of the Soils."

Class I. Soils have few limitations that restrict their use (no subclasses). (No Class I soils in Cleburne County.)

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

Subclass IIe. Soils subject to moderate erosion unless protected.

Unit IIe–2. Deep, well drained, gently sloping soils on high river terraces; loamy surface layer and loamy subsoil.

Subclass IIw. Soils moderately limited for cultivation by excess water.

[2] LEWIS D. WILLIAMS, conservation agronomist, Soil Conservation Service, helped prepare this section.

Unit IIw–2. Deep, well drained or somewhat poorly drained, nearly level soils on flood plains or low stream terraces; loamy surface layer and loamy subsoil.

Unit IIw–4. Deep, well drained, nearly level soils on river flood plains; sandy surface layer and sandy underlying layer; subject to flooding.

Unit IIw–6. Deep, well drained, nearly level soils on low river terraces; loamy surface layer and loamy subsoil; subject to flooding.

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

Subclass IIIe. Soils subject to severe erosion if cultivated and not protected.

Unit IIIe–1. Deep, well drained, sloping soils on high stream terraces; loamy surface layer and clayey or loamy subsoil.

Unit IIIe–2. Deep, well drained, gently sloping to strongly sloping soils on uplands; loamy surface layer and loamy subsoil.

Unit IIIe–5. Moderately deep, well drained, sloping soils on uplands; loamy surface layer and clayey or loamy subsoil.

Subclass IIIw. Soils severely limited for cultivation by excess water.

Unit IIIw–2. Deep, somewhat poorly drained, nearly level soils in low stream terrace depressions; loamy surface layer and loamy subsoil; subject to flooding.

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

Subclass IVe. Soils subject to very severe erosion if cultivated and not protected.

Unit IVe–1. Deep or moderately deep, well drained, sloping or strongly sloping soils on uplands; loamy surface layer and clayey subsoil.

Unit IVe–5. Moderately deep, well drained, sloping and strongly sloping soils on uplands; loamy surface layer and clayey or loamy subsoil.

Class V. Soils are subject to little or no erosion, but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife. (No Class V soil in Cleburne County.)

Class VI. Soils have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Subclass VIe. Soils severely limited, chiefly by risk of erosion unless protective cover is maintained.

Unit VIe–5. Moderately deep and shallow, well drained, steep soils on uplands; loamy surface layer and clayey or loamy subsoil.

Class VII. Soils have very severe limitations that make them unsuitable for cultivation and restrict their use largely to range, woodland, or wildlife food and cover.

Subclass VIIs. Soils very severely limited by stones in and on the soil.

Unit VIIs–6. Moderately deep, well drained, steep soils on mountains; loamy, stony surface layer and loamy subsoil.

Class VIII. Soils and landforms have limitations that preclude their use for commercial crops and restrict their use to recreation, wildlife habitat, water supply, or to esthetic purposes. (No Class VIII soils in Cleburne County.)

General Principles of Soil Management

Good management of crops results in rapid growth, provides some protection from erosion, increases the amount of crop residue to be returned to the soil, and improves yields.

The management needed on all cropped soils includes the following:

Lime and fertilizer.—Lime and fertilizer needs should always be determined by soil tests. All soils in Cleburne County respond well to applications of lime and fertilizer.

Crop varieties.—Those varieties that have been tested and recommended for the area by the Auburn University Experiment Station should be used.

Land preparation.—Seedbeds should be adequately prepared for the crop grown. Preparing seedbeds too far in advance of planting results in excessive soil erosion.

Planting.—Crops should be planted by a suitable method, at the proper rate, and at the right time.

Weed, insect, and disease control.—Controlling crop pests is essential to growing strong, healthy crops.

Conservation practices should be specifically planned according to the soil and the sequence of crops grown. Nearly level soils generally do not require extensive management, but strongly sloping soils generally require several practices to effectively reduce erosion and runoff.

Common conservation practices on sloping upland soils include the following:

Conservation cropping systems.—Cropping systems that include close-growing sod crops are very effective in controlling erosion, reducing runoff, reducing problems from crop pests, and increasing crop yields.

Contour farming.—Planting in contour rows and tilling on the contour result in slower movement of runoff. As a result, the water has more time to be absorbed by the soil.

Minimum tillage.—Reducing the number of tillage operations results in less compaction. Planting in narrow seedbeds and leaving residue on the rest of the soil surface are very effective in reducing erosion and runoff.

Terraces.—Properly constructed terraces are effective in reducing erosion. Well established grassed waterways or grassed disposal areas are essential for safe disposal of runoff at terrace outlets. Underground tile outlets can be used in some soils where waterways are difficult to establish and maintain.

Contour stripcropping.—Alternate strips of cultivated crops and close-growing crops that follow the contour are very effective in controlling erosion.

Grassed waterways.—Natural drains or constructed outlets require a cover of perennial, sod-forming grass. Well established waterways prevent gullies from forming in areas where concentrated runoff leaves the field.

Crop residue management.—Crop residue should be shredded and left on the surface until land preparation for the next crop.

Cover crops.—Soils that are left bare after harvesting should be planted to cover crops to prevent erosion and to provide residue to be returned to the soil.

Bottom land soils need conservation practices that control water. Common practices include the following:

Surface drainage systems.—Open drainage ditch systems remove surface water that is seasonally ponded or drains slowly.

Tile drainage systems.—These systems are effective in lowering the seasonal water table in imperfectly drained soils.

Diversions.—Diversions divert runoff from uplands to ditch drainage systems. Diversions can be used on some soils that are subject to flooding to reduce floodwater erosion and sediment deposition.

Crop residue management.—Crop residue should be incorporated into the soil soon after harvesting if the soil is subject to flooding. This practice reduces accumulations of flooding crop residue.

Management is very important in establishing and maintaining pasture and hayland. The following management applies to all soils used for grassland:

Proper fertilization.—Lime and fertilizer should be applied according to soil test analysis.

Rotational grazing.—Removing livestock from pasture to allow time for regrowth increases the life of the stand.

Proper grazing or cutting heights.—A good ground cover should be maintained at all times by rotating the grazing or by adjusting stocking rates. Plants in overgrazed pasture die or become infested with weeds.

Weed control.—Weeds can be controlled by mowing or spraying with recommended herbicides.

Scattering droppings.—Droppings scattered on heavily grazed pasture increase the utilization of forage.

Predicted Yields

Table 3 lists the predicted yields of the principal crops grown on the nonirrigated soils in the county. The yields are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The predicted yields are average yields per acre that can be expected under a level of management that produces the highest economic returns. Under this level of management—

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems, or both, are installed.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Insects, disease, and weeds are consistently controlled.
6. Fertilizer is applied according to soil tests and crop needs.
7. Suitable crop varieties are planted at recommended seeding rates.

Woodland [3]

Originally Cleburne County was mainly woodland. Many acres have been cleared for cultivation, but a large part of the acreage has been reforested and now trees cover about 85 percent of the county (*6*).

Good stands of commercial trees can be produced in the woodlands of the county. Needleleaf forest types are most common on uplands, and broadleaf types predominate in the bottoms along the rivers and creeks. Desirable trees need to be established on approximately 94,000 acres and some type of tree improvement is needed on 70,800 acres (*10*).

The value of woodland in the county for wood products is substantial, though it is below its potential. Other values include grazing, wildlife, recreation, natural beauty, and conservation of soil and water. This section explains how soils affect tree growth and woodland management in the county.

Table 4 lists the woodland suitability groups in each mapping unit, along with some of the characteristics that are useful in identifying the groups on the ground. In the first column the soils are listed by name and map symbol. The second and third columns show the major woodland suitability groups in the unit and the average proportion of each. Woodland managers who want to treat each mapping unit with only one type of management should use the woodland suitability group listed first because it is dominant in the unit. The woodland suitability groups listed for each mapping unit in the section "Descriptions of the Soils" refer to the dominant woodland suitability group in table 4. The fourth column lists the major soil series in each woodland suitability group. The last column gives a brief topographic description of the landscape position of each woodland suitability group.

Table 5 lists woodland interpretations for each woodland suitability group. In planning woodland management, refer to table 4 to determine which woodland suitability groups are in the mapping unit and then to table 5 for interpretations for each woodland suitability group.

The first column in table 5 lists the woodland suitability groups. Each group is made up of soils that are suited for the same species of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity.

Each woodland suitability group is identified by a three-part symbol. The first part of the symbol indicates the relative productivity of the soil. The numeral 1 means very high; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *x* shows that the main limitation is stoniness or rockiness; *w* shows that excessive water in or on the soil is the chief limitation; *r* shows that the soils have steep slopes; and *o* shows that the soils have no significant restrictions or limitations for woodland use or management. The third element in the symbol indicates the degree of management problems and the general

[3] JERRY L. JOHNSON, woodland conservationist, Soil Conservation Service, helped prepare this section.

TABLE 3.—*Predicted yields per acre of principal crops*

[Yields are those that can be expected under optimum management practices. Dashed lines indicate that the crop is not commonly grown or that yields are too variable for estimates to be made]

Soil	Corn	Cotton [1]	Soybeans [1]	Wheat [1]	Grain sorghum [1]	Fescue and clover pasture	Coastal bermuda hay	Apples [1]
	Bu	*Lb lint*	*Bu*	*Bu*	*Bu*	*AUM* [2]	*Tons*	*Bu*
Cheaha association, steep								
Hiwassee-Gwinnett association, hilly				25	45	6.0	4.0	
Holston loam, 2 to 6 percent slopes	100	800	35	35	50	8.0	5.0	
Holston-Allen association, rolling				30	40	7.0	4.0	
Madison gravelly sandy loam, 6 to 10 percent slopes	60	500	30	30	50	6.5	4.5	300
Madison association, hilly				25	40	5.5	4.0	300
Madison-Louisa association, steep								
Mecklenburg association, rolling				25	45	6.0	4.0	
Ochlockonee loamy fine sand	80	700	40	30	55	8.0	6.0	
Riverview loam	90	800	40	35	60	9.0	6.0	
Riverview-State-Sylacauga complex	85	800	40	35	60	9.0	6.0	
State fine sandy loam	110	850	45	40	65	9.0	6.0	
Sylacauga silt loam			30		45	7.5		
Tatum-Fruithurst complex, 6 to 10 percent slopes	60	450	25	30	50	6.5	4.0	250
Tatum-Fruithurst association, hilly				25	40	5.5	3.5	250
Tatum-Tallapoosa-Fruithurst association, steep								
Waynesboro fine sandy loam, 10 to 25 percent slopes	65	450	30	35	45	6.0	3.5	
Waynesboro-Holston complex, 2 to 10 percent slopes	70	600	30	35	50	7.0	4.0	

[1] The acreage currently grown in the county is small or insignificant.

[2] AUM stands for animal-unit-month. The figures represent the number of months that 1 acre will provide grazing for one animal (1,000 pounds live weight), or the number of months the pasture can be grazed multiplied by the number of animal units 1 acre will support.

suitability of the soils for certain types of trees. Numerals 1, 2, and 3 indicate that limitations are slight, moderate, and severe, respectively, and that the soils are best suited for needleleaf trees. Numerals 7 and 8 indicate that limitations are slight and moderate, respectively, and that the soils are suited for needleleaf and broadleaf trees.

Table 5 shows ratings for common problems in woodland management. These problems are defined in the following paragraphs.

Erosion hazard refers to the potential hazard of soil losses in well managed woodland. The hazard is *slight* if expected soil losses are small; *moderate* if some soil losses are expected and care is needed during logging and construction to reduce these losses; and *severe* if special methods of operation are necessary for preventing excessive soil losses.

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting trees. In Cleburne County soil characteristics having the most limiting effect are drainage, depth to the water table, slope, and stones on the surface. The limitation is *slight* if there is no restriction in the kind of equipment or in the time of year it is used; *moderate* if some difficulty is encountered with most equipment or if the use of equipment is restricted for less than 3 months of the year; and *severe* if special equipment is needed and its use is restricted for more than 3 months of the year.

TABLE 4.—*Woodland suitability groups*

Mapping units and symbols	Woodland suitability groups in mapping unit	Characteristics of woodland suitability groups		
		Proportionate extent of soils in mapping unit [1]	Soils	Topographic location and dominant slope range
		Percent		
Cheaha association, steep: CES.	4x2	50	Cheaha	Mountaintops, upper and mid mountainsides, 15 to 45 percent slopes.
	4r3	30	Minor upland soils	Lower slopes, 25 to 65 percent slopes.
	(2)	15		Rock cliffs, piles of broken rock (midslope).
	1o7	5	Minor bottom land soils	Narrow drainageways, 6 to 15 percent slopes.
Hiwassee-Gwinnett association, hilly: HGH.	3o7	80	Hiwassee, Gwinnett	Uplands, 2 to 15 percent slopes.
	3r8	10	Gwinnett, minor upland soils.	Uplands, 15 to 35 percent slopes.
	1o7	10	Minor bottom land soils	Narrow drainageways, stream flood plains and terraces, 0 to 6 percent slopes.
Holston loam, 2 to 6 percent slopes: HoB.	3o7	100	Holston	Stream terraces.
Holston-Allen association, rolling: HAR.	3o7	80	Holston, Allen	Uplands, 2 to 15 percent slopes.
	4r2	10	Minor upland soils	Uplands, 15 to 35 percent slopes.
	2w8	10	Minor bottom land soils	Narrow drainageways, 0 to 4 percent slopes.
Madison gravelly sandy loam, 6 to 10 percent slopes: MaC.	3o7	100	Madison	Uplands.
Madison association, hilly: MAH.	3o7	70	Madison	Uplands, 6 to 15 percent slopes.
	3r8	20	Madison, minor upland soils.	Uplands, 15 to 35 percent slopes.
	1o7	10	Minor bottom land soils	Narrow drainageways, stream flood plains and terraces, 0 to 6 percent slopes.
Madison-Louisa association, steep: MLS.	3r8	50	Madison, Louisa	Mid and upper slopes, 15 to 35 percent slopes.
	3o7	20	Madison	Ridges and upper slopes, 6 to 15 percent slopes.
	4r3	15	Louisa	Lower side slopes, 35 to 60 percent slopes.
	1o7	15	Minor bottom land soils	Narrow drainageways and stream flood plains, 0 to 10 percent slopes.
Mecklenburg association, rolling: MRR.	4o1	90	Mecklenburg	Uplands, 2 to 15 percent slopes.
	2w8	10	Minor bottom land soils	Narrow drainageways, 0 to 4 percent slopes.
Ochlockonee loamy fine sand: Oc.	1o7	100	Ochlockonee	Flood plains.
Riverview loam: Re.	1o7	100	Riverview	Flood plains.
Riverview-State-Sylacauga complex: Rs.	1o7	80	Riverview, State	Stream flood plains and terraces.
	2w8	20	Sylacauga	Small depressions in stream terraces.
State fine sandy loam: St.	1o7	100	State	Stream terraces.
Sylacauga silt loam: Sy.	2w8	100	Sylacauga	Small depressions in stream terraces.
Tatum-Fruithurst complex, 6 to 10 percent slopes: TfC.	3o1	100	Tatum, Fruithurst	Uplands.
Tatum-Fruithurst association, hilly: TFH.	3o1	70	Tatum, Fruithurst	Uplands, 6 to 15 percent slopes.
	4r2	15	Tatum, Fruithurst, Tallapoosa.	Uplands, 15 to 35 percent slopes.
	1o7	15	Minor bottom land soils	Narrow drainageways and stream flood plains, 0 to 6 percent slopes.

TABLE 4.—*Woodland suitability groups*—Continued

Mapping units and symbols	Woodland suitability groups in mapping unit	Characteristics of woodland suitability groups		
		Proportionate extent of soils in mapping unit[1]	Soils	Topographic location and dominant slope range
		Percent		
Tatum-Tallapoosa-Fruithurst association, steep: TTS.	4r2	45	Tatum, Tallapoosa, Fruithurst.	Mid and upper slopes, 15 to 35 percent slopes.
	3o1	20	Tatum, Fruithurst	Ridges and upper slopes, 6 to 15 percent slopes.
	4r3	20	Tallapoosa	Lower side slopes, 35 to 60 percent slopes.
	1o7	15	Minor bottom land soils	Narrow drainageways and stream flood plains, 0 to 10 percent slopes.
Waynesboro fine sandy loam, 10 to 25 percent slopes: WaD.	3o7	100	Waynesboro	Uplands.
Waynesboro-Holston complex, 2 to 10 percent slopes: WhC.	3o7	100	Waynesboro, Holston	Uplands.

[1] These percentages apply to whole map delineations. Significant differences in percentage values will be encountered on land areas that involve a small portion of map delineation.
[2] Unclassified.

Seedling mortality refers to the expected degree of mortality of planted seedlings as influenced by kinds of soil when plant competition is not a limiting factor. Considered in the ratings are depth to the water table, hazard of flooding, drainage, soil depth and structure, and degree of erosion. Normal rainfall, good planting stock, and proper planting are assumed. A rating of *slight* indicates an expected loss of less than 25 percent; *moderate,* a loss of 25 to 50 percent; and *severe,* a loss of more than 50 percent.

Windthrow hazard reflects the effect of the soil on root development and the ability of the soil to hold trees firmly. The hazard is *slight* if effective rooting depth is more than 20 inches and the trees withstand most wind; *moderate* if effective rooting depth is from 10 to 20 inches and some trees are blown down during periods of excessive soil wetness and strong winds; and *severe* if effective rooting depth is 10 inches or less and trees will not withstand strong wind.

Plant competition is rated on the basis of the degree to which unwanted plants invade openings in the tree canopy. Considered in the ratings are available water capacity, fertility, drainage, and degree of erosion. A rating of *slight* means that competition from other plants is not a problem; *moderate,* that plant competition delays development of fully stocked stands of desirable trees; and *severe,* that plant competition prevents establishment of a desirable stand unless intensive site preparation and such practices as weeding are used to control undesirable plants.

Table 5 also lists trees and understory plants that are suited to the soils in the woodland suitability groups. Commercially important trees are the trees that woodland managers generally favor in intermediate or improvement cuttings. The potential productivity of these trees is shown in terms of site index and annual volume of growth. For this survey, conversions of average site index into volumetric growth and yield are based on research as follows: southern pines (*8*); upland oaks (*7*); and southern hardwoods (*10*). Yields are based on 35 year rotations for pulpwood and 60 year rotations for sawtimber. The site index is the average height of dominant trees, in feet, at age 50. Trees to plant are the trees that are best suited for commercial wood production.

The potential productivity of understory grasses, forbs, or low shrubs for a medium tree canopy class (36 to 55 percent canopy) is expressed in pounds of air-dry forage per acre. The stocking rate for these plants is expressed as a range, in acres, of grazed woodland per animal unit.

Wildlife [4]

The wildlife population of any area depends upon the availability of food, cover, and water in suitable combinations. Wildlife habitat is created and maintained by establishing desirable vegetation and by developing water supplies in suitable places.

In table 6 each of the soils in Cleburne County is rated according to its suitability for the elements that make up wildlife habitat and for three kinds of wildlife —openland, woodland, and wetland. The ratings refer to only the suitability of the soil. They do not take into account present land use or the distribution and density of wildlife and human populations. The suitability

[4] ROBERT E. WATERS, biologist, Soil Conservation Service, helped prepare this section.

TABLE 5.—*Woodland interpretations*

Woodland suitability group	Descriptions of soils	Erosion hazard	Equipment limitations	Seedling mortality	Windthrow hazard	Plant competition	Important trees
1o7	Nearly level, well drained soils on flood plains and low terraces; loamy subsoil; very high potential productivity; suited for broadleaf and needleleaf trees.	Slight	Slight	Slight	Slight	Moderate.	Yellow-poplar Sweetgum Oaks Loblolly pine
2w8	Nearly level, somewhat poorly drained soils on terrace depressions; loamy subsoil; high potential productivity; suited for broadleaf and needleleaf trees.	Slight	Moderate	Slight	Slight	Moderate.	Loblolly pine Sweetgum Yellow-poplar
3o1	Sloping and strongly sloping, well drained soils on uplands; loamy and clayey subsoil; moderately high potential productivity; suited for needleleaf trees.	Slight	Slight	Slight	Slight	Slight.	Loblolly pine Shortleaf pine Virginia pine Longleaf pine Oaks
3o7	Gently to strongly sloping, well drained soils on uplands; loamy and clayey subsoils; moderately high potential productivity; suited for broadleaf and needleleaf trees.	Slight	Slight	Slight	Slight	Slight.	Loblolly pine Shortleaf pine Virginia pine Oaks
3r8	Steep, well drained soils on uplands; loamy and clayey subsoils; moderately high potential productivity; suited for broadleaf and needleleaf trees.	Moderate	Moderate	Slight	Slight	Slight.	Loblolly pine Shortleaf pine Virginia pine Oaks
4o1	Gently sloping to sloping, well drained soils on uplands; clayey subsoils; moderate potential productivity; suited for needleleaf trees.	Slight	Slight	Slight	Slight	Slight.	Loblolly pine Shortleaf pine
4r2	Steep, well drained soils on uplands; loamy and clayey subsoils; moderate potential productivity; suited for needleleaf trees.	Moderate	Moderate	Slight	Slight	Slight.	Loblolly pine Shortleaf pine Longleaf pine Virginia pine
4r3	Steep, well drained, shallow soils on uplands; loamy subsoils; moderate potential productivity; suited for needleleaf trees.	Severe	Severe	Slight	Moderate	Slight.	Loblolly pine Shortleaf pine Longleaf pine Virginia pine
4x2 [2]	Steep, well drained stony soils on mountains; loamy subsoils; moderate potential productivity; suited for needleleaf trees.	Moderate	Severe	Slight	Slight	Slight.	Loblolly pine Shortleaf pine Virginia pine Longleaf pine

[1] Animal-unit-months. Number of months in a year that an acre will provide grazing for one animal unit (one cow, steer, or horse, or seven sheep or goats) without injury to pasture.

for woodland suitability groups

Site index	Estimated annual growth		Trees to plant	Important understory forage species	Estimated forage yield (medium overstory canopy)	Stocking rate for woodland grazing
	Cords per acre	*Bd ft per acre (Doyle scale)*			*Lb per acre per yr*	*AUM* [1]
110	----------	570	Loblolly pine, yellow-poplar, cottonwood, black walnut.	Low panicum, switch cane, longleaf uniola, honeysuckle, pinehill bluestem, beaked panicum, sedges, rushes.	1,200	24 to 48
100	----------	430				
90	0.9	290				
100	1.8	492				
90	1.5	367	Loblolly pine, yellow-poplar, sweetgum, American sycamore.	Pinehill bluestem, Indiangrass, plumegrass, low panicum, honeysuckle, switch cane, switchgrass.	1,800	16 to 36
90	----------	310				
100	----------	430				
80	1.3	267	Loblolly pine, Virginia pine, slash pine.	Pinehill bluestem, Indiangrass, plumegrass, grassleaf aster, little bluestem, broomsedge, purple lovegrass, cutover muhly, tickclover, perennial lespedeza.	1,200	24 to 48
70	1.4	210				
70	----------	----------				
60	----------	90				
70	.6	120				
80	1.3	267	Loblolly pine, slash pine, Virginia pine, yellow-poplar, sweetgum.	Pinehill bluestem, Indiangrass, plumegrass, grassleaf aster, little bluestem, broomsedge, purple lovegrass, cutover muhly, tickclover, perennial lespedeza.	1,200	24 to 48
70	1.4	210				
70	----------	----------				
70	.6	120				
80	1.3	267	Loblolly pine, slash pine, Virginia pine, yellow-poplar, sweetgum.	Pinehill bluestem, plumegrass, grassleaf aster, little bluestem, broomsedge, purple lovegrass, cutover muhly, three-awn, tickclover, perennial lespedeza, honeysuckle.	1,000	28 to 50
70	1.4	210				
70	----------	----------				
70	.6	120				
70	1.1	167	Loblolly pine, slash pine, Virginia pine, eastern redcedar.	Pinehill bluestem, plumegrass, grassleaf aster, little bluestem, broomsedge, purple lovegrass, cutover muhly, three-awn, tickclover, perennial lespedeza, honeysuckle.	900	32 to 50
60	1.1	127				
70	1.1	167	Slash pine, Virginia pine, eastern redcedar.	Grassleaf aster, perennial lespedeza, purple lovegrass, little bluestem, honeysuckle.	----------	----------
60	1.1	127				
60	.7	60				
60	----------	----------				
70	1.1	167	Loblolly pine, slash pine, Virginia pine, eastern redcedar.	Pinehill bluestem, broomsedge, grassleaf aster, perennial lespedeza, purple lovegrass, little bluestem, honeysuckle.	800	36 to 50
60	1.1	127				
60	.7	60				
60	----------	----------				
70	1.1	167	Virginia pine, eastern redcedar, longleaf pine.	----------	----------	----------
60	1.1	127				
60	----------	----------				
60	.7	60				

[1] Occasionally damaged by ice (freezing rain).

TABLE 6.—*Wildlife*

Soil name and map symbols	Habitat elements							Habitat for wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Allen: Mapped only with Holston soils.										
Cheaha: CES	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
Fruithurst: Mapped only with Tatum and Tallapoosa soils.										
Gwinnett: Mapped only with Hiwassee soils.										
Hiwassee:										
[1] HGH:										
Hiwassee part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Gwinnett part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Holston:										
HoB	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
[1] HAR:										
Holston part	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Fair	Very poor.
Allen part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Louisa: Mapped only with Madison soils.										
Madison:										
MaC, MAH	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
[1] MLS:										
Madison part	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Louisa part	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Good	Good	Very poor.
Mecklenburg: MRR	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Ochlockonee: Oc	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Poor.
Riverview:										
Re	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
[1] Rs:										
Riverview part	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
State part	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Sylacauga part	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.

TABLE 6.—*Wildlife*—Continued

Soil name and map symbols	Habitat elements							Habitat for wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
State: St	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Sylacauga: Sy	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.
Tallapoosa: Mapped only with Tatum soils.										
Tatum:										
[1] TfC:										
Tatum part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fruithurst part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
[1] TFH:										
Tatum part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fruithurst part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
[1] TTS:										
Tatum part	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Fruithurst part	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Tallapoosa part	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Waynesboro:										
WaD	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
[1] WhC:										
Waynesboro part	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Holston part	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Fair	Very poor.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

of individual sites must be determined by onsite inspection.

Their suitability for producing the elements of wildlife habitat is expressed as good, fair, poor, or very poor. These elements are described in the following paragraphs.

Grain and seed crops are domestic grain or other seed-producing annuals that are commonly planted to produce food for wildlife. Examples are corn, sorghum, wheat, oats, barley, millet, cowpeas, soybeans, and sunflower.

Domestic grasses and legumes are perennial grasses and herbaceous legumes that are commonly planted to produce food or cover, or both, for wildlife. Examples are fescue, lovegrass, orchardgrass, clover, and vetches.

Wild herbaceous plants are native or naturally established dryland herbaceous grasses and forbs, including weeds, that provide food or cover, or both, for wildlife. Examples are goldenrod, beggarweed, milkpeas, ragweed, partridgepeas, pokeweed, crotons, fescue, and grama.

Hardwood trees are nonconiferous trees and associated woody understory plants that provide wildlife cover or produce nuts, buds, catkins, twigs, bark, or foliage used as food by wildlife.

Coniferous plants are cone-bearing trees, shrubs, or ground cover that furnish wildlife cover or supply food in the form of browse, seeds, or fruitlike cones. These plants are commonly established through natural processes, but they may be planted or transplanted. Examples are pine, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist to wet sites. Submerged and floating aquatic plants are not included. These plants provide food or cover, or both, for wetland forms of wildlife. Examples are smartweed, wild millets, rushes, sedges, reeds, wildrice, cutgrass, cordgrass, and cattail.

Shallow water areas are areas of surface water that are useful to wildlife. Their average depth is less than 5 feet. They may be naturally wet areas or those created by dams, levees, or water-control devices in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, wildlife ponds, and beaver ponds.

The suitability of the soils as habitat for the three kinds of wildlife is expressed as good, fair, poor, or very poor.

Good means that habitat is easily improved, maintained, or created; that there are few or no soil limitations in habitat management; and that satisfactory results can be expected.

Fair means that habitat can be improved, maintained, or created; that moderate soil limitations affect habitat management or development; and that moderate intensity of management and fairly frequent attention may be required to ensure satisfactory results.

Poor means that habitat can be improved, maintained, or created; that soil limitations are severe; that habitat management may be difficult and expensive and may require intensive effort. Satisfactory results are questionable.

Very poor means that under the prevailing soil conditions, it is impractical to attempt to improve, maintain, or create habitat. Unsatisfactory results are probable.

The three kinds of wildlife are defined in the following paragraphs.

Openland wildlife are birds and mammals of croplands, pastures, meadows, lawns, and areas overgrown with grasses, herbs, shrubs, and vines. Examples are bobwhite quail, meadowlark, field sparrow, killdeer, cottontail rabbit, mourning dove, and red fox.

Woodland wildlife are birds and mammals in wooded areas of either hardwood or coniferous trees and shrubs, or a mixture of both. Examples are wild turkey, woodcock, thrushes, vireos, woodpeckers, squirrels, gray fox, raccoon, and white-tailed deer.

Wetland wildlife are birds and mammals of swampy, marshy, or openwater areas. Examples are ducks, geese, herons, shore birds, rails, kingfisher, muskrat, mink, beaver, and otter.

Engineering [5]

This section provides information of special interest to engineers and others who use the soil as structural material or as foundation material upon which structures are built. A large part of soil engineering consists of locating various soils, determining their engineering properties, correlating these properties with the requirements of the job, and selecting the best soil material for each requirement.

Among the properties of soils that are important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, available water capacity, reaction, corrosion characteristics, slope, soil thickness, and depth to rock or a water table. These properties, in various degrees and combinations, affect construction and maintenance of roads; airports; pipelines; building foundations; irrigation, runoff, drainage, and sewage disposal systems; and many other uses involving soil engineering.

Most of the information in this section is presented in tables 7 and 8, which show, respectively, estimates of soil properties significant in engineering and the results of engineering laboratory tests on representative soil samples. The data reported in these tables do not eliminate the need for sampling and testing at the site of a specific engineering work, particularly one that is highly dependent on a narrow range of certain soil properties or involves material beneath the soil. Even in these situations, however, the soil map and the information in this and other sections is useful in planning more detailed investigations and indicating the kinds of soil problems that may be encountered. Also, inspection of sites is needed because many soil mapping units have small areas of soils that have contrasting properties and different suitabilities and limitations for soil engineering.

Users of this section should also refer to the section "Town and Country Planning," which contains interpretations for many soil uses that involve soil engineering.

[5] JESSE C. BUSH, civil engineer, Soil Conservation Service, helped prepare this section.

Some terms have special meanings in soil science that may not be familiar to engineers. These terms are defined in the Glossary.

Engineering Soil Classification Systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*4*) used by the SCS engineers, Department of Defense, and others and the AASHTO system (*3*) adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL-ML. Table 7 shows the estimated Unified classification for all soils mapped in Cleburne County.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils, which have high bearing strength and are the best soils for subgrade, or foundation. At the other extreme, in group A–7, are clay soils, which have low strength when wet and are the poorest soils for subgrade. When laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest.

Table 7 shows the estimated AASHTO classification, without group index numbers, for all soils mapped in Cleburne County. Table 8 shows the AASHTO classification, with group index numbers in parentheses, for tested soils.

Soil Properties Significant in Engineering

Table 7 contains estimates of many soil properties that are significant in engineering. These estimates are made for typical soil profiles by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 7.

Depth to saprolite is the distance from the surface of the soil to rock that is weathered and can be excavated with earthmoving equipment.

Depth to bedrock is distance from the surface of the soil to rock that is difficult or impossible to excavate with earthmoving equipment.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

USDA soil texture is described in table 7 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a dry clayey soil is increased, the material changes from semisolid to plastic. As the moisture content is further increased, the material changes from plastic to liquid. The plastic limit is the moisture content at which the soil material changes from semisolid to plastic; and the liquid limit, from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Permeability is the quality that enables a soil to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 7 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks when dry or swells when wet. The extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes considerable damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Risk of corrosion, as used in table 7, is the potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion on uncoated steel is related to soil properties, such as drainage, texture, total acidity, and electrical conductivity of the soil material. Risk of corrosion for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A risk of corrosion rating of *low* means that there is a low probability of soil-induced

TABLE 7.—*Estimates of soil properties*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such first column of this table carefully. The symbol >

Soil series and map symbols	Depth to—			Depth from surface	USDA texture	Classification		Coarse fraction greater than 3 inches
	Saprolite (rippable)	Bedrock (nonrippable)	Seasonal high water table			Unified	AASHTO	
	Inches	*Inches*	*Feet*	*Inches*				*Percent*
Allen Mapped only with Holston soils.	>60	>60	>6	0–5	Sandy loam, loam	ML, SM, SM–SC, CL–ML	A–4	0–8
				5–60	Clay loam, sandy clay loam.	CL	A–4, A–6	0–5
Cheaha: CES		24–40	>6	0–4	Stony silt loam, cobbly sandy loam, stony sandy loam.	SM, ML	A–4, A–2	15–35
				4–35	Clay loam, sandy clay loam, loam.	ML, SM	A–4, A–2	15–35
				35	Sandstone.			
Fruithurst Mapped only with Tatum soils.	20–40	>60	>6	0–10	Loam, silt loam, gravelly loam, gravelly silt loam.	ML, CL–ML	A–4	0–5
				10–39	Clay loam, loam	ML, CL	A–6, A–7	0–5
				39	Slate saprolite.			
Gwinnett Mapped only with Hiwassee soils.	20–40	>60	>6	0–4	Clay loam, gravelly clay loam, gravelly loam.	CL	A–4, A–6	0–4
				4–36	Clay, clay loam	CL, ML, MH	A–7	0–4
				36	Schist saprolite.			
*Hiwassee: HGH For Gwinnett part, see Gwinnett series.	>60	>60	>6	0–3	Clay loam, loam	CL	A–4, A–7	0
				3–51	Clay	ML, CL, MH, CH	A–7	0
*Holston: HoB, HAR For Allen part of HAR, see Allen series.	>60	>60	>6	0–5	Fine sandy loam, gravelly fine sandy loam, loam, silt loam.	SC, SM–SC, CL, CL–ML	A–4	0
				5–65	Loam, clay loam	CL	A–4, A–6	0
Louisa Mapped only with Madison soils.	10–20	40–60	>6	0–19	Loam, sandy loam, gravelly loam, gravelly sandy loam.	SM	A–2, A–4	0–5
				19	Mica schist saprolite.			
*Madison: MaC, MAH, MLS For Louisa part of MLS, see Louisa series.	21–40	>40	>6	0–5	Gravelly loam, gravelly sandy loam.	SM, ML	A–4	0–10
				5–38	Clay, clay loam	CL, MH	A–4, A–5, A–7	0–5
				38	Mica schist saprolite.			
Mecklenburg: MRR	20–40	>40	>6	0–4	Loam, silt loam	ML, CL, CL–ML	A–4, A–6	0
				4–24	Clay, clay loam	MH, CH, CL, ML	A–7	0
				24	Chloritic schist saprolite.			
Ochlockonee: Oc	>60	>60	5–6	0–104	Fine sandy loam, loamy fine sand.	SM	A–2, A–4	0
*Riverview: Re, Rs For State and Sylacauga parts of Rs, see State and Sylacauga series.	>60	>60	3–5	0–39	Silt loam, loam	ML, CL–ML	A–4	0
				39–64	Loam, sandy loam	SM, ML, SC–SM	A–4	0

significant in engineering

mapping units may have different properties and limitations, and for this reason it is necessary to follow the instructions in the means more than; the symbol < means less than]

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Risk of corrosion	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Percent		*Inches per hour*	*Inches per inch of soil*	*pH*			
90–100	80–100	75–90	40–60	<30	[1] NP–7	0.6–2.0	0.14–0.19	4.5–5.5	Low	Low	High.
85–100	80–95	75–95	50–80	25–38	7–15	0.6–2.0	0.15–0.18	4.5–5.5	Low	Moderate	High.
70–100	60–90	40–80	30–60	<35	NP–7	2.0–6.0	0.10–0.15	4.1–5.5	Low	Low	High.
70–100	60–90	40–80	30–60	20–35	4–10	0.6–2.0	0.12–0.18	4.1–5.5	Low	Low	High.
80–100	75–95	65–85	50–80	20–34	NP–7	0.6–2.0	0.15–0.20	4.5–5.5	Low	Low	High.
85–100	80–100	65–95	55–80	35–55	10–30	0.6–2.0	0.15–0.20	4.5–5.5	Low	Low	High.
80–100	75–100	60–90	50–70	15–32	7–15	0.6–2.0	0.10–0.17	5.1–6.0	Low	Moderate	Moderate.
95–100	90–100	75–90	60–80	40–65	16–28	0.6–2.0	0.12–0.16	5.1–6.0	Moderate	High	Moderate.
100	90–100	85–100	60–80	25–45	7–21	0.6–2.0	0.10–0.15	4.5–6.0	Low	Moderate	Moderate.
100	95–100	90–100	70–90	41–75	17–35	0.6–2.0	0.12–0.15	4.5–6.0	Moderate	High	Moderate.
95–100	80–100	60–80	25–65	10–20	5–10	0.6–2.0	0.12–0.20	4.5–5.5	Low	Low	High.
95–100	75–100	60–100	50–80	20–40	7–20	0.6–2.0	0.12–0.20	4.5–5.5	Low	Moderate	High.
80–100	75–85	60–80	25–50	----------	NP	2.0–6.0	0.10–0.12	4.5–5.5	Low	Low	Moderate.
87–100	81–100	61–90	36–55	25–34	NP–6	2.0–6.0	0.10–0.14	5.1–5.5	Low	Low	Moderate.
90–100	90–100	81–97	66–78	35–60	5–25	0.6–2.0	0.12–0.14	5.1–5.5	Moderate	High	Moderate.
90–100	80–100	70–90	50–75	20–40	5–15	0.6–2.0	0.15–0.18	5.6–6.5	Low	Low	Low.
90–100	85–100	80–100	75–95	45–70	15–35	0.06–0.2	0.12–0.14	5.6–6.5	Moderate	High	Low.
100	98–100	85–100	15–45	----------	NP	2.0–6.0	0.07–0.12	4.5–5.5	Low	Low	High.
100	100	90–100	60–80	<30	NP–7	0.6–2.0	0.16–0.22	4.5–5.5	Low	Low	Moderate.
100	100	80–90	40–70	<20	NP–7	0.6–2.0	0.12–0.18	4.5–5.5	Low	Low	Moderate.

TABLE 7.—*Estimates of soil properties*

Soil series and map symbols	Depth to—			Depth from surface	USDA texture	Classification		Coarse fraction greater than 3 inches
	Saprolite (rippable)	Bedrock (nonrippable)	Seasonal high water table			Unified	AASHTO	
	Inches	*Inches*	*Feet*	*Inches*				*Percent*
State: St	>60	>60	3–5	0–6	Silt loam, loam, sandy loam.	SM, ML	A–4	0
				6–40	Clay loam, sandy clay loam, silty clay loam, loam.	CL	A–4, A–6	0
				40–60	Silt loam, sandy loam, silty clay.	ML, CL, CL–ML, SC, SM, SM–SC	A–4, A–2	0
Sylacauga: Sy	>60	>60	0.5–1.5	0–7	Silt loam, fine sandy loam, loam.	ML, CL–ML	A–4	0
				7–65	Clay loam, silty clay loam.	CL	A–6	0
Tallapoosa Mapped only with Tatum soils.	10–20	>60	>6	0–4	Gravelly loam, gravelly sandy loam, gravelly silt loam.	SM	A–4, A–5	0–10
				4–13	Clay loam, silt loam, loam.	ML, SM	A–4, A–5	0–10
				13	Slate saprolite.			
*Tatum: TfC, TFH, TTS For the Fruithurst part of TfC, TFH, and TTS, see Fruithurst series; for Tallapoosa part of TTS, see Tallapoosa series.	25–50	>50	>6	0–5	Loam, gravelly loam, silt loam, gravelly silt loam.	SM, ML	A–4	0–5
				5–26	Clay, clay loam, silty clay, silty clay loam.	MH, CH	A–7	0
				26	Slate saprolite.			
*Waynesboro: WaD, WhC For the Holston part of WhC, see Holston series.	>60	>60	>6	0–5	Fine sandy loam, loam.	SM, ML, CL–ML	A–4	0
				5–25	Clay, clay loam	ML, CL	A–4, A–6	0
				25–75	Clay	ML, CL, MH, CH	A–6, A–7	0
				75–110	Gravelly sandy clay loam, sandy clay loam.	SM, SC, ML, CL	A–2, A–4, A–6	0–30

[1] Nonplastic.

corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Engineering Test Data

Table 8 contains engineering test data for some of the major soil series in Cleburne County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Compaction, or moisture-density, data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Tests to determine liquid limit and plastic limit measure the effect of water on the consistence of soil material, as has been explained for table 7.

Town and Country Planning

This section provides information on soils that is useful to planners, builders, architects, engineers, zoning officials, farmers, and others who are interested in the use of soils for sanitary facilities, community de-

significant in engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Risk of corrosion	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Percent		*Inches per hour*	*Inches per inch of soil*	*pH*			
95–100	95–100	65–90	40–70	<34	NP–6	0.6–2.0	0.10–0.20	4.5–5.5	Low	Low	High.
95–100	95–100	85–100	65–85	24–34	8–15	0.6–2.0	0.13–0.17	4.5–5.5	Low	Moderate	High.
95–100	90–100	50–90	40–70	<30	NP–10	0.6–2.0	0.10–0.17	4.5–5.5	Low	Low	High.
98–100	95–100	85–95	70–80	25–35	5–10	0.6–2.0	0.10–0.15	4.5–6.0	Low	High	Moderate.
98–100	95–100	90–95	85–95	30–40	12–20	0.06–0.2	0.12–0.18	4.5–6.0	Moderate	High	Moderate.
80–85	60–75	55–65	35–50	<48	NP–7	0.6–2.0	0.13–0.18	4.5–5.5	Low	Low	High.
75–100	65–100	60–90	45–65	25–50	3–10	0.6–2.0	0.13–0.18	4.5–5.5	Low	Moderate	High.
80–100	70–95	50–90	40–80	<34	NP–7	0.6–2.0	0.13–0.20	4.5–5.5	Low	High	High.
85–100	70–100	60–100	55–95	50–66	16–36	0.6–2.0	0.12–0.19	4.5–5.5	Moderate	High	High.
95–100	90–100	70–100	40–70	16–25	3–7	0.6–2.0	0.12–0.18	4.5–5.5	Low	Low	High.
95–100	90–100	70–100	51–75	28–40	7–16	0.6–2.0	0.12–0.18	4.5–5.5	Moderate	High	High.
95–100	90–100	70–100	51–75	35–55	10–30	0.6–2.0	0.12–0.18	4.5–5.5	Moderate	High	High.
60–100	50–100	40–100	30–60	28–40	7–16	0.6–2.0	0.10–0.16	4.5–5.5	Low	Moderate	High.

velopment, resource materials, recreation, and water management.

Soil interpretations in the tables in this section are based on important soil properties that affect each particular use (*13*). Some of the most important properties are texture, reaction, shrink-swell potential, slope, permeability, depth to rock or a water table, and susceptibility to flooding. Users of this section may want to refer to the section "Engineering," in which estimates are given for many soil properties that are significant in this section.

Soil interpretations for sanitary facilities, community development, and recreation are given as kind and degree of soil limitations. Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* indicates soil properties generally favorable for the specified use, or in other words, limitations that are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* indicates soil properties so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Soil interpretations for resource materials are given as soil suitability. Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe. In addition, the term *unsuited* indicates soils with no potential as a source of a specific resource material.

The soil map and information in this section are guides for evaluating areas of the specified uses. They do not eliminate the need for detailed, onsite investigations before a final determination is made.

Some mapping units in Cleburne County have more than one major soil and a broad range in slope. In the

TABLE 8.—*Engineering*

[Tests performed by Alabama Highway Department,

Soil name and location	Parent material	Alabama report number	Depth	Moisture density[1]	
				Maximum dry density	Optimum moisture
		S72Ala-15	Inches	Lb per cu ft	Percent
Allen loam: 1 mile northwest of Borden Springs, sec. 33, T. 12 S., R. 11 E.	Colluvium from sandstone.	11–2	5–36	115	13
Fruithurst loam: Approximately 1 mile north-northwest of Antioch Church, NW¼SW¼ sec. 8, T. 16 S., R. 12 E.	Residuum from slate and phyllite.	9–4 9–6	13–28 36–50	105 97	18 23
Hiwassee clay loam: Approximately 1.5 mile south-southwest of Hurricane Church, SW¼NW¼ sec. 16, T. 17 S., R. 11 E.	Residuum from hornblende schist.	7–2 7–3	6–52 52–97	92 88	28 29
Holston loam: Approximately 0.75 mile southeast of Oak Grove Church, sec. 6, T. 16 S., R. 12 E.	Old alluvium from Tallapoosa River.	3–2 3–3 3–4	5–20 20–33 33–65	118 115 109	12 13 15
Holston loam: Approximately 0.25 mile west of Palestine, sec. 35, T. 12 S., R. 11 E.	Old colluvium from slate and sandstone.	2–2	4–23	121	11
Ochlockonee loamy fine sand: 2 miles south of Muscadine, SW¼NW¼ sec. 21, T. 15 S., R. 12 E.	Recent alluvium from Tallapoosa River.	10–1 10–3 10–4	0–9 20–37 37–80	106 115 115	15 12 12
Tallapoosa silt loam: Approximately 2.5 miles north of Five Points, SE¼SE¼ sec. 23, T. 16 S., R. 9 E.	Residuum from slate and phyllite.	8–2	4–13	106	15
Tatum loam: Approximately 1 mile north of Five Points, NE¼SE¼ sec. 27, T. 16 S., R. 9 E.	Residuum from slate and phyllite.	6–2 6–3	5–26 26–40	99 115	22 12
Waynesboro fine sandy loam: Approximately 1.25 miles southeast of Bell Mills, SW¼NE¼ sec. 26, T. 16 S., R. 11 E.	Old alluvium from Tallapoosa River.	5–2 5–3 5–4	5–25 25–75 75–96	108 101 107	17 21 18

[1] Based on AASHTO Designation T 99, Method A (*3*).

[2] Mechanical analyses according to the AASHTO Designation T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is

tables in this section, soil interpretations for these soils are presented for each of the major soils indicated in the mapping unit name. The slope range on which the interpretation is based is the dominant or most significant portion of the slope range of the mapping unit.

Sanitary Facilities

Soil interpretations for sanitary facilities are presented in table 9. Interpretations are provided for septic tank absorption fields, sewage lagoons, and sanitary landfills.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table, and susceptibility to flooding. Slope and depth to rock affect difficulty of layout and construction and the risk of soil erosion, lateral seepage, and downslope flow of effluent.

Sewage lagoons are shallow ponds constructed to

test data

Bureau of Materials and Tests, Montgomery, Alabama]

Mechanical analysis [3]							Liquid limit	Plasticity index	Classification	
2-in	1½-in	1-in	Percentage passing sieve— No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)			AASHTO [3]	Unified [4]
							Percent			
100	100	92	88	85	75	55	33	7	A–4(2)	ML
		100	95	90	87	73	43	14	A–7–6(10)	ML
		100	99	99	98	91	52	11	A–7–5(15)	MH
			100	99	98	92	69	31	A–7–5(36)	MH
				100	99	94	74	31	A–7–5(38)	MH
			100	99	99	79	24	7	A–4(3)	CL-ML
		100	99	99	99	78	29	9	A–4(5)	CL
				100	100	80	39	13	A–6(11)	ML
		100	82	78	66	50	27	8	A–4(1)	CL
				100	98	35		[5] NP	A–2–4(0)	SM
				100	99	34		NP	A–2–4(0)	SM
				100	98	40		NP	A–4(0)	SM–SC
	100	87	75	69	63	59	39	8	A–4(3)	ML
		100	94	90	84	77	50	16	A–7–5(14)	MH
		100	93	88	58	44	40	2	A–4(0)	ML
			100	99	97	66	36	12	A–6(7)	ML
			100	99	98	66	43	11	A–7–5(8)	ML
			100	99	97	54	38	9	A–4(3)	ML

analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[3] Based on AASHTO Designation M 145–49.

[4] Based on ASTM Stand. D 2487–69 *In* 1974 Annual Book of ASTM Standards (4).

[5] Nonplastic.

hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. It is assumed that the embankment is compacted to medium density and the pond is protected from flooding. Soil properties considered to be most important for sewage lagoons are depth to water table, permeability, depth to bedrock, slope, coarse fragments, organic matter, flooding, and the Unified soil classification.

Sanitary landfill (trench type) refers to a dug trench in which refuse is buried daily, or more frequently if necessary. The refuse is covered with a layer of soil material at least 6 inches thick, generally with soil excavated in digging the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill.

Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. Ratings apply only to a depth of about 6 feet, and therefore limitations of *slight* or *moderate* may not be valid if excavations are to be much deeper than that. For some soils reliable predic-

TABLE 9.—*Sanitary facilities*

[Some terms in this table are explained in the glossary where they are identified by an asterisk]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)
Allen: Mapped only with Holston soils.			
Cheaha: CES	Severe: slope; depth to rock; large stones.	Severe: slope; depth to rock; large stones.	Severe: slope; depth to large stones.
Fruithurst: Mapped only with Tatum and Tallapoosa soils.			
Hiwassee:			
[1] HGH:			
Hiwassee part	Moderate: slope	Severe: slope	Severe: too clayey.
Gwinnett part	Moderate: slope; depth to rock.	Severe: slope	Severe: too clayey.
Holston:			
HoB	Slight	Moderate: slope; seepage	Moderate: too clayey.
[1] HAR:			
Holston part	Slight	Severe: slope	Moderate: too clayey.
Allen part	Slight	Severe: slope	Moderate: too clayey.
Louisa: Mapped only with Madison soils.			
Madison:			
MaC	Moderate: depth to rock	Severe: slope	Severe: depth to rock; too clayey.
MAH	Moderate: slope; depth to rock.	Severe: slope	Severe: depth to rock; too clayey.
[1] MLS:			
Madison part	Severe: slope	Severe: slope	Severe: depth to rock; too clayey.
Louisa part	Severe: slope; depth to rock.	Severe: slope; seepage	Severe: depth to rock; seepage.
Mecklenburg: MRR	Severe: percolates slowly	Moderate: slope; depth to rock.	Severe: depth to rock.
Ochlockonee: Oc	Severe: floods	Severe: floods; seepage	Severe: floods; seepage; wetness.
Riverview:			
Re	Severe: floods	Severe: floods; seepage	Severe: floods; seepage; wetness.
[1] Rs:			
Riverview part	Severe: floods	Severe: floods; seepage	Severe: floods; seepage; wetness.
State part	Severe: floods	Severe: floods; seepage	Severe: floods; wetness.
Sylacauga part	Severe: floods; percolates slowly; wetness.	Severe: floods; seepage	Severe: floods; wetness.
State: St	Severe: floods	Severe: floods; seepage	Severe: floods; wetness.
Sylacauga: Sy	Severe: floods; percolates slowly; wetness.	Severe: floods; wetness	Severe: floods; wetness.
Tatum:			
[1] TfC:			
Tatum part	Moderate: depth to rock	Severe: slope	Severe: too clayey.

TABLE 9.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench type)
Fruithurst part	Moderate: depth to rock	Severe: slope; depth to rock	Moderate: depth to rock; too clayey.
[1] TFH: Tatum part	Moderate: slope; depth to rock.	Severe: slope	Severe: too clayey.
Fruithurst part	Moderate: slope; depth to rock.	Severe: slope; depth to rock	Moderate: depth to rock; too clayey.
[1] TTS: Tatum part	Severe: slope	Severe: slope	Severe: too clayey.
Fruithurst part	Severe: slope	Severe: slope; depth to rock	Severe: slope.
Tallapoosa part	Severe: slope; depth to rock	Severe: slope	Severe: slope.
Waynesboro: WaD	Moderate: slope	Severe: slope	Severe: too clayey.
[1] WhC: Waynesboro part	Slight	Severe: slope	Severe: too clayey.
Holston part	Slight	Severe: slope	Moderate: too clayey.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

tions can be made to a depth of 10 to 15 feet, but for most soils geologic investigations will be needed below a depth of about 6 feet.

Community Development

Soil interpretations for community development are presented in table 10. Interpretations are provided for shallow excavations, dwellings without basements, dwellings with basements, small commercial buildings, and local roads and streets.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. Soil properties considered to be most important for shallow excavations are soil drainage, depth to seasonal water table, susceptibility to flooding, slope, texture, depth to bedrock, and stoniness and rockiness.

Dwellings and small commercial buildings, as rated in table 10, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties considered to be most important are drainage, depth to seasonal water table, susceptibility to flooding, slope, shrink-swell potential, Unified soil classification, depth to bedrock, and stoniness and rockiness.

Local roads and streets have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep. Soil properties considered to be most important for local roads and streets are drainage, susceptibility to flooding, slope, depth to bedrock, AASHTO or Unified soil classification, shrink-swell potential, and stoniness and rockiness.

Source Material

Soil interpretations for source material are presented in table 11. Interpretations are provided for road fill, sand, and topsoil.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage. They also reflect the ease of excavating the material at borrow areas. Soil properties considered to be most important for road fill sources are the Unified soil classification, shrink-swell potential, slope, soil thickness, stoniness and rockiness, and drainage.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 10 provide guidance about where to look for probable sources. A soil rated as a *good* or *fair* source of sand generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account the location of the water table or other factors that affect mining of the material, and they do not indicate quality of the deposit.

TABLE 10.—*Community*

[Some terms in this table are explained in the

Soil name and map symbol	Shallow excavations	Dwellings without basements
Allen: Mapped only with Holston soils.		
Cheaha: CES	Severe: slope, depth to rock, large stones.	Severe: slope, large stones
Fruithurst: Mapped only with Tatum and Tallapoosa soils.		
Gwinnett: Mapped only with Hiwassee soils.		
Hiwassee:		
[1] HGH:		
Hiwassee part	Moderate: slope, too clayey	Moderate: slope, low strength, shrink-swell potential.
Gwinnett part	Moderate: slope, depth to rock, too clayey.	Moderate: slope, low strength, shrink-swell potential.
Holston:		
HoB	Moderate: too clayey	Moderate: low strength
[1] HAR:		
Holston part	Moderate: too clayey	Moderate: low strength
Allen part	Moderate: too clayey	Moderate: low strength
Louisa: Mapped only with Madison soils.		
Madison:		
MaC	Moderate: depth to rock, too clayey	Moderate: low strength, shrink-swell potential.
MAH	Moderate: slope, depth to rock	Moderate: slope, low strength
[1] MLS:		
Madison part	Severe: slope	Severe: slope
Louisa part	Severe: slope	Severe: slope
Mecklenburg: MRR	Severe: too clayey	Moderate: low strength, shrink-swell potential.
Ochlockonee: Oc	Severe: floods	Severe: floods
Riverview:		
Re	Severe: floods	Severe: floods
[1] Rs:		
Riverview part	Severe: floods	Severe: floods
State part	Severe: floods	Severe: floods
Sylacauga part	Severe: floods, wetness	Severe: floods, wetness
State: St	Severe: floods	Severe: floods
Sylacauga: Sy	Severe: floods, wetness	Severe: floods, wetness
Tallapoosa: Mapped only with Tatum soils.		
Tatum:		
[1] TfC:		
Tatum part	Moderate: too clayey	Moderate: low strength, shrink-swell potential.
Fruithurst part	Moderate: depth to rock, too clayey	Moderate: low strength

development

glossary, where they are identified by an asterisk]

Dwellings with basements	Small commercial buildings	Local roads and streets
Severe: slope, depth to rock, large stones.	Severe: slope, large stones	Severe: slope.
Moderate: slope, low strength, shrink-swell potential.	Severe: slope	Moderate: slope, low strength, shrink-swell potential.
Moderate: slope, depth to rock, low strength, shrink-swell potential.	Severe: slope	Moderate: slope, low strength, shrink-swell potential.
Moderate: low strength	Moderate: slope, low strength	Moderate: low strength.
Moderate: low strength	Moderate: slope, low strength	Moderate: slope, low strength.
Moderate: low strength	Moderate: slope, low strength	Moderate: slope, low strength.
Moderate: depth to rock, low strength, shrink-swell potential.	Moderate: slope, low strength, shrink-swell potential.	Moderate: low strength, shrink-swell potential.
Moderate: slope, depth to rock, low strength, shrink-swell potential.	Severe: slope	Moderate: slope, low strength, shrink-swell potential.
Severe: slope	Severe: slope	Severe: slope.
Severe: slope, depth to rock	Severe: slope	Severe: slope.
Moderate: depth to rock, low strength, shrink-swell potential.	Moderate: slope, low strength, shrink-swell potential.	Severe: low strength.
Severe: floods	Severe: floods	Severe: floods.
Severe: floods	Severe: floods	Severe: floods.
Severe: floods	Severe: floods	Severe: floods.
Severe: floods	Severe: floods	Severe: floods.
Severe: floods, wetness	Severe: floods, wetness	Severe: floods.
Severe: floods	Severe: floods	Severe: floods.
Severe: floods, wetness	Severe: floods, wetness	Severe: floods.
Moderate: low strength, shrink-swell potential, depth to rock.	Moderate: slope, low strength, shrink-swell potential.	Severe: low strength.
Moderate: low strength, depth to rock	Moderate: slope, low strength	Moderate: low strength.

TABLE 10.—*Community*

Soil name and map symbol	Shallow excavations	Dwellings without basements
[1] TFH:		
Tatum part	Moderate: slope, too clayey	Moderate: slope, low strength, shrink-swell potential.
Fruithurst part	Moderate: slope, depth to rock, too clayey.	Moderate: slope, low strength
[1] TTS:		
Tatum part	Severe: slope	Severe: slope
Fruithurst part	Severe: slope	Severe: slope
Tallapoosa part	Severe: slope	Severe: slope
Waynesboro:		
WaD	Moderate: slope, too clayey	Moderate: slope, low strength, shrink-swell potential.
[1] WhC:		
Waynesboro part	Moderate: too clayey	Moderate: low strength, shrink-swell potential.
Holston part	Moderate: too clayey	Moderate: low strength

[1] This mapping unit is made up of two or more kinds of soil. See mapping unit description for the composition and behavior

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Soil properties considered to be most important for topsoil sources are consistence, texture, thickness of material, fragments and stones, slope, and drainage.

Recreation

Soil interpretations for recreation are presented in table 12. Interpretations are provided for playgrounds, picnic areas, camp areas, and paths and trails.

Playgrounds are subject to intensive foot traffic. Soil properties considered to be most important for playgrounds are drainage, depth to water table, susceptibility to flooding, permeability, slope, texture of the surface layer, fragments on the surface, and stoniness and rockiness.

Picnic areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. Soil properties considered to be most important for picnic areas are drainage, depth of water table, susceptibility to flooding, slope, texture of the surface layer, fragments on the surface, and stoniness and rockiness.

Paths and trails are used for local and cross-country travel by foot or on horseback. Design and layout should require little or no cutting and filling. Soil properties considered to be most important for paths and trails are drainage, depth to water table, susceptibility to flooding, slope, texture of the surface layer, fragments on the surface, and stoniness and rockiness.

Water Management

Soil interpretations for water management are presented in table 13. Interpretations are provided for pond reservoirs, pond embankments, drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water that is impounded by a dam or embankment. Soil properties considered most important for pond reservoir areas are permeability, depth to water table, depth to bedrock or material that allows seepage, and slope.

Pond embankments are structures that impound water. Engineering soil properties affecting pond embankments are inferred from the Unified soil classification. These are shear strength, compressibility, permeability when compacted, susceptibility to piping, and compaction characteristics.

Drainage of crops and pasture is accomplished by a system of surface or subsurface structures, or both, that remove excess water. Surface drainage systems are used to remove ponded water from the soil surface. Subsurface systems are used to lower the water table. Soil properties considered to be most important for drainage systems are permeability, texture, structure, depth to soil layers that restrict water movement, depth to water table, slope, flooding, and availability of outlets.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Soil properties considered to be most important for terraces and diversions are steepness, shape, and length of slope; depth to rock; stones and rock outcrop; susceptibility to erosion, texture; permeability; susceptibility to siltation; suitability for plants; and availability of outlets.

Grassed waterways are structures that are shaped and vegetated for use as downslope conduits for hillside runoff. Soil properties considered to be most important for grassed waterways are susceptibility to

development—Continued

Dwellings with basements	Small commercial buildings	Local roads and streets
Moderate: slope, low strength, depth to rock, shrink-swell potential.	Severe: slope	Severe: low strength.
Moderate: slope, low strength, depth to rock.	Severe: slope	Moderate: slope, low strength.
Severe: slope	Severe: slope	Severe: slope, low strength.
Severe: slope	Severe: slope	Severe: slope.
Severe: slope, depth to rock	Severe: slope	Severe: slope.
Moderate: slope, low strength, shrink-swell potential.	Moderate: slope, low strength, shrink-swell potential.	Moderate: low strength, shrink-swell potential.
Moderate: low strength, shrink-swell potential.	Severe: slope	Moderate: slope, low strength, shrink-swell potential.
Moderate: low strength	Moderate: slope, low strength	Moderate: low strength.

of the whole mapping unit.

erosion, texture, nature and pattern of natural drainageways, stones and rock outcrop, slope, susceptibility to siltation, available water capacity, and drainage.

Formation and Classification of the Soils

This section describes the major factors of soil formation and the current system of soil classification. It also shows mechanical and chemical analyses of soils in Cleburne County.

Formation of the Soils

Soils form through the physical and chemical weathering of deposited or accumulated geologic material. The five major soil-forming factors are parent material, climate, plant and animal life, relief, and time. The relative importance of these factors differs from place to place. The effect of any one is modified to some degree by all the others. The five factors of soil formation are described in the paragraphs that follow.

Parent material.—Parent material is the unconsolidated mass from which soil forms. It is largely responsible for the chemical and mineralogical composition of soils. The parent material of the soils in Cleburne County is of two kinds: material that is residual from the weathering of rocks in place and material transported by water or gravity and laid down as unconsolidated deposits of clay, silt, sand, and gravel.

The parent material that weathered in place consists of residuum from schist, slate, or sandstone, which belong to several geologic formations (*1*).

The soils near the base of mountains and along the larger streams in the county formed in alluvium that was transported and deposited by water and laid down as unconsolidated deposits of gravelly sand, silt, or clay. Some of this material came from nearby uplands, and some came from a great distance. The soils on first bottoms still receive new soil material and, therefore, have a weakly expressed profile. Soils on terraces have been in place long enough for the formation of distinct horizons. Narrow strips of local alluvium that have not been in place long and have not been modified by soil-forming processes are along narrow drainageways throughout the uplands.

Climate.—Climate affects the physical, chemical, and biological relationships in the soil mainly through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the soil profile. The amount of water that percolates through the soil depends mainly on the amount and intensity of rainfall, on the relative humidity, and on the length of the frost-free period. The rate of downward percolation is also affected by the physiographic position and permeability of the soil. Temperature influences the kinds and growth of plants and animals in and on the soils and determines the rate of physical and chemical reactions in the soils.

Cleburne County has a temperate, humid climate. Summers are long. Hot, humid weather begins in May and continues until about mid-September. Winters are not severe, and extended periods of severe cold are rare.

Plant and animal life.—Trees, grass, earthworms, micro-organisms, and other forms of plant and animal life on and in the soils are active agents in soil formation. The kinds of plants and animals are determined

TABLE 11.—*Source material*

[Some terms in this table are explained in the glossary, where they are identified by an asterisk]

Soil name and map symbols	Road fill	Sand	Topsoil
Allen: Mapped only with Holston soils.			
Cheaha: CES	Poor: slope	Unsuited: excess fines	Poor: slope, large stones.
Fruithurst: Mapped only with Tatum and Tallapoosa soils.			
Gwinnett: Mapped only with Hiwassee soils.			
Hiwassee: [1] HGH: Hiwassee part	Fair: low strength, shrink-swell potential.	Unsuited: excess fines	Poor: thin layer.
Gwinnett part	Fair: low strength, shrink-swell potential.	Unsuited: excess fines	Poor: thin layer.
Holston: HoB	Fair: low strength	Unsuited: [2] excess fines	Good.
[1] HAR: Holston part	Fair: low strength	Unsuited: [2] excess fines	Good.
Allen part	Fair: low strength	Unsuited: excess fines	Fair: too clayey, small stones.
Louisa: Mapped only with Madison soils.			
Madison: MaC, MAH	Fair: low strength, shrink-swell potential.	Unsuited: excess fines	Poor: thin layer.
[1] MLS: Madison part	Fair: slope, low strength, shrink-swell potential.	Unsuited: excess fines	Poor: slope, thin layer.
Louisa part	Poor: thin layer	Unsuited: excess fines	Poor: slope, thin layer.
Mecklenburg: MRR	Poor: low strength	Unsuited: excess fines	Poor: thin layer.
Ochlockonee: Oc	Good	Poor: [3] excess fines	Good.
Riverview: Re	Fair: low strength	Unsuited: [3] excess fines	Good.
[1] Rs: Riverview part	Fair: low strength	Unsuited: [3] excess fines	Good.
State part	Fair: low strength	Unsuited: [3] excess fines	Good.
Sylacauga part	Fair: wetness, low strength, shrink-swell potential.	Unsuited: excess fines	Fair: too clayey.
State: St	Fair: low strength	Unsuited: [3] excess fines	Good.
Sylacauga: Sy	Fair: wetness, low strength, shrink-swell potential.	Unsuited: excess fines	Fair: too clayey.
Tallapoosa: Mapped only with Tatum soils.			
Tatum: [1] TfC: Tatum part	Poor: low strength	Unsuited: excess fines	Poor: too clayey.

TABLE 11.—*Source material*—Continued

Soil name and map symbols	Road fill	Sand	Topsoil
Fruithurst part	Fair: low strength	Unsuited: excess fines	Fair: too clayey.
[1] TFH:			
Tatum part	Poor: low strength	Unsuited: excess fines	Poor: too clayey.
Fruithurst part	Fair: low strength	Unsuited: excess fines	Fair: slope, too clayey.
[1] TTS:			
Tatum part	Poor: low strength	Unsuited: excess fines	Poor: too clayey.
Fruithurst part	Fair: slope, low strength	Unsuited: excess fines	Fair: slope.
Tallapoosa part	Poor: slope, thin layer	Unsuited: excess fines	Poor: slope, thin layer.
Waynesboro:			
WaD	Fair: low strength	Unsuited: [2] excess fines	Poor: thin layer.
[1] WhC:			
Waynesboro part	Fair: low strength	Unsuited: [2] excess fines	Poor: thin layer.
Holston part	Fair: low strength	Unsuited: [2] excess fines	Good.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

[2] Some areas in map units HAR, HoB, WhC, and WaD have materials immediately underlying the soil that are used locally as sources of gravel or clayey gravel mixtures.

[3] Some areas in map units Oc, Re, Rs, and St have materials immediately underlying the soil that are used locally as sources of sand or sand and gravel mixtures.

largely by the climate and also, to a varying degree, by the kinds of parent material, the relief, and the length of time the soil material has been in place.

The native vegetation in the county was a forest of hardwoods and pines. The dominant hardwoods on well drained uplands were oak and hickory. The dominant hardwoods along drainageways and on bottom land were white oak, water oak, red maple, yellow-poplar, and sweetgum. Loblolly pine and shortleaf pine were the dominant species of pines on uplands.

Animals continuously mix the soil material. Organisms are active in the decay of organic matter, the fixing of nitrogen, and the weathering of rock. Earthworms and other small invertebrates also slowly but continuously mix the soil.

Relief.—Relief influences soil formation through its effect on runoff and erosion, on movement of water within the soil, on plant cover, and, to some extent, on soil temperature. The relief, or topography, of the county is determined largely by the underlying bedrock and the effect of dissection by streams. The topography ranges from nearly level to steep. Runoff is more rapid in steep areas than in nearly level areas. Consequently, less water enters and moves through the soils in steep areas. The hazard of erosion increases as the slope increases. The influence of relief is modified by the other four soil-forming factors.

In Cleburne County Allen and Holston soils, for example, have slopes of less than 15 percent and have deep, well defined profiles. In the steeper areas soil material is removed by geologic erosion about as fast as it accumulates. Tallapoosa and Louisa soils, for example, have steep slopes and thin, weakly expressed profiles.

Relief also affects soils through its influence on drainage. State and Sylacauga soils, for example, formed in similar parent material on low terraces. State soils are on the elevated parts of terraces. They are well drained and have a strong brown or yellowish brown subsoil. In contrast, Sylacauga soils are in depressions in terraces and are somewhat poorly drained. They have a seasonal high water table and have gray mottles in the subsoil.

Time.—Time is required for the formation of soils that have distinct horizons. The length of time needed for the formation of a soil profile depends mainly on the other factors of soil formation. Generally, less time is needed in a humid, warm region than in a dry or cold region. Fine textured parent material forms into soil more slowly than does coarse textured parent material.

The soils of Cleburne County range from very young to very old. A young soil lacks distinct, genetically related horizons and commonly has some characteristics of its parent material. Young soils in Cleburne County are on first bottoms and steep hillsides. Riverview and Ochlockonee soils are examples of young soils that formed on first bottoms. These soils have been in place only a short time. They have not been changed enough by the soil-forming process to have well defined, genetically related horizons. Material is still being deposited on these soils in most places.

Louisa soils are examples of young soils that formed on steep hillsides. They have thin, weakly expressed horizons because the soil material is removed by geologic erosion about as fast as it accumulates.

An old soil is one that has been in place for a long time and has reached equilibrium with its environment. It has a profile of distinct, genetically related horizons. The soil material little resembles the material from

TABLE 12.—*Recreation*

[Some terms in this table are explained in the glossary, where they are identified by an asterisk]

Soil name and map symbols	Playgrounds	Picnic areas	Camp areas	Paths and trails
Allen: Mapped only with Holston soils.				
Cheaha: CES	Severe: slope, large stones.	Severe: slope	Severe: slope, large stones.	Severe: slope, large stones.
Fruithurst: Mapped only with Tatum and Tallapoosa soils.				
Gwinnett: Mapped only with Hiwassee soils.				
Hiwassee:				
[1] HGH:				
Hiwassee part	Severe: slope	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
Gwinnett part	Severe: slope	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
Holston:				
HoB	Moderate: slope	Slight	Slight	Slight.
[1] HAR:				
Holston part	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Allen part	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Louisa: Mapped only with Madison soils.				
Madison:				
MaC	Severe: slope	Slight	Slight	Slight.
MAH	Severe: slope	Moderate: slope	Moderate: slope	Slight.
[1] MLS:				
Madison part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Louisa part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Moderate: slope.
Mecklenburg: MRR	Severe: slope	Slight	Moderate: percolates slowly.	Slight.
Ochlockonee: Oc	Severe: floods	Moderate: floods	Severe: floods	Slight.
Riverview:				
Re	Severe: floods	Moderate: floods	Severe: floods	Slight.
[1] Rs:				
Riverview part	Severe: floods	Moderate: floods	Severe: floods	Slight.
State part	Moderate: floods	Moderate: floods	Severe: floods	Slight.
Sylacauga part	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: wetness.
State: St	Moderate: floods	Moderate: floods	Severe: floods	Slight.
Sylacauga: Sy	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: wetness.
Tallapoosa: Mapped only with Tatum soils.				

TABLE 12.—*Recreation*—Continued

Soil name and map symbols	Playgrounds	Picnic areas	Camp areas	Paths and trails
Tatum:				
[1] TfC:				
Tatum part	Severe: slope	Slight	Slight	Slight.
Fruithurst part	Severe: slope	Slight	Slight	Slight.
[1] TFH:				
Tatum part	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Fruithurst part	Severe: slope	Moderate: slope	Moderate: slope	Slight.
[1] TTS:				
Tatum part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Fruithurst part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Tallapoosa part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Waynesboro:				
WaD	Severe: slope	Moderate: slope	Moderate: slope	Slight.
[1] WhC:				
Waynesboro part	Severe: slope	Slight	Slight	Slight.
Holston part	Severe: slope	Slight	Slight	Slight.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

which, or in which, the soil formed. Allen, Waynesboro, and Hiwassee soils are examples.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the current system should search the latest literature available.[6]

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 14, the soil series of Cleburne County are assigned to four categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is identified by a word of three or four syllables ending in *sol* (Ult-i-sol).

SUBORDER. Each order is divided into suborders that are based mainly on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. Each suborder is identified by a word of two syllables. The last syllable indicates the order. An example is *Udult* (*Ud*, meaning humid climate and *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those having pans that interfere with growth of roots, movement of water, or both; and thick, dark colored surface horizons. The features used are the self-mulching

[6] See the unpublished working document "Selected Chapters of the Soil Taxonomy" available in the SCS State Office, Auburn, Ala.

TABLE 13.—*Water management*

[Some terms in this table are explained in the glossary, where they are identified by an asterisk]

Soil name and map symbols	Pond reservoir areas	Pond embankments	Drainage	Terraces and diversions	Grassed waterways
Allen: Mapped only with Holston soils.					
Cheaha: CES	Seepage, depth to rock.	Seepage, piping, large stones.	Not needed	Slope, large stones, easily erodible.	Slope, large stones, easily erodible.
Fruithurst: Mapped only with Tatum and Tallapoosa soils.					
Gwinnett: Mapped only with Hiwassee soils.					
Hiwassee:					
[1] HGH:					
Hiwassee part	Seepage	Compressibility, piping.	Not needed	Slope	Slope.
Gwinnett part	Seepage, depth to rock.	Compressibility, piping, thin layer.	Not needed	Slope	Slope.
Holston:					
HoB	Seepage	Compressibility, piping.	Not needed	Complex slope	Favorable.
[1] HAR:					
Holston part	Seepage	Compressibility, piping.	Not needed	Complex slope	Favorable.
Allen part	Seepage	Compressibility, piping.	Not needed	Complex slope	Favorable.
Louisa: Mapped only with Madison soils.					
Madison:					
MaC, MAH	Seepage, depth to rock.	Compressibility, piping, thin layer.	Not needed	Slope	Slope.
[1] MLS:					
Madison part	Seepage, depth to rock.	Compressibility, piping, thin layer.	Not needed	Slope	Slope.
Louisa part	Seepage, depth to rock.	Seepage, piping; thin layer.	Not needed	Slope, depth to rock.	Slope.
Mecklenburg: MRR	Depth to rock	Compressibility, thin layer.	Not needed	Complex slope	Favorable.
Ochlockonee: Oc	Seepage	Seepage, piping, easily erodible.	Floods	Not needed	Favorable.
Riverview:					
Re	Seepage	Seepage, piping	Floods	Not needed	Favorable.
[1] Rs:					
Riverview part	Seepage	Seepage, piping	Floods	Not needed	Favorable.
State part	Seepage	Seepage, piping	Floods	Not needed	Favorable.
Sylacauga part	Favorable	Compressibility, piping, low strength.	Floods, wetness, percolates slowly.	Not needed	Wetness, percolates slowly.

TABLE 13.—*Water management*—Continued

Soil name and map symbols	Pond reservoir areas	Pond embankments	Drainage	Terraces and diversions	Grassed waterways
State: St	Seepage	Seepage, piping	Floods	Not needed	Favorable.
Sylacauga: Sy	Favorable	Compressibility, piping, low strength.	Floods, wet, percolates slowly.	Not needed	Wetness, percolates slowly.
Tallapoosa: Mapped only with Tatum soils.					
Tatum:					
[1] TfC:					
Tatum part	Seepage, depth to rock.	Compressibility, low strength.	Not needed	Slope	Slope.
Fruithurst part	Seepage, depth to rock.	Piping, thin layer.	Not needed	Slope	Slope.
[1] TFH:					
Tatum part	Seepage, depth to rock.	Compressibility, low strength.	Not needed	Slope	Slope.
Fruithurst part	Seepage, depth to rock.	Piping, thin layer.	Not needed	Slope	Slope.
[1] TTS:					
Tatum part	Seepage, depth to rock.	Compressibility, low strength.	Not needed	Slope	Slope.
Fruithurst part	Seepage, depth to rock.	Piping, thin layer.	Not needed	Slope	Slope.
Tallapoosa part	Seepage, depth to rock.	Seepage, piping, thin layer.	Not needed	Slope, depth to rock, rooting depth.	Slope, rooting depth.
Waynesboro:					
WaD	Seepage	Compressibility, piping.	Not needed	Slope	Slope.
[1] WhC:					
Waynesboro part	Seepage	Compressibility, piping.	Not needed	Slope	Slope.
Holston part	Seepage	Compressibility, piping.	Not needed	Complex slope	Favorable.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the dark red and dark brown colors associated with basic rocks. Each great group is identified by a word of three or four syllables; a prefix is added to the name of the suborder. An example is Hapludults (*Hapl,* meaning simple horizons, *ud* for humid climate, and *ult* for Ultisols).

SUBGROUP. Each great group is divided into subgroups, one representing the central, or typic, segment of the group, and others called intergrades, which have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups also represent intergrades outside the range of any other great group, suborder, or order. Each subgroup is identified by one or more adjectives before the name of the great group. An example is Typic Hapludults (a typical Hapludult).

FAMILY. Soil families are established within a subgroup mainly on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for the soil properties, such as texture and mineralogy, that are used as family differentiae. An example is the clayey, mixed, thermic family of Typic Hapludults.

TABLE 14.—*Soil series classified by higher categories*

Series	Family	Subgroup	Order
Allen	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Cheaha	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Fruithurst	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Gwinnett [1]	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Hiwassee [1]	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Holston	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Louisa	Loamy, micaceous, thermic, shallow	Ruptic-Ultic Dystrochrepts	Inceptisols.
Madison [1]	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Mecklenburg [2]	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Ochlockonee	Coarse-loamy, siliceous, acid, thermic	Typic Udifluvents	Entisols.
Riverview	Fine-loamy, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
State	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Sylacauga	Fine-silty, mixed, thermic	Aeric Ochraquults	Ultisols.
Tallapoosa [3]	Loamy, micaceous, thermic, shallow	Ochreptic Hapludults	Ultisols.
Tatum	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Waynesboro	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.

[1] Laboratory data indicate that these soils have oxidic mineralogy, but the classification has not been changed pending further studies and consideration of these and similar soils.

[2] These soils are taxadjuncts to the Mecklenburg series because the clay content of the B2t horizon is less than is defined as the range for the series. This difference, however, does not alter their use or management.

[3] These soils are taxadjuncts to the Tallapoosa series because the mica content is less than is defined as the range for the series. This difference, however, does not alter their use or management.

Mechanical and Chemical Analyses of Soils [7]

Mechanical and chemical data obtained from laboratory analyses are helpful to the soil scientist in classifying soils. These data are helpful in estimating available water capacity, acidity, base exchange capacity, mineralogical composition, and other characteristics that affect soil use and management. The data are also useful in developing concepts of soil formation and refining soil series concepts. They could be useful to future researchers in solving soil problems and developing soil interpretations for soils in Cleburne County.

Data for mechanical and chemical analyses for each soil series in Cleburne County are shown in table 15. The data were obtained by published laboratory methods of the Soil Conservation Service (*11*) and Auburn University (*5*).

Climate [8]

The climate of Cleburne County is temperate, and rainfall is generally well distributed throughout the year. Temperature and precipitation data are shown in table 16. Except for the summer months, day to day weather is the result of the march of pressure systems and contrasting air masses across the south. In summer when the climate borders on the subtropical, moist tropical air prevails along with a weak, permanent high pressure system.

Spring, the most changeable season, has a large range in temperature and variable rainfall. The vagaries of spring weather make it difficult to plan fieldwork with any certainty. In March the days are frequently cold, rainy, and windy, but the approach of May brings sunny, warm, and pleasant days. Freezing temperatures occur as late as early in May, but daytime readings reach the 90's late in May. Low temperatures late in spring vary greatly because of the terrain. March is the wettest month of the year. Rainfall decreases in April and May. Dry spells are common in May and June, but moisture is generally adequate for plant growth. These dry spells are beneficial for cultivation and other needed fieldwork. Severe thunderstorms and occasional tornadoes are likely in spring.

The summer season is long. Warm to hot weather begins late in May or June and continues into September and often into October. Breaks in the hot weather are few in July and August. Only the frequency of afternoon thundershowers distinguishes one day from another. Thundershowers provide most of the summer rainfall. They occur on the average about 1 day in 3 and vary greatly in the amount of rainfall. Rainfall during July is essential for maximum yields of most crops. July is the most dependable of the summer months for rain. The average number of days with maximum temperatures of 90° F or more is near 75 for the season. High temperatures of 100° or more are common during extended dry periods, when the effects of the heat are more harmful to crops.

Fall is a season of transition when the hot, humid weather early in September gradually gives way to the mild, sunny, and generally dry days of October. Rainfall is generally light and infrequent, skies are sunny during the day and clear at night, humidity is low, and temperature extremes are rare. Extended periods without rain are common, resulting occasionally in mild droughts. The dry periods are favorable for the harvest of crops. During some years, however,

[7] B. F. HAJEK, associate professor of agronomy and soils, Auburn University, Auburn, Alabama, helped prepare this section.

[8] This section was prepared by the National Weather Service Office of the National Oceanic and Atmospheric Administration, Montgomery, Alabama.

the lack of moisture hinders the germination and growth of small grain that is planted early in fall. Prewinter cold spells begin early in October and become more common in November. Table 17 gives the probabilities of the first low temperatures in fall and the last low temperatures in spring. The occurrence of the first and last frosts is commonly determined by the terrain. For example, the hillsides remain frost free longer than the lower valleys.

In winter there are frequent shifts and interaction between mild air, which has been warmed and moistened by travel over the Gulf of Mexico, and cold, dry air from the north. As a result, winter is characterized by considerable cloudiness and precipitation that is mainly rain. Snow is likely every winter, but amounts are generally light and remain on the ground for only a day or two. Measurable rain can be expected on 1 out of 3 days, and cloudy days often prevail for 3 or 4 days at a time. Minimums of 32° or less can be expected on 2 out of 3 days during December and January and on almost half the days in November, February, and March. Temperatures of 10° or less are rare and last only a day or two.

Prevailing winds vary with locale, but are generally northeasterly in winter, westerly in spring and early in summer, and easterly late in summer and in fall. Average humidity for the year is near 70 percent. The humidity varies greatly during the day. The average number of hours of sunshine is near 2,750 per year, which is about 65 percent of the possible sunshine.

Rainfall is generally the most important weather element in determining crop yields. In most years the amount and timeliness of rain is adequate for good yields, but wet and dry spells of varying intensity occur. A mild drought that slightly affects crop yields but does not cause a total crop failure is likely for about a month on the average of 2 out of 3 years. A severe drought that results in almost total crop failure is very rare. None has occurred in the past 30 years.

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Glossary

[Asterisks indicate terms used in tables 9, 10, 11, 12, and 13]

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

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

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

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

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

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

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

* **Complex slope.** Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

* **Compressible.** Excessive decrease in volume of soft soil under load.

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

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

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

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

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

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

TABLE 15.—*Mechanical and*
[Analysis made by Auburn

Soil name and sample number	Horizon	Depth from surface	Particle-size distribution		
			Sand (2.0 to 0.05 mm)	Silt (0.05 to 0.002 mm)	Clay (less than 0.002 mm)
		Inches	*Percent*	*Percent*	*Percent*
Allen loam, S72Ala–15–11.	A1	0–5	44.5	40.4	15.1
	A21t	5–36	37.8	30.2	32.0
	B22t	36–60	49.0	20.5	30.5
Cheaha stony silt loam, S73Ala–15–20.	A1	0–4	33.4	52.2	14.4
	B21t	4–23	31.4	50.3	18.3
	B22t	23–35	31.3	40.8	27.9
Fruithurst loam, S73Ala–15–19.	A1	0–5	49.6	41.1	9.3
	B1	5–10	47.6	41.5	10.9
	B21t	10–18	31.2	46.4	22.4
	B22t	18–29	32.1	44.4	23.5
	B23t	29–39	39.8	37.5	22.7
	C	39–50	56.4	33.2	10.4
Gwinnett silty clay loam, S73Ala–15–16.	A1	0–4	18.4	49.9	31.7
	B2t	4–22	14.4	34.9	50.7
	B3	22–36	25.1	37.7	37.2
	C1	36–44	62.4	33.2	4.4
Hiwassee clay loam, S73Ala–15–15.	A1	0–3	32.4	34.0	33.6
	B2t	3–51	22.2	25.6	52.2
	C	51–57	48.6	21.1	30.3
Holston loam, S72Ala–15–3.	Ap	0–5	43.6	48.4	8.0
	B21	5–20	31.9	48.9	19.2
	B22t	20–33	36.2	41.2	22.6
	B23t	33–65	31.2	38.0	30.8
Louisa gravelly sandy loam, S73Ala–15–21.	A1	0–4	64.8	26.4	8.8
	B1	4–13	57.0	33.2	9.8
	B2	13–19	49.9	36.1	14.0
Madison gravelly sandy loam, S73Ala–15–14.	A1	0–5	62.9	28.9	8.2
	B2t	5–38	33.1	22.5	44.4
Mecklenburg silt loam, S73Ala–15–22.	A1	0–4	23.7	54.7	21.6
	B2t	4–24	11.0	58.4	30.6
Ochlockonee loamy fine sand, S72Ala–15–10.	A1	0–9	81.1	10.8	8.1
	C1	9–20	74.6	17.8	7.6
	C2	20–37	71.3	21.0	7.7
	C3	37–80	67.9	21.8	10.3
Riverview loam, S73Ala–15–12.	A1	0–10	40.1	44.9	15.0
	B2	10–39	27.8	53.4	18.8
	C1	39–52	56.3	30.1	13.6
	C2	52–64	63.5	25.3	11.2
State loam, S73Ala–15–13.	A12	2–6	47.2	40.4	12.4
	B21t	6–27	31.8	49.0	19.2
	B22t	27–40	13.3	63.9	22.8
	B3	40–55	16.7	51.9	31.4
Sylacauga silt loam, S72Ala–15–4.	Ap	0–7	23.6	56.8	19.6
	B21t	7–16	28.1	44.4	27.5
	B22t	16–65	21.8	45.0	33.2
Tallapoosa silt loam, S72Ala–15–8.	A1	0–4	12.8	65.3	21.9
	B2t	4–13	14.6	60.6	24.8
	C1	13–20	43.1	29.9	27.0
Tatum loam, S72Ala–15–6.	A1	0–5	46.1	41.8	12.1
	B2t	5–26	19.7	43.6	36.7
	C	26–40	50.6	40.9	8.5
Waynesboro fine sandy loam, S72Ala–15–5.	Ap	0–5	52.3	30.5	17.2
	B21t	5–25	42.5	23.9	33.6
	B22t	25–75	31.9	23.0	45.1
	C1	75–96	52.5	13.3	34.2

chemical analyses of soils
University, Auburn, Alabama]

USDA texture	Extractable bases			Extractable acidity	Base saturation	Reaction (soil: water ratio 1:1)
	Calcium	Magnesium	Potassium			
	Meq per 100 g of soil	*Meq per 100 g of soil*	*Meq per 100 g of soil*	*Meq per 100 g of soil*	*Percent*	*pH*
Loam	0.82	0.38	0.16	6.00	18.56	5.0
Clay loam	.18	.19	.09	7.12	6.22	4.9
Sandy clay loam	.16	.04	.04	6.80	3.55	4.9
Silt loam	.26	.05	.10	8.48	4.03	4.2
Silt loam	.12	.03	.06	6.08	3.50	4.5
Clay loam	.16	.10	.05	7.68	3.97	5.0
Loam	.69	.13	.18	5.76	14.79	5.0
Loam	.42	.10	.07	5.68	9.41	4.7
Loam	.44	.13	.09	6.80	8.85	4.8
Clay loam	.32	.16	.13	7.36	7.65	4.9
Clay loam	.25	.20	.11	8.08	6.48	4.9
Saprolite	.14	.08	.06	5.92	4.52	4.8
Silty clay loam	1.95	1.59	.21	8.16	31.49	5.2
Clay	.30	.16	.04	6.88	6.78	5.1
Clay loam	.14	.07	.03	7.28	3.19	5.1
Sandy loam	.14	.04	.04	5.60	3.78	5.1
Clay loam	1.35	.79	.14	3.44	39.86	5.3
Clay	.24	.25	.04	5.20	9.25	5.2
Sandy clay loam	.15	.04	.03	3.60	5.76	5.0
Loam	1.00	.76	.20	2.88	40.6	5.6
Loam	1.82	.20	.05	3.36	38.1	5.5
Loam	.78	.12	.05	5.60	14.6	4.8
Clay loam	.05	.17	.05	7.20	3.6	4.7
Sandy loam	.16	.05	.11	5.84	5.38	4.5
Sandy loam	.08	.02	.05	3.52	4.42	4.9
Loam	.08	.02	.04	3.30	4.28	4.9
Sandy loam	.35	.07	.06	2.64	15.38	5.0
Clay	.62	.34	.05	6.08	14.25	5.2
Silt loam	6.00	2.62	.15	4.72	65.03	5.6
Silty clay loam	1.40	3.52	.03	4.64	51.65	6.5
Loamy sand	.18	.07	.05	2.72	9.9	5.2
Sandy loam	.10	.02	.04	2.88	5.3	5.0
Sandy loam	.12	.08	.05	2.24	10.2	5.1
Sandy loam	.18	.09	.04	2.96	9.5	5.0
Loam	.27	.06	.07	5.84	6.41	4.5
Silt loam	.35	.03	.05	6.32	6.37	4.6
Sandy loam	.25	.03	.05	3.28	9.14	4.7
Sandy loam	.19	.02	.05	3.44	7.03	4.6
Loam	1.06	.18	.07	5.04	20.63	4.9
Loam	.42	.14	.05	5.20	10.50	4.7
Silt loam	.30	.16	.05	6.48	7.30	4.7
Silty clay loam	.32	.44	.06	8.72	8.60	4.5
Silt loam	.90	.31	.08	5.84	18.1	5.0
Clay loam	.68	.31	.07	5.60	15.9	4.7
Clay loam	.38	.89	.07	8.24	13.9	5.0
Silt loam	.74	.15	.16	8.32	11.21	4.7
Silt loam	.20	.08	.15	7.04	5.76	4.6
Loam	.20	.20	.19	5.20	10.19	4.9
Loam	.36	.16	.14	4.56	12.6	4.9
Clay loam	.14	.33	.07	6.56	7.6	4.9
Loam	.09	.20	.06	1.84	16.0	5.0
Sandy loam	.36	.23	.07	3.84	14.7	4.8
Clay loam	.64	.66	.08	5.84	19.0	5.0
Clay	.14	.08	.08	7.04	4.1	4.9
Sandy clay loam	.09	.04	.05	6.40	2.7	4.9

TABLE 16.—*Temperature and precipitation*

[Based on data from Heflin and Hightower, Cleburne County]

Month	Temperature				Precipitation			
			Two years in 10 will have at least 4 days with—		Average monthly total	One year in 10 will have—		Average snowfall
	Average daily maximum	Average daily minimum	Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—	
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*	*Inches*
January	53	28	70	9	4.9	2.9	8.2	0.6
February	56	30	72	14	5.0	2.2	8.6	.5
March	63	35	80	21	6.5	3.0	9.8	.2
April	75	45	84	31	5.3	2.2	8.7	0
May	82	52	91	41	3.7	1.1	7.5	0
June	87	60	96	52	3.9	2.0	6.1	0
July	90	64	97	58	5.0	2.4	7.3	0
August	90	63	97	56	3.8	1.4	7.6	0
September	85	57	95	45	4.3	.6	7.7	0
October	75	45	87	28	2.9	.7	5.9	0
November	65	34	78	21	4.1	1.2	7.1	[1] T
December	56	30	68	15	4.9	2.0	7.9	T
Year	73	45	[2] 99	[3] 5	53.3	46.9	60.4	1.6

[1] Trace—less than .05 inch. [2] Average annual maximum. [3] Average annual minimum.

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

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

* **Depth to rock.** Bedrock at a depth that adversely affects the specified use.

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

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

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

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

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

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

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

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

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

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains.
Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

* **Excess fines.** Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

* **Favorable.** Favorable soil features for the specific use.

TABLE 17.—*Probabilities of last low temperatures in spring and first in fall*

[Based on data from Heflin, Cleburne County]

Probability	Dates for given probability and temperature					
	20° F or less	24° F or less	28° F or less	32° F or less	36° F or less	40° F or less
Spring:						
1 year in 10 later than	March 22	April 3	April 21	May 4	May 17	May 21
1 year in 4 later than	March 21	March 31	April 14	April 24	May 13	May 17
1 year in 3 later than	March 18	March 28	April 9	April 22	May 12	May 16
2 years in 3 later than	March 1	March 19	March 28	April 12	April 24	May 2
3 years in 4 later than	February 23	March 17	March 23	April 9	April 22	May 1
9 years in 10 later than	February 11	March 7	March 22	March 24	April 15	April 23
Fall:						
1 year in 10 earlier than	November 4	October 26	October 24	October 5	September 30	September 24
1 year in 4 earlier than	November 7	November 1	October 26	October 16	October 5	September 29
1 year in 3 earlier than	November 13	November 2	October 28	October 18	October 6	October 1
2 years in 3 earlier than	November 21	November 7	November 3	October 26	October 18	October 7
3 years in 4 earlier than	November 30	November 8	November 5	October 28	October 19	October 17
9 years in 10 earlier than	December 20	November 18	November 10	November 4	October 21	October 19

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

* **Large stones.** Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

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

* **Low strength.** Inadequate strength for supporting loads.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—few, common, and many; size—fine, medium, and coarse; and contrast—faint, distinct, and prominent. The size measurements are of the diameter along the greatest dimension. Fine indicates less than 5 millimeters (about 0.2 inch); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and coarse, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

* **Percs slowly.** The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

* **Piping.** Formation by moving water of subsurface tunnels or pipelike cavities.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

* **Rooting depth.** Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

* **Seepage.** The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

* **Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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