United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Alabama Agricultural Experiment Station and Alabama Soil and Water Conservation Committee

Soil Survey of Bullock County, Alabama

How To Use This Soil Survey

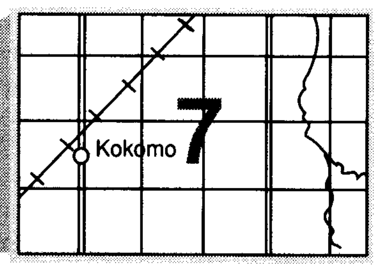
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

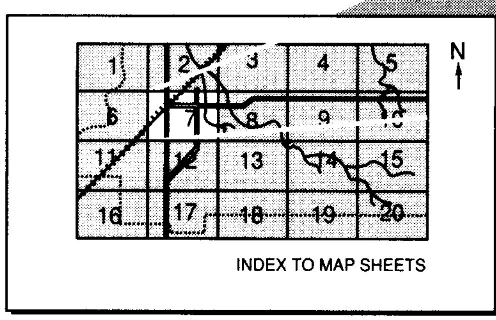
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

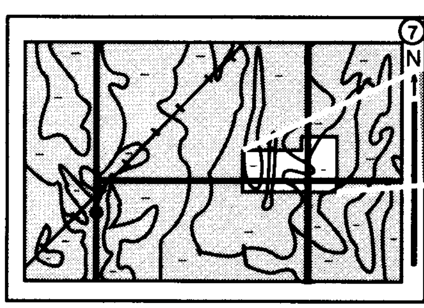


MAP SHEET

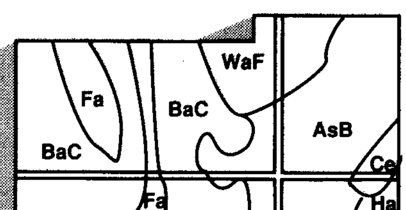
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Natural Resources Conservation Service and the Alabama Agricultural Experiment Station, the Alabama Cooperative Extension Service, the Alabama Soil and Water Conservation Committee, and the Alabama Department of Agriculture and Industries. It is part of the technical assistance furnished to the Bullock County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A pointer has located a covey of quail in an area of Maytag silty clay, 3 to 8 percent slopes, eroded. Areas of this soil, which were once used for cultivated crops, are now managed as habitat for openland wildlife.

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AgB—Alaga loamy sand, 2 to 8 percent slopes 15
BaE—Blanton loamy sand, 8 to 20 percent slopes 16
BbB—Blanton-Bonifay loamy sands, 2 to 8 percent slopes 17
CaB—Compass loamy fine sand, 0 to 5 percent slopes 20
CeB2—Conecuh sandy loam, 2 to 5 percent slopes, eroded 20
CeC2—Conecuh sandy loam, 5 to 8 percent slopes, eroded 22
CeE—Conecuh sandy loam, 8 to 20 percent slopes 23
CoB2—Cowarts sandy loam, 2 to 6 percent slopes, eroded 24
CuD2—Cowarts-Luverne loamy sands, 6 to 12 percent slopes, eroded 25
CuE—Cowarts-Luverne loamy sands, 12 to 25 percent slopes 26
EaB—Eunola loamy sand, 1 to 3 percent slopes 28
GoA—Goldsboro loamy fine sand, 0 to 2 percent slopes 30
HoA—Houlka clay, 0 to 1 percent slopes, frequently flooded 31
KpB2—Kipling fine sandy loam, 1 to 3 percent slopes, eroded 31
LnB—Luverne loamy sand, 2 to 8 percent slopes 33
LnE2—Luverne loamy sand, 8 to 20 percent slopes, eroded 34
LoE—Luverne-Blanton loamy sands, 5 to 20 percent slopes 35
LtF—Luverne-Blanton-Cowarts complex, 15 to 45 percent slopes 37
LyA—Lynchburg-Ocilla complex, 0 to 2 percent slopes, rarely flooded 38
MBA—Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded 40
MgB2—Maytag silty clay, 1 to 3 percent slopes, eroded 42
MgD2—Maytag silty clay, 3 to 8 percent slopes, eroded 44
MgE2—Maytag silty clay, 8 to 12 percent slopes, eroded 45
MkE2—Maytag-Oktibbeha complex, 3 to 12 percent slopes, eroded 46
MnA—Minter loam, 0 to 1 percent slopes, occasionally flooded 47
OcA—Ocilla loamy fine sand, 0 to 2 percent slopes, rarely flooded 48
OkB2—Oktibbeha clay loam, 1 to 3 percent slopes, eroded 49
OkD2—Oktibbeha clay loam, 3 to 8 percent slopes, eroded 50
OkE2—Oktibbeha clay loam, 8 to 15 percent slopes, eroded 53
OrB2—Orangeburg loamy sand, 2 to 5 percent slopes, eroded 54
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Foreword

This soil survey contains information that can be used in land-planning programs in Bullock County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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State Conservationist
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Soil Survey of Bullock County, Alabama

By Cleo Stubbs, Natural Resources Conservation Service

Fieldwork by Cleo Stubbs, Herbert L. Ross, Delaney B. Johnson, Johnny C. Travick, and James E. Boman, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Alabama Agricultural Experiment Station, the Alabama Cooperative Extension Service, the Alabama Soil and Water Conservation Committee, and the Alabama Department of Agriculture and Industries

BULLOCK COUNTY is in the southeastern part of Alabama (fig. 1). Union Springs, the county seat, had a population of 4,431 in 1980 *(3)*. The total area of the county, including areas of water, is 401,000 acres, or about 626.6 square miles.

The city of Union Springs and unincorporated areas had a total population of 10,596 in 1980 *(3)*. Midway, Fitzpatrick, Mitchell Station, Inverness, Peachburg, and Perote are among the many small communities in the county. Bullock County, although sparsely populated, has a nearly equal distribution of residents. Two major highways pass through Union Springs. U.S. Highway 82 runs east to west, and U.S. Highway 29 runs north to south. Farming, timber, and related industries are the main sources of income for most of the residents. The construction of a new correctional facility has spurred some economic growth in the form of service-related businesses.

Many small landowners are in the county. However, most of the land in the county is owned in large tracts, which are several hundred acres or more in size. The large tracts are owned by corporations, absentee owners, or individual families. They are used for hunting, are held for aesthetic qualities, or are loosely managed for timber production.

General Nature of the County

This section gives general information about the county. It provides a brief description of history, natural resources, geology, farming, and climate.

History

The area of land that makes up present-day Bullock County belonged to the Creek Indians until the Treaty of Fort Jackson in 1814. On December 5, 1866, the Alabama Legislature approved an act that created a new county from parts of southern Macon County, eastern Montgomery County, western Barbour County, and northern Pike County. The county was named Bullock County in honor of an officer in the militia. The first European settler in the area was B.F. Baldwin. He lived peaceably with the Indians and adapted many of their customs. Conflicts later developed between the Indians and the European settlers, and they lasted until the military became involved. Despite the conflicts, people continued to settle in the area. Settlements were made at Midway, Enon, Guerrytown, Suspension, and Union Springs. Prosperous settlers from North Carolina, South Carolina, and Georgia chose to settle the Chunnunneggee Ridge because of the fertile soil and excellent water supply *(11)*.

Union Springs, the county seat and the largest town in the county, is centrally located. It was settled about thirty years before the county was created. It is located on a ridge at a point where four springs form the sources of water for four perennial streams, and it was named for this natural geological occurrence *(11)*. On January 13, 1844, Governor Fitzpatrick signed a bill that incorporated Union Springs. The city of Union Springs is about an equal distance from Eufaula and Montgomery. It is believed the first horticultural society

Figure 1.—Location of Bullock County in Alabama.

in the south was organized in Union Springs on March 6, 1847 *(11)*.

Farming, the main economic enterprise in the county, was profitable during the years of significant cotton production. As the profitability of cotton began to decline, the residents of the county experienced a tough economic period. Many of the farmers realized that a change was necessary, and they began a transition in farming from row crops to cattle. As this transition occurred, the population in Bullock County steadily declined from about 30,000 residents during the late 1940's *(3)* to 10,596 residents in 1980. Presently, the county is basically a farming community that has a relatively stable population.

Natural Resources

Soil. Soil is one of the most important natural resources in the county. The pastures that are grazed by livestock, the crops that are produced on farms, and the timber that is produced in areas of woodland are all marketable products that are derived from the soil.

Water. Bullock County has an adequate supply of water for domestic uses and for livestock. The Conecuh River, the Pea River, and their tributaries drain the southern part of the county. Line Creek, Bughall Creek, and their tributaries drain the area north of the Chunnennuggee Ridge. The water for domestic uses is mainly drawn from wells by large and small pumping systems. Several lakes and ponds are throughout the county. They are used by livestock and wildlife, provide recreational opportunities, and offer aesthetic qualities. Flood-retarding structures were built on several major streams and creeks to prevent downstream flood damage. Some of the impoundments serve as a source of water for livestock and for domestic uses.

Forest. About 67 percent, or about 267,600 acres, of the total land area in the county is forested *(19)*. Timber is produced mainly in the southern part of the county on soils that are well suited to pine trees. Many acres of cropland and pasture are currently being converted to woodland by timber companies and by individual landowners (fig. 2). Pine trees are also grown on the acid soils of the Blackland Prairie north of Chunnenugee Ridge. A pine tree seedling nursery is south of Union Springs (fig. 3).

Geology

The Chunnennuggee Ridge divides the two major land resource areas in Bullock County *(14)*. The northern part of the county is in the Alabama-Mississippi Blackland Prairie major land resource area. The soils formed in chalk, marl, and limestone deposits of the Bluffton, Eutaw, Mooreville, and Demopolis Chalk Formations *(14)*. The land area consists of a network of low hills and irregular ridges that have narrow, v-shaped valleys. The southern part of the county is in the Coastal Plain major land resource area. The soils formed in unconsolidated marine sediments of the Ripley, Clayton, and Providence Formations *(14)*. Some areas consist of rolling hills that are dissected by a dendritic drainage pattern. The sandy areas are plateaulike upland flats that have steep, short side slopes. Low stream terraces and flood plains are also in Bullock County. They range from one-eighth mile to nearly one mile in width. The soils in these areas are

Figure 2.—Young loblolly pine trees in an area of Oktibbeha clay loam, 3 to 8 percent slopes, eroded. Many areas of soils that are marginal for use as cropland are being planted to pine trees.

quite diverse, and they formed from deposits of the land in the watershed.

High Ridge, in the southwestern part of the county, is believed to be the highest point in Bullock County. It is about 620 feet above sea level. The lowest point, about 240 feet above sea level, is believed to be at a point where Line Creek flows out of the county.

Farming

Soybeans and grain sorghum are the major cultivated crops in Bullock County. Presently, many soybean farmers are also planting small grain to utilize the land during winter. The county also has small acreages of cotton and corn. Hay, grown to sell to livestock

Figure 3.—A pine tree seedling nursery in an area of Blanton-Bonifay loamy sands, 2 to 8 percent slopes.

producers, is produced throughout the county on relatively small acreages. Peanuts, which are grown only in the southern part of the county, are the leading and most profitable cash crop. Specialty crops of economic significance include pecans, vegetable crops, sod, and nursery crops.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Bullock County has long, hot summers because moist tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short. A rare cold wave lingers for 1 or 2 days. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation, mainly in the form of afternoon thunderstorms, is adequate for the growth of all crops.

Severe local storms, including tornadoes, strike occasionally in or near the county. They are short in duration and cause variable and spotty damage. Every few years in summer or fall, a tropical depression or a remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Union Springs in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 46 degrees F and the average daily minimum temperature is 36 degrees. The lowest temperature on record, which occurred at Union Springs on January 21, 1985, is -2 degrees. In summer, the average temperature is 70 degrees and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred at Union Springs on July 24, 1952, is 107 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 54 inches. Of this, 27 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 7.40 inches at Union Springs on March 17, 1990. Thunderstorms occur on about 61 days each year, and most occur in summer.

Snowfall is rare. In 99 percent of the winters, there is no measurable snowfall. In 1 percent, the snowfall, usually of short duration, is less than 1 inch.

The average relative humidity in midafternoon is about 56 percent. Humidity is higher at night, and the average at dawn is about 86 percent. The sun shines 63 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management.

Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Survey Procedures

The general procedures followed in making this survey are described in the "National Soil Survey Handbook" *(20)* of the Natural Resources Conservation Service. The soil survey of Bullock County, published in 1913, and the "Generalized Geologic Map of Bullock County, Alabama" *(14)* were among the references used.

Before the fieldwork began, preliminary boundaries of landforms were plotted stereoscopically, at a scale of 1:20,000, on high-altitude aerial photographs that were flown in 1980. Photographs at the same scale and other scales and soil surveys that were produced for conservation planning since 1937 were studied to relate land and image features.

General soil map units were surveyed by random transect method and by random observations made by vehicle on the existing network of roads and trails. In other parts of the survey area, traverses were made mostly on foot and by vehicle, at intervals of about one-fourth mile. They were made at closer intervals in areas of high variability.

Soil examinations along the traverses were made 50, 100, and 300 feet apart, depending on the landscape and the soil patterns *(13, 15)*. Observations of landforms, uprooted trees, vegetation, roadbanks, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined on the basis of landform positions, soil examinations, observations, and photo interpretation. The soil material was examined with the aid of a spade, a hand auger, or a truck probe to a depth of about 5 feet. The pedons described as typical were observed and studied in pits that were dug by hand.

Samples for chemical and physical analyses and engineering test data were taken from the site of the typical pedon of some of the major soils in the survey area. The analyses were made by Auburn University, Auburn, Alabama *(12)*, and by the State of Alabama Highway Department, Montgomery, Alabama *(4, 5)*. Some of the results of the analyses are published in this soil survey.

After completion of the soil mapping on high-altitude aerial photographs, the map unit delineations were transferred by hand to photo base sheets at a scale of 1:20,000. Surface drainage was mapped in the field. Cultural features were transferred from the U.S. Geological Survey 7½-minute topographic maps and were recorded from visual observations.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It also shows the suitability of each for major land uses and the soil properties that limit use.

Each map unit is rated for *cultivated crops, pasture and hay, woodland, urban uses,* and *recreational areas.* Cultivated crops are those grown extensively in the survey area. Pasture and hay refer to improved, locally grown grasses and legumes. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreational areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreational areas are those used for nature study and as wilderness.

1. Oktibbeha-Maytag

Nearly level to strongly sloping, moderately well drained soils that have a clayey subsoil

This map unit mainly consists of soils on ridgetops and side slopes of the Blackland Prairie. The landscape generally consists of broad, nearly level to gently sloping ridgetops and long, gently sloping to strongly sloping side slopes. Slopes are mainly 1 to 12 percent, but they range from 0 to 15 percent.

About 85 percent of the acreage of this unit has been cleared. Most of the cleared areas were once used for cultivated crops but are now used for pasture or hay. A small acreage is still used for cultivated crops. The main crops are grain sorghum, soybeans, and cotton. The wooded areas of this unit are mainly on side slopes and in narrow drainageways, but a few large areas support mixed hardwoods and pine or have been planted to loblolly pine.

This map unit makes up about 15 percent of the county. It is about 69 percent Oktibbeha soils, 22 percent Maytag soils, and 9 percent soils of minor extent.

Oktibbeha soils are on ridgetops and side slopes. Typically, they have a very dark grayish brown clay loam surface layer. The subsoil is yellowish red clay in the upper part, red clay in the middle part, and light olive brown and olive silty clay in the lower part. The substratum is pale olive and olive yellow clay that has few calcium carbonate nodules.

Maytag soils are in landscape positions similar to those of the Oktibbeha soils. Typically, they have an olive silty clay surface layer. The subsoil is light olive brown silty clay in the upper part, olive yellow clay in the middle part, and pale olive clay in the lower part. Soft accumulations and hard nodules of calcium carbonate are throughout the subsoil.

Of minor extent in this map unit are the somewhat poorly drained Kipling and Vaiden soils on nearly level ridgetops and the somewhat poorly drained Sucarnoochee soils in drainageways.

The soils in this map unit are fairly suited to cultivated crops. They are well suited to pasture and hay. The main limitations are the slope and poor tilth. If the soils are tilled, erosion is a moderate to severe hazard. Practices such as conservation tillage, cover crops, stripcropping, grassed waterways, and contour farming help to control runoff and reduce the hazard of erosion. Returning crop residue to the soil helps to reduce erosion and improves soil tilth.

The soils in this map unit are fairly suited to woodland. The productivity of loblolly pine is moderately high in areas of Oktibbeha soils. The main limitations are the clayey texture, which can limit the use of equipment during wet periods, and the high pH of Maytag soils. Loblolly pine is suitable for planting in areas of Oktibbeha soils, and eastern redcedar is suitable for planting in areas of Maytag soils.

The soils in this map unit are poorly suited to most urban uses. The main limitations are the very slow permeability and the high shrink-swell potential. The slope is a limitation for some uses in areas of soils on strongly sloping side slopes.

The soils in this map unit are poorly suited to intensive recreational areas and are well suited to extensive recreational areas. The main limitations are the clayey surface texture, the very slow permeability, and the slope.

Oktibbeha soils are well suited and Maytag soils are fairly suited as habitat for woodland and openland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

2. Blanton-Luverne

Nearly level to moderately steep, moderately well drained and well drained soils that have a loamy or a clayey subsoil

This map unit mainly consists of soils on broad, nearly level to gently sloping ridgetops and on short, strongly sloping to moderately steep side slopes. The drainage pattern is poorly defined, especially in areas of Blanton soils. Slopes are mainly 2 to 8 percent, but they range from 0 to 20 percent.

About 50 percent of the acreage of this unit has been cleared. The cleared areas are used for cultivated crops, pasture, or hay. Peanuts are the main cultivated crop grown in nearly level to gently sloping areas of the sandy Blanton soils. Coastal bermudagrass is the main grass grown for hay. Most of the cleared areas of the clayey Luverne soils and similar soils are used for bahiagrass or native pasture. Other crops include soybeans, corn, grain sorghum, cotton, and truck crops. The wooded areas of this unit are mainly on side slopes and in narrow drainageways, but some broad ridges support mixed hardwoods and pine or have been planted to loblolly pine.

This map unit makes up about 14 percent of the county. It is about 57 percent Blanton soils, 23 percent Luverne soils, and 20 percent soils of minor extent.

Blanton soils are on broad ridgetops and long side slopes. Typically, the surface layer is grayish brown loamy sand. The subsurface layer is pale brown and very pale brown loamy sand. The subsoil is yellowish brown sandy loam in the upper part and is mottled red, brown, and gray sandy clay loam and sandy loam in the lower part.

Luverne soils are on narrow ridgetops and short side slopes. Typically, the surface layer is dark yellowish brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is yellowish red clay in the upper part; reddish brown and yellowish red clay in the middle part; and mottled red, strong brown, brownish yellow, and very pale brown sandy clay in the lower part. The substratum is stratified red, strong brown, brownish yellow, and light gray sandy clay loam.

Of minor extent in this map unit are the poorly drained Bibb soils in drainageways; the somewhat excessively drained Alaga soils, the well drained Bonifay soils, and the moderately well drained Compass soils in slightly lower positions on the landscape than the major soils; and the well drained Cowarts soils in slightly higher positions on ridgetops.

The soils in this map unit are fairly suited to cultivated crops, hay, and pasture in the less sloping areas and are poorly suited on the steeper slopes. The low available water capacity of the sandy soils is a limitation for most crops. If the soils are tilled, the hazard of erosion is moderate to severe. Crop rotation, cover crops, terraces, grassed waterways, and contour farming are management practices that help to maintain productivity and control erosion. Returning crop residue to the soil helps to increase the water-holding capacity and improves tilth. The suitability of the soils for nursery crops is good if a source of water is available.

The soils in this map unit are well suited to woodland. The productivity of loblolly pine is moderately high. Common trees include loblolly pine, southern red oak, post oak, and hickory. Areas of Luverne soils have few limitations for use as woodland. The sandy surface texture of the Blanton soils may limit equipment use during dry periods. Droughtiness is a limitation for the establishment of seedlings. Erosion is a hazard along logging roads, log landings, and skid trails.

The soils in this map unit are fairly suited to most urban uses. In some areas of soils on side slopes, the slope is a limitation for most uses. The seasonal high water table and the moderate permeability of the Blanton soil are limitations for some types of sanitary facilities. The slow permeability and moderate shrink-swell potential are the main limitations in areas of Luverne soils.

The soils in this map unit are fairly suited to intensive recreational areas and are well suited to extensive recreational areas. The slope and the slow permeability are the main limitations. Droughtiness and the thick, sandy surface layer of the Blanton soils are limitations for some uses.

This map unit is fairly suited as habitat for openland and woodland wildlife. Droughtiness is the main limitation. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

3. Cowarts-Luverne

Gently sloping to moderately steep, well drained soils that have a loamy or a clayey subsoil

This map unit mainly consists of soils on narrow to broad, gently sloping ridgetops and strongly sloping to moderately steep side slopes. Most areas are drained by deeply incised streams on narrow flood plains. Slopes are mainly 6 to 25 percent, but they range from 2 to 30 percent.

About 80 percent of the acreage of this map unit is used as woodland. A small acreage on the gently sloping ridgetops has been cleared. It is used for cultivated crops or pasture. Peanuts are the main cultivated crop. Coastal bermudagrass and bahiagrass are the main grasses grown for hay and pasture.

This map unit makes up about 5 percent of the county. It is about 45 percent Cowarts soils, 35 percent Luverne soils, and 20 percent soils of minor extent.

Cowarts soils are generally on very narrow ridgetops and on lower or mid slope positions on side slopes. They have a surface layer of yellowish brown sandy loam. The subsoil is strong brown sandy clay loam in the upper part; strong brown sandy clay loam in the middle part; and mottled yellowish red, red, and yellowish brown sandy clay loam in the lower part. The substratum is mottled strong brown, yellow, red, and light gray sandy loam.

Luverne soils are generally on the upper part of side slopes. The surface layer is dark yellowish brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is yellowish red clay in the upper part; reddish brown clay in the middle part; and mottled red, strong brown, brownish yellow, and very pale brown sandy clay in the lower part. The substratum is stratified red, strong brown, brownish yellow, and light gray sandy clay loam and sandy loam.

Of minor extent in this map unit are the poorly drained Bibb soils in drainageways, the moderately well drained Blanton soils on flat ridges, the moderately well drained Conecuh soils on the lower slopes, and the well drained Orangeburg soils on the higher ridgetops.

The soils in this map unit are poorly suited to cultivated crops. They are fairly suited to pasture and hay in the less sloping areas and are poorly suited on the steeper slopes. The main limitations are the slope and droughtiness. If the soils are tilled, erosion is a severe hazard. Crop rotation, cover crops, terraces, grassed waterways, conservation tillage, and contour farming are management practices that help to maintain productivity and control erosion. Returning crop residue to the soil improves tilth and increases the water-holding capacity of the soils.

The soils in this map unit are well suited to woodland. They have few limitations for this use. The productivity of loblolly pine is moderately high. Common trees include loblolly pine, shortleaf pine, sweetgum, and water oak. Erosion is a hazard along logging roads, landings, and skid trails.

The soils in this map unit are poorly suited to most urban uses. The slope, the moderate shrink-swell potential, and the slow permeability are the main limitations.

The soils in this map unit are poorly suited to intensive recreational areas and are well suited to extensive recreational areas. The slope is the main limitation for most uses.

The soils in this map unit are well suited as habitat for woodland and openland wildlife. Habitat for whitetailed deer, gray squirrel, and turkey can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants.

4. Mantachie-Iuka-Lynchburg

Nearly level, somewhat poorly drained and moderately well drained soils that have a loamy subsoil

This map unit consists of soils on the flood plains of major creeks and rivers and low stream terraces. The landscape generally consists of long smooth slopes, but some places have numerous old stream channels, sloughs, and depressional areas. The soils on flood plains are subject to frequent flooding, and the soils on low terraces are rarely flooded. Slopes are mainly 0 to 1 percent, but they range up to 3 percent in areas of minor soils.

About 85 percent of the acreage of this unit is used as woodland. Common trees on the flood plains include blackgum, American sycamore, ash, water oak, and sweetgum. Loblolly pine, shortleaf pine, sweetgum, and water oak are dominant on the terraces. Most of the cleared areas are in areas of Lynchburg and similar soils on low terraces. They are used for cultivated crops, such as corn, soybeans, cotton, and grain sorghum. The cleared areas on the flood plains generally support native grasses.

This map unit makes up about 13 percent of the county. It is about 39 percent Mantachie soils, 15 percent Iuka soils, 12 percent Lynchburg soils, and 34 percent soils of minor extent.

Mantachie soils are on smooth, slightly convex parts of flood plains along streams. The surface layer is very dark grayish brown clay loam. The subsoil is mottled yellowish brown, strong brown, and grayish brown sandy clay loam in the upper part; gray sandy clay loam in the middle part; and gray clay loam in the lower part. Mottles are in shades of brown and yellow.

Iuka soils are on natural levees adjacent to the main stream channel. They have a surface layer of dark brown loam. The substratum is strong brown and yellowish brown sandy loam in the upper part; brown sandy loam in the middle part; and mottled light gray, light brownish gray, and light yellowish brown sandy loam in the lower part.

Lynchburg soils are on low terraces. They have a surface layer of dark gray fine sandy loam. The subsurface layer is pale brown loamy sand. The subsoil is yellowish brown sandy loam in the upper part and is light brownish gray sandy clay loam in the lower part. Mottles in shades of gray, brown, and yellow are throughout the subsoil.

Of minor extent in this map unit are the poorly drained Bibb and Minter soils on the lower parts of flood plains, the moderately well drained Eunola and Goldsboro soils and somewhat poorly drained Ocilla soils on low terraces, and small areas of the well drained Cowarts and Luverne soils on adjacent side slopes.

The soils in this map unit are poorly suited to fairly well suited to cultivated crops, hay, and pasture. Frequent flooding is the main limitation in areas of Mantachie and Iuka soils on flood plains. Wetness is the main limitation in areas of Lynchburg and similar soils on terraces.

The soils in this map unit are well suited to woodland. The potential productivity of loblolly pine and hardwoods is high. Wetness, resulting from the seasonal high water table, and frequent flooding are severe limitations for the use of equipment on the lower parts of the landscape.

The soils in this map unit are poorly suited to most urban uses. The main limitations are the flooding and wetness. Areas of Lynchburg or similar soils on terraces are best suited to urban uses.

The soils in this map unit are poorly to fairly suited to intensive recreational areas and are fairly suited to well suited to extensive recreational areas. The frequent flooding and the wetness are the main limitations. Camp areas, picnic areas, and playgrounds should be located in areas of Lynchburg or similar soils, since they are rarely flooded.

The soils in this map unit are well suited as habitat for woodland wildlife and are fairly suited as habitat for openland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

5. Urbo-Riverview-Goldsboro

Nearly level, somewhat poorly drained, well drained, and moderately well drained soils that have a clayey or a loamy subsoil

This map unit mainly consists of soils on broad, nearly level flood plains and low terraces of major creeks and rivers. The landscape generally consists of long, smooth slopes that have many depressions and old stream channels in the flood plain and nearly level, smooth, slightly convex slopes on low terraces. Slopes are mainly 0 to 1 percent, but they range to 3 percent.

About 80 percent of the acreage of this unit is used as woodland and wildlife habitat. Hardwoods, such as sweetgum, yellow-poplar, American sycamore, and green ash, are dominant on the flood plains. Loblolly pine and sweetgum are dominant on the terraces. Most of the cleared areas are on low terraces. They are used for cultivated crops, such as corn, soybeans, cotton, and grain sorghum. A few areas on the flood plains are cleared. They are used as pasture.

This map unit makes up about 10 percent of the county. It is about 26 percent Urbo soils, 16 percent Riverview soils, 14 percent Goldsboro soils, and 44 percent soils of minor extent.

The somewhat poorly drained Urbo soils are on the lower parts of flood plains. They have a surface layer of very dark grayish brown and brown clay loam. The subsoil is dark grayish brown clay loam in the upper part, light brownish gray clay in the middle part, and gray clay loam in the lower part. Mottles are in shades of brown and yellow.

The well drained Riverview soils are on higher, more convex parts of the flood plain. They have a surface layer of yellowish brown sandy loam. The subsoil is yellowish brown and dark yellowish brown sandy clay loam in the upper part; brown sandy clay loam in the middle part; and mottled brownish yellow, light yellowish brown, pale brown, and strong brown sandy clay loam and brownish yellow sandy loam in the lower part.

The moderately well drained Goldsboro soils are on low terraces. They have a surface layer of light brownish gray loamy fine sand. The subsurface layer is pale yellow sandy loam. The subsoil is olive yellow sandy loam in the upper part; brownish yellow sandy clay loam in the middle part; and mottled brownish yellow, light brownish gray, and yellowish red sandy clay loam in the lower part. Mottles in shades of brown and gray are in the subsoil.

Of minor extent in this map unit are the poorly drained Minter soils and the somewhat poorly drained Houlka and Sucarnoochee soils. Also included are the moderately well drained Eunola soils and the somewhat poorly drained Lynchburg and Ocilla soils on low, convex terraces.

The soils in this map unit are poorly suited to well suited to cultivated crops, pasture, and hay. Frequent flooding is the main limitation in areas of Urbo and Riverview soils on the flood plains. Short-season crops, such as soybeans or grain sorghum, can be grown on these soils in some years. Areas of Goldsboro and similar soils on the low terraces have few limitations for cultivated crops.

The soils in this map unit are well suited to woodland. The potential productivity of loblolly pine and hardwoods is high. Wetness, resulting from a seasonal high water table, and frequent flooding are severe limitations for the use of equipment on the lower parts of the landscape. Areas of Goldsboro and similar soils on low terraces have few limitations for use as woodland.

The soils in this map unit are poorly suited to urban uses. The main limitations are the flooding and wetness. Areas of Goldsboro or similar soils on terraces are best suited to urban uses.

The soils in this map unit are poorly suited to well suited to intensive recreational areas and are fairly suited to well suited to extensive recreational areas. The frequent flooding and the wetness are the main limitations. Intensively used areas should be located on Goldsboro soils, since they are rarely flooded.

This map unit is well suited as habitat for woodland wildlife and is fairly suited as habitat for openland wildlife. Habitat for whitetail deer, gray squirrel, and turkey can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants.

6. Conecuh-Luverne

Gently sloping to moderately steep, moderately well drained and well drained soils that have a clayey subsoil

This map unit mainly consists of soils on narrow to broad, gently sloping ridgetops and strongly sloping to moderately steep side slopes. Most areas are drained by deeply incised streams on narrow flood plains. Slopes are mainly 8 to 15 percent, but they range from 2 to 20 percent.

Most of the acreage in this map unit is used as woodland, mainly mixed hardwoods and pine. About 15 percent of the unit has been cleared and is used as pasture or for cultivated crops. The main crops, generally grown on the gently sloping ridgetops, are cotton, soybeans, and grain sorghum. The more sloping, cleared areas are used for bahiagrass or coastal bermudagrass pastures.

This map unit makes up about 39 percent of the county. It is about 53 percent Conecuh soils, 32 percent Luverne soils, and 15 percent soils of minor extent.

Conecuh soils are in landscape positions slightly higher than those of the Luverne soils. They have a surface layer of brown sandy loam. The subsoil is red clay in the upper part; mottled red, yellowish red, gray, and light brownish gray clay in the middle part; and light brownish gray clay in the lower part. The substratum is gray clayey shale.

Luverne soils are on the lower slopes and ridges. They have a surface layer of dark yellowish brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is yellowish red clay in the upper part; reddish brown clay in the middle part; and mottled red, strong brown, brownish yellow, and very pale brown sandy clay in the lower part. The substratum is stratified red, strong brown, brownish yellow, and light gray sandy clay loam and sandy loam.

Of minor extent in this map unit are the moderately well drained Blanton and well drained Cowarts soils on higher ridgetops and the poorly drained Bibb soils and somewhat poorly drained Mantachie soils in drainageways.

The soils in this map unit are poorly suited to cultivated crops and are fairly well suited to pasture and hay. The main limitations are the slope and the complex topography. If the soils are tilled, erosion is a severe hazard. Crop rotation, terraces, grassed waterways, conservation tillage, cover crops, and contour farming are management practices that help to maintain productivity and control erosion.

The soils in this map unit are well suited to woodland. They have few limitations for this use. The potential productivity of loblolly pine is moderately high. Common trees include loblolly pine, shortleaf pine, sweetgum, and water oak. Erosion is a severe hazard along logging roads, landings, and skid trails.

The soils in this map unit are poorly suited to most urban uses. The main limitations are the slow permeability, clayey texture, and high shrink-swell potential. In some areas of soils on side slopes, the slope is a limitation for most urban uses.

The soils in this map unit are poorly suited to intensive recreational areas and are well suited to extensive recreational areas. The slope and the slow permeability are the major limitations.

The soils in this map unit are well suited as habitat for woodland and openland wildlife. Habitat for whitetail deer, gray squirrel, and turkey can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants.

7. Luverne-Cowarts-Blanton

Strongly sloping to steep, well drained or moderately well drained soils that have a clayey or a loamy subsoil

This map unit mainly consists of soils on narrow, strongly sloping ridges and moderately steep to steep side slopes. The landscape consists of narrow ridges; long, complex side slopes; and deeply incised drainageways. Many seep areas and springs are scattered throughout the map unit. Slopes are mainly 12 to 25 percent, but they range from 8 to 45 percent.

Most of the acreage of this map unit is used as woodland, mainly mixed hardwoods and pine. A very small acreage has been cleared. It is idle or supports native pasture.

This map unit makes up about 4 percent of the county. It is about 44 percent Luverne soils, 24 percent Cowarts soils, 13 percent Blanton soils, and 19 percent soils of minor extent.

Luverne soils are generally on the upper part of side slopes. They have a surface layer of dark yellowish brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is yellowish red clay in the upper part; reddish brown and yellowish red clay in the middle part; and mottled red, strong brown, brownish yellow, and very pale brown sandy clay in the lower part. The substratum is stratified red, strong brown, brownish yellow, and light gray sandy clay loam and sandy loam.

Cowarts soils are generally on the lower parts of side slopes and on narrow ridgetops. They have a surface layer of yellowish brown sandy loam. The subsoil is strong brown sandy clay loam in the upper part; strong brown sandy clay loam in the middle part; and mottled yellowish red, red, and yellowish brown sandy clay loam in the lower part. The substratum is mottled strong brown, yellow, red, and light gray sandy loam.

Blanton soils are on broad ridgetops and long side slopes. Typically, the surface layer is grayish brown loamy sand. The subsurface layer is pale brown and very pale brown loamy sand. The subsoil is yellowish brown sandy loam in the upper part and is mottled red, brown, and gray sandy clay and sandy loam in the lower part.

Of minor extent in this map unit are the moderately well drained Conecuh soils on side slopes and the poorly drained Bibb soils in drainageways.

The soils in this map unit are not suited to cultivated crops. They are poorly suited to pasture and hay. The main limitations are the steep slope and the complex, highly dissected topography. If the soils are tilled, erosion is a severe hazard.

The soils in this map unit are fairly suited to woodland. The potential productivity of loblolly pine is moderate. The steep slopes and the dissected topography restrict the use of conventional equipment. Common trees include loblolly pine, shortleaf pine, sweetgum, water oak, and southern red oak. Erosion is a severe hazard along logging roads, landings, and skid trails.

The soils in this map unit are poorly suited to most urban uses. The steep, complex slopes and the slow permeability are severe limitations for most urban uses.

The soils in this map unit are poorly suited to intensive recreational areas and are fairly well suited to extensive recreational areas. The steep slopes and the highly dissected topography are the main limitations.

The soils in this map unit are well suited as habitat for woodland wildlife and are fairly well suited as habitat for openland wildlife. Habitat for whitetail deer, gray squirrel, and turkey can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Luverne loamy sand, 2 to 8 percent slopes, is a phase of the Luverne series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Maytag-Oktibbeha complex is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Urbo and Riverview soils, 0 to 1 percent slopes, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

AgB—Alaga loamy sand, 2 to 8 percent slopes. This very deep, somewhat excessively drained, gently sloping soil is on broad ridgetops and hill slopes in the Coastal Plain. Slopes are smooth and convex. Individual areas are irregular in shape. They range from 20 to 100 acres in size.

Typically, the surface layer is dark brown loamy sand about 7 inches thick. The substratum, to a depth of 80 inches, is brownish yellow loamy sand in the upper part, yellowish brown loamy sand in the middle part, and brownish yellow and very pale brown sand in the lower part.

Important properties of the Alaga soil—

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Moderately acid to very strongly acid

Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included with this soil in mapping are a few areas of Blanton, Bonifay, Compass, and Luverne soils. Blanton and Bonifay soils are in landscape positions similar to those of the Alaga soil or are slightly lower on the landscape. They have a surface layer of loamy sand 40 to 60 inches thick. Bonifay soils have plinthite in the subsoil. Compass and Luverne soils are in lower positions on the landscape. Compass soils do not have a thick, sandy surface layer. They have a loamy subsoil. Luverne soils have a clayey subsoil. Also included in mapping are small areas of soils that have more clay in the subsurface layer than the Alaga soil. The included soils make up about 10 percent of the map unit, but individual areas are generally less than 3 acres in size.

Most areas of this soil are idle land. A few small areas are used for cultivated crops, pasture, or hay.

This soil is poorly suited to cultivated crops. The suitability is limited by the very low available water capacity and the slope. Erosion is a moderate hazard in cultivated areas. In areas that have a concentrated water flow, the soil is subject to gully erosion. If the soil is used for row crops, conservation tillage, crop rotation, stripcropping, and the use of cover crops help to conserve moisture, reduce the runoff rate, and control erosion. Leaving crop residue on or near the surface helps to maintain tilth and conserve moisture.

This soil is fairly well suited to pasture and hay. The very low available water capacity is a limitation for the growth of plants. Only drought-tolerant grasses should be planted. The leaching of plant nutrients is a management concern. Frequent, light applications of fertilizer are needed to maintain growth and productivity. Proper stocking rates, pasture rotation, and restricted grazing during prolonged dry periods help to keep the pasture in good condition.

This soil is fairly well suited to the production of loblolly pine and longleaf pine. Other species that grow in areas of this soil include shortleaf pine and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 80. Loblolly pine is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of bluestem, huckleberry, pancium, and grassleaf goldaster.

This soil has moderate limitations for the management of timber. The limitations are the use of equipment, the seedling mortality rate, and plant competition. The thick, sandy surface layer restricts the use of wheeled equipment when the soil is dry. Management activities should be performed when the soil is moist. The moderate seedling mortality rate is caused by droughtiness. It can be reduced by increasing the tree planting rate. Competition from undesirable plants reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is fairly well suited to most urban uses. It has slight limitations for building sites, local roads and streets, and septic tank absorption fields. The main limitations are the sandy texture and the rapid permeability.

This soil has has fair potential as habitat for openland wildlife, poor potential as habitat for woodland wildlife, and very poor potential as habitat for wetland wildlife. The very low available water capacity and the low natural fertility are limitations. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Alaga soil is in land capability subclass IVs and in woodland ordination group 8S.

BaE—Blanton loamy sand, 8 to 20 percent slopes. This very deep, moderately well drained, strongly sloping and moderately steep soil is on uplands in the Coastal Plain. Slopes are generally short and complex. Individual areas are irregular in shape. They range from 50 to 250 acres in size.

Typically, the surface layer is grayish brown loamy sand about 7 inches thick. The subsurface layer is pale brown and very pale brown loamy sand to a depth of 46 inches. The subsoil, to a depth of 70 inches, is yellowish brown sandy loam in the upper part, yellowish brown sandy clay loam in the middle part, and yellowish brown sandy loam in the lower part. The subsoil has mottles in shades of brown, yellow, and gray.

Important properties of the Blanton soil—

Permeability: Moderate in the upper part; moderately slow in the lower part
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low

Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 4.0 to 6.0 feet, from March through August
Flooding: None

Included in mapping are a few small areas of Alaga, Bibb, Bonifay, Compass, Conecuh, and Luverne soils. Alaga soils are in slightly higher landscape positions than the Blanton soil. They have a sandy texture to a depth of 80 inches or more. The poorly drained Bibb soils are in narrow drainageways. Bonifay soils are in landscape positions similar to those of the Blanton soil, and they have plinthite in the subsoil. Compass soils are in lower positions on the landscape. They do not have a thick, sandy surface layer. Conecuh and Luverne soils are on lower slopes. They have a clayey subsoil and do not have a thick, sandy surface layer. Included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few areas have been cleared and are used for pasture, hay, or cultivated crops.

This soil is not suited to cultivated crops. The major limitations are the short, complex slopes and the droughtiness. Erosion is a severe hazard in cultivated areas. Because of the sloping, complex topography, erosion-control measures are difficult to implement and maintain in cultivated areas.

This soil is poorly suited to hay and pasture. Slope and droughtiness are severe limitations. The use of equipment is limited by the sloping, complex topography and the sandy surface texture. The low available water capacity limits the production of plants that are suitable for pasture. Only drought-resistant plants should be planted. The leaching of plant nutrients is a management concern. Frequent, light applications of fertilizer are needed to maintain growth and productivity of the desired pasture plants.

This soil is fairly well suited to the production of loblolly pine and longleaf pine. Other trees that grow in areas of this soil include shortleaf pine and southern red oak. On the basis of a 50-year site curve, the site index for loblolly pine is 95. Loblolly pine is capable of growing 142 cubic feet, or 710 board feet, per acre per year, as measured when the mean annual increment culminates. The understory consists mainly of water oak, flowering dogwood, sweetgum, panicums, bluestem, blackberry, greenbriar, and poison oak.

This soil has moderate limitations for the management of timber. The limitations are the use of equipment, the seedling mortality rate, and plant competition. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is dry. The high seedling mortality rate, which is a result of droughtiness, can be reduced by increasing the tree planting rate. Competition from undesirable plant species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope and wetness. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Cutbanks are unstable and are subject to slumping. Effluent from absorption fields can surface in downslope areas and create a health hazard. Absorption lines should be installed on the contour.

This soil has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. The low available water capacity and the low natural fertility are limitations. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Blanton soil is in land capability subclass VIs and in woodland ordination group 10S.

BbB—Blanton-Bonifay loamy sands, 2 to 8 percent slopes. This map unit consists of the very deep, moderately well drained, gently sloping Blanton soil and the very deep, well drained, gently sloping Bonifay soil. These soils are on ridgetops and side slopes in the uplands of the Coastal Plain. Slopes are generally long and smooth. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this map unit range from 50 to 400 acres in size. They are about 55 percent Blanton soil and 30 percent Bonifay soil.

The Blanton soil is generally on the upper parts of slopes and on the less convex ridgetops. Typically, the surface layer is grayish brown loamy sand about 7 inches thick. The subsurface layer is pale brown and very pale brown loamy sand to a depth of 46 inches. The subsoil, to a depth of 70 inches, is yellowish brown sandy loam in the upper part, yellowish brown sandy clay loam in the middle part, and yellowish brown sandy loam in the lower part. The subsoil has mottles in shades of brown, yellow, and gray.

Important properties of the Blanton soil—

Permeability: Rapid in the upper part; moderately slow in the lower part
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 4.0 to 6.0 feet, from March through August
Flooding: None

The Bonifay soil is generally on the lower parts of slopes and on the more convex ridgetops. Typically, the surface layer is brown loamy sand about 5 inches thick. The subsurface layer is yellowish brown, pale brown, light yellowish brown, and brownish yellow loamy sand to a depth of 53 inches. The subsoil is strong brown sandy loam and sandy clay loam to a depth of 70 inches. The subsoil has common plinthite and mottles in shades of brown and red.

Important properties of the Bonifay soil—

Permeability: Rapid in the surface layer and subsurface layer; moderate in the upper part of the subsoil and moderately slow in the lower part
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 4.0 to 5.0 feet, from January through February
Flooding: None

Included in mapping are a few small areas of Compass, Conecuh, Luverne, and Ocilla soils. Compass soils are in lower positions on the landscape. They do not have a thick, sandy surface layer. Conecuh and Luverne soils are on the lower parts of slopes. They have a clayey subsoil and do not have a thick, sandy surface layer. The somewhat poorly drained Ocilla soils are on concave slopes near the heads of drainageways. The included soils make up about 15 percent of the map unit, but individual areas are less than 5 acres in size.

Most areas of this map unit are used for cultivated crops. Some areas have been planted to loblolly pine.

This map unit is poorly suited to cultivated crops. The main imitations are the slope, droughtiness, and low fertility. Erosion is a moderate hazard in cultivated areas. The low available water capacity limits yields in most years. In areas where water is available, supplemental irrigation can prevent crop stress from droughty conditions and can increase productivity in most years. Returning crop residue to the soil helps to maintain tilth and increases the water-holding capacity. If this map unit is used for row crops, conservation tillage, contour farming, terraces, stripcropping, and cover crops are needed to reduce the runoff rate and to help control erosion. Most crops respond well to applications of lime and frequent, light applications of fertilizer.

This map unit is well suited to pasture (fig. 4). Droughtiness is the main limitation. Only deep-rooted or drought-tolerant grasses are recommended. The leaching of plant nutrients is a management concern. Frequent, light applications of nitrogen are needed to maintain the productivity of grasses. Proper stocking rates, pasture rotation, and restricted grazing during prolonged dry periods help to keep the pasture in good condition.

This map unit is fairly well suited to the production of loblolly pine and longleaf pine. Other trees growing in areas of these soils include shortleaf pine and southern red oak. On the basis of a 50-year site curve, the site index for loblolly pine is 95 on the Blanton soil and 85 on the Bonifay soil. In areas of the Blanton soil, loblolly pine is capable of growing 142 cubic feet, or 710 board feet, per acre per year, as measured when the mean annual increment culminates. In areas of the Bonifay soil, it is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of water oak, flowering dogwood, sweetgum, panicums, bluestem, blackberry, greenbriar, and poison oak.

This map unit has moderate limitations for the management of timber. The limitations are the use of equipment, the seedling mortality rate, and plant competition. The seedling mortality rate, which is a result of droughtiness, can be reduced by increasing the tree planting rate. The sandy texture restricts the use of wheeled equipment when the soil is dry. Management activities should be performed when the soil is moist. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This map unit is fairly well suited to most urban uses. It has slight limitations for building sites and local roads and streets and moderate to severe limitations for sanitary facilities. The main limitations are wetness, seepage, and the moderately slow permeability in the Bonifay soil. Septic tank absorption fields may not

Figure 4.—An area of Blanton-Bonifay loamy sands, 2 to 8 percent slopes. This map unit produces high yields of coastal bermudagrass hay.

function properly during rainy periods because of the wetness. Effluent from absorption fields can surface in downslope areas and create a health hazard. Increasing the size of the absorption area and installing the absorption lines on the contour help to overcome these limitations; however, an alternate system of sewage disposal may be necessary.

This map unit has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. The low available water capacity and the low natural fertility are limitations. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

The Blanton and Bonifay soils are in land capability subclass IVs. The Blanton soil is in woodland ordination group 10S, and the Bonifay soil is in woodland ordination group 8S.

CaB—Compass loamy fine sand, 0 to 5 percent slopes. This very deep, moderately well drained, nearly level and gently sloping soil is in the uplands of the Coastal Plain. Slopes are generally long, simple, and slightly concave. Individual areas are generally broad. They range from 10 to 150 acres in size.

Typically, the surface layer is dark grayish brown loamy fine sand about 9 inches thick. The subsurface layer is yellowish brown loamy fine sand to a depth of 17 inches. The subsoil, to a depth of 62 inches, is yellowish brown sandy loam in the upper and middle parts and is mottled red, strong brown, and light brownish gray sandy clay loam in the lower part. Plinthite nodules are common in the middle and lower parts of the subsoil.

Important properties of the Compass soil—

Permeability: Moderately slow
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet, from January through May
Flooding: None

Included in mapping are small areas of Blanton, Bonifay, Conecuh, and Luverne soils. Blanton and Bonifay soils are in slightly lower landscape positions than the Compass soil. They have a thick, sandy surface layer. Conecuh and Luverne soils are in lower landscape positions than the Compass soil. They have a clay subsoil.

Most areas of this soil are used for cultivated crops or pasture. A few small areas are used as woodland.

This soil is well suited to cultivated crops (fig. 5). Erosion is a moderate hazard in cultivated areas. If this soil is used for row crops, conservation practices, such as minimum tillage, contour farming, stripcropping, and cover crops, reduce the runoff rate and help to control erosion. Returning crop residue to the soil helps to maintain tilth. Most crops respond well to applications of lime and a complete fertilizer.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Grasses such as coastal bermudagrass or bahiagrass are well suited to the soil. Proper stocking rates, pasture rotation, and restricted grazing during prolonged dry periods help to keep the pasture in good condition. Applications of fertilizer and lime are needed for the optimum production of forage.

This soil is well suited to the production of loblolly pine and longleaf pine. Other species that grow in areas of this soil include sweetgum and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of blackberry, muscadine, bluestems, persimmon, greenbriar, huckleberry, and flowering dogwood.

Plant competition is a moderate limitation for timber management. Competition from undesirable plant species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is suited to most urban uses. It has slight limitations for building sites and local roads and streets and severe limitations for most sanitary facilities. The main limitations are the wetness and the moderately slow permeability. Septic tank absorption fields may not function properly during rainy periods because of the wetness and moderately slow permeability. Increasing the size of the absorption field helps to compensate for these limitations.

This soil has fair potential as habitat for openland and woodland wildlife and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Compass soil is in land capability subclass IIe and in woodland ordination group 9A.

CeB2—Conecuh sandy loam, 2 to 5 percent slopes, eroded. This very deep, moderately well drained, gently sloping soil is on hill slopes in the uplands of the Coastal Plain. Slopes are generally long, smooth, and slightly convex. Individual areas are irregular in shape. They range from 50 to 175 acres in size.

Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil, to a depth of 50 inches, is reddish brown clay loam and red clay in the upper part; mottled red, yellowish red, and gray clay in the middle part; and light brownish gray clay that has

Figure 5.—An area of Compass loamy fine sand, 0 to 5 percent slopes. This soil produces high yields of peanuts and corn.

mottles in shades of red in the lower part. The substratum, to a depth of 63 inches, is stratified clay that is mottled in shades of brown and red.

Important properties of the Conecuh soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: 40 to 60 inches
Flooding: None

Included in mapping are a few small areas of Blanton, Bonifay, Compass, and Luverne soils. Blanton and Bonifay soils are in higher positions on the landscape than the Conecuh soil. They have a thick, sandy surface layer. Compass soils are in slightly higher ridgetop positions. They are loamy throughout the profile. Luverne soils are in landcape positions similar to those of the Conecuh soil. They have a mixed clay mineralogy in the particle-size control section.

Included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few areas are used for pasture or hay.

This soil is poorly suited to cultivated crops. The main limitation is the slope. Erosion is a severe hazard in cultivated areas. Conservation practices, such as minimum tillage, contour farming, stripcropping, and the use of cover crops, reduce the runoff rate and help to control erosion. All tillage should be on the contour or across the slope. Returning crop residue to the soil helps maintain tilth, improves fertility, reduces crusting, and increases the water intake rate. Most crops respond well to applications of lime and a complete fertilizer.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Grazing when the soil is wet results in compaction of the surface layer, excessive runoff, and damage to the plant community. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, sweetgum, and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, yellow jessamine, blackberry, huckleberry, bluestems, muscadine, and flowering dogwood.

The only limitation for the management of timber is severe plant competition, which reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the very slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Septic tank absorption fields may not function properly because of the very slow permeability. Using sandy backfill for the trenches and installing long absorption lines help to overcome this limitation. Roads and streets can be built if they are designed to compensate for the low strength and instability of the subsoil.

This soil has good potential as habitat for openland and woodland wildlife and poor potential as habitat for wetland wildlife. Habitat for whitetailed deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Conecuh soil is in land capability subclass IVe and in woodland ordination group 9C.

CeC2—Conecuh sandy loam, 5 to 8 percent slopes, eroded. This very deep, moderately well drained, gently sloping soil is on hill slopes in the uplands of the Coastal Plain. Slopes are generally short and complex. Individual areas are irregular in shape. They range from 50 to 250 acres in size.

Typically, the surface layer is yellowish brown sandy loam about 3 inches thick. The subsoil, to a depth of 60 inches, is reddish brown clay in the upper part; red silty clay in the middle part; and mottled brown, yellowish brown, and gray clay and silty clay in the lower part. The substratum, to a depth of 72 inches, is mottled gray, brown, yellow, and red sandy loam.

Important properties of the Conecuh soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6.0 feet
Flooding: None

Included in mapping are a few small areas of Bibb, Blanton, Bonifay, and Luverne soils. The poorly drained Bibb soils are in narrow drainageways. Blanton and Bonifay soils are on the upper parts of slopes. They have a thick, sandy surface layer. Luverne soils are in landscape positions similar to those of the Conecuh soil. They have a mixed clay mineralogy in the particle-size control section. Included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few small areas are used for pasture or hay.

This soil is not suited to cultivated crops. The main limitation is the short, complex slopes. Erosion is a severe hazard in cultivated areas. The hazard of sheet and rill erosion on the steeper slopes can be reduced by using terraces and contour farming. Waterways should be shaped and seeded to perennial grasses. Drop structures can be installed in grassed waterways where they are needed to prevent gullying. Limiting the tillage needed for seedbed preparation and weed control reduces the runoff rate and the hazard of erosion.

This soil is well suited to pasture and hay. The slope is a limitation for the use of some equipment. The seedbed should be prepared on the contour or across the slope. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, sweetgum, and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly greenbriar, yellow jessamine, blackberry, huckleberry, bluestems, muscadine, and flowering dogwood.

The only limitation for the management of timber is severe plant competition, which reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning. Management practices that minimize the hazard of erosion are essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the very slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Septic tank absorption fields may not function properly because of the very slow permeability. Using sandy backfill for the trenches and installing long absorption lines help to overcome this limitation. Roads and streets can be built if they are designed to compensate for the low strength and instability of the subsoil.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat for whitetailed deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Conecuh soil is in land capability subclass VIe and in woodland ordination group 9C.

CeE—Conecuh sandy loam, 8 to 20 percent slopes. This very deep, moderately well drained, strongly sloping and moderately steep soil is in the uplands of the Coastal Plain. Well defined drainageways dissect the unit in most places. Slopes are generally short and complex. Individual areas are irregular in shape. They range from 100 to 300 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 5 inches thick. The subsoil, to a depth of 57 inches, is reddish brown clay in the upper part; mottled red, yellowish red, and light brownish gray clay in the middle part; and mottled yellowish red, strong brown, and light brownish gray clay in the lower part. The substratum, to a depth of 72 inches, is clay loam that is stratified in shades of gray, red, and brown.

Important properties of the Conecuh soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6.0 feet
Flooding: None

Included in mapping are a few small areas of Bibb, Blanton, Bonifay, Compass, and Luverne soils. The poorly drained Bibb soils are in narrow drainageways. Blanton and Bonifay soils are on the upper parts of slopes. They have a thick, sandy surface layer. Compass soils are on narrow ridgetops and are loamy throughout the profile. Luverne soils are in landscape positions similar to those of the Conecuh soil. They have a mixed clay mineralogy in the particle-size control section. Included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few small areas have been cleared and are used as pasture or are idle.

This soil is not suited to cultivated crops. The major limitations are the steep slopes; the short, complex slope pattern; and the hazard of erosion if the soil is tilled. The hazard of erosion can be minimized by constructing terraces where feasible, by contour farming, and by providing adequate areas for water disposal. Limiting tillage operations and providing protection for the soil with temporary vegetation or crop residue when the area is not cultivated help to reduce the hazard of erosion.

This soil is poorly suited to pasture and hay. The slope is a severe limitation for the use of some equipment. Erosion is a severe hazard during the establishment of pastures. The seedbed should be prepared on the contour or across the slope if practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, sweetgum, and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, yellow jessamine, blackberry, huckleberry, bluestems, muscadine grape, and flowering dogwood.

This soil has moderate limitations for the management of timber. The limitations are the hazard of erosion and the use of equipment because of the slope. Good management includes conservation practices that help to control erosion. Site preparation methods that minimize soil disturbance should be used. The slope restricts the use of wheeled equipment. In areas where it is unsafe to operate wheeled equipment, tracked equipment can be used. Plant competition is severe because of the high quality of the site. The competing vegetation reduces the growth of trees and can prevent adequate reforestation. It can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the high shrink-swell potential, the very slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Roads should be designed to offset the limited ability of the soil to support a load. Septic tank absorption fields may not function properly because of the very slow permeability and the slope. Increasing the size of the absorption field and installing the absorption lines on the contour help to overcome these limitations; however, an alternate method may be needed to dispose of sewage properly.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Conecuh soil is in land capability subclass VIIe and in woodland ordination group 9C.

CoB2—Cowarts sandy loam, 2 to 6 percent slopes, eroded. This very deep, well drained, gently sloping soil is on narrow ridgetops and upper side slopes of the Coastal Plain. Slopes are generally long, smooth, and convex. Individual areas are irregular in shape. They range from 5 to 200 acres in size.

Typically, the surface layer is yellowish brown sandy loam about 5 inches thick. The subsoil, to a depth of 40 inches, is strong brown sandy clay loam in the upper part; mottled yellowish red, red, and yellow in the middle part; and mottled yellowish red, red, and yellow sandy clay loam in the lower part. The substratum, to a depth of 64 inches, is mottled strong brown, yellow, red, and light gray sandy loam.

Important properties of the Cowarts soil—

Permeability: Moderate in the subsoil; moderately slow or slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Blanton, Bonifay, Compass, and Luverne soils. Blanton and Bonifay soils are on slightly higher parts of the ridgetops than the Cowarts soil. They have a thick, sandy surface layer. Compass soils are on the lower parts of ridges. They have about 5 to 15 percent plinthite in the subsoil. Luverne soils are on lower slopes. They have more clay in the subsoil than the Cowarts soil. Also included are areas of Cowarts soils that have a surface layer of sandy clay loam. Included soils make up about 20 percent of mapped areas, but individual areas generally are less than 5 acres in size.

Most areas of this soil are used as pasture or woodland. Some areas are used for cultivated crops.

This soil is fairly well suited to cultivated crops. The main limitations are the slope and the severe hazard of erosion. Practices that help to control erosion include seeding small grain or winter cover crops in the early fall; using minimum tillage; and constructing terraces, diversions, and grassed waterways. Drop structures can be installed in grassed waterways where they are needed to prevent gullying. All tillage should be on the contour or across the slope. Leaving crop residue on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to applications of lime and fertilizer.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Erosion is a hazard during the establishment of grasses or legumes. The seedbed should be prepared on the contour or across the slope if practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include sweetgum and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 85. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of bluestems, greenbriar, panicums, tickclover, and flowering dogwood.

The only limitation for the management of timber is the moderate plant competition, which reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is well suited to most urban uses. It has slight limitations for building sites and local roads and streets and has slight to severe limitations for sanitary facilities. The main limitation is the moderately slow permeability of the substratum. Septic tank absorption fields may not function properly because of the moderately slow permeability. This limitation can be overcome by increasing the size of the absorption area or by using an alternate system of sewage disposal.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Cowarts soil is in land capability subclass IIIe and in woodland ordination group 8A.

CuD2—Cowarts-Luverne loamy sands, 6 to 12 percent slopes, eroded. This map unit consists of very deep, well drained, strongly sloping soils on narrow ridgetops and side slopes in the uplands of the Coastal Plain. Slopes are generally long and smooth, although some are short and complex. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this map unit range from 10 to 250 acres in size. They are about 50 percent Cowarts soil and 30 percent Luverne soil.

The Cowarts soil is generally on narrow ridges and the upper parts of side slopes. Typically, the surface layer is dark grayish brown loamy sand about 4 inches thick. The subsoil, to a depth of 36 inches, is light yellowish brown sandy clay loam in the upper part, strong brown sandy clay loam in the middle part, and yellowish brown sandy clay loam in the lower part. It has mottles in shades of red and brown. The substratum, to a depth of 60 inches, is mottled yellowish brown and light gray sandy loam.

Important properties of the Cowarts soil—

Permeability: Moderate in the subsoil; moderately slow or slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

The Luverne soil is generally on the lower parts of side slopes. Typically, the surface layer is dark yellowish brown loamy sand about 6 inches thick. The subsoil, to a depth of 40 inches, is yellowish red sandy clay in the upper part and mottled yellowish red and brownish yellow sandy clay loam in the lower part. The substratum, to a depth of 62 inches, is stratified red, yellowish red, and brownish gray sandy loam. Thin strata of gray clay and sandy clay are common.

Important properties of the Luverne soil—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6.0 feet
Flooding: None

Included in mapping are small areas of Blanton, Bonifay, Compass, Conecuh, and Mantachie soils. Blanton and Bonifay soils are on the high parts of narrow ridges. They have a thick, sandy surface layer. Compass soils are on the flatter parts of ridges. They have plinthite in the subsoil. Conecuh soils are in landscape positions similar to those of the Luverne soil. The clay in the subsoil of the Conecuh soils is dominantly montmorillinitic. The somewhat poorly drained Mantachie soils are in narrow drainageways. Also included are areas of Cowarts soils that have a surface layer of sandy clay loam, small areas of soils that have up to 15 percent coarse fragments on the surface, and small areas of Luverne soils that have a surface layer of sandy loam. Included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this map unit are used as woodland. A few areas are used for pasture or hay.

This map unit is poorly suited to cultivated crops. The slope is the main limitation. Erosion is a severe hazard in cultivated areas. In areas that have a concentrated water flow, the soils are subject to gully erosion. Practices that help to control erosion include seeding cool-season crops in the early fall; using minimum tillage; and constructing terraces, diversions, and grassed waterways. Drop structures can be installed in grassed waterways where they are needed to prevent gullying. All tillage should be on the contour or across the slope. Leaving crop residue on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This map unit is fairly well suited to pasture and hay. The slope is the main limitation. It can limit the use of some equipment. Erosion is a hazard during the establishment of pastures. The seedbed should be prepared on the contour or across the slope if practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This map unit is well suited to the production of loblolly pine. Other species that grow in areas of these soils include shortleaf pine, water oak, and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 85 on the Cowarts soil and 90 on the Luverne soil. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year in areas of the Cowarts soil and 131 cubic feet, or 655 board feet, per acre per year in areas of the Luverne soil, as measured when the mean annual increment culminates. The understory vegetation consists mainly of bluestem, greenbriar, panicums, huckleberry, waxmyrtle, muscadine, and flowering dogwood.

This map unit has moderate limitations for the management of timber. The main limitation is the restricted use of equipment in areas of the Luverne soil because of the clayey texture. Management activities should be performed when the soil is dry. Plant competition is moderate in areas of the Cowarts soil and severe in areas of the Luverne soil. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning. Management practices that minimize the hazard of erosion are essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills.

This map unit is fairly well suited to most urban uses. The main limitations are the slope, the moderate shrink-swell potential and the low strength of the Luverne soil, and the slow and moderately slow permeability. Septic tank absorption fields may not function properly because of the slow and moderately slow permeability. This limitation can be overcome by increasing the size of the absorption area or by using an alternate system of sewage disposal. Absorption lines should be installed on the contour in the more steeply sloping areas. If buildings are constructed in areas of the Luverne soil, properly designing foundations and footings helps to prevent the structural damage that results from shrinking and swelling. Roads should be designed to offset the limited ability of the Luverne soil to support a load.

This map unit has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

The Cowarts and Luverne soils are in land capability subclass VIe. The Cowarts soil is in woodland ordination group 8A, and the Luverne soil is in woodland ordination group 9C.

CuE—Cowarts-Luverne loamy sands, 12 to 25 percent slopes. This map unit consists of very deep, well drained soils on strongly sloping to moderately steep side slopes in the uplands of the Coastal Plain. Well defined drainageways dissect the unit in most places. Slopes are generally long and complex. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this map unit range from 50 to 500 acres in size. They are about 50 percent Cowarts soil and 35 percent Luverne soil.

The Cowarts soil is generally on the upper parts of slopes and in the less sloping areas. Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsurface layer is light yellowish brown sandy loam to a depth of 12 inches. The subsoil, to a depth of 36 inches, is brownish yellow sandy clay loam. The substratum, to a depth of 65 inches, is brownish yellow sandy clay loam in the upper part and strong brown sandy loam in the lower part. Mottles are in shades of red and gray.

Important properties of the Cowarts soil—

Permeability: Moderate in the subsoil; slow or moderately slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

The Luverne soil is generally on the lower parts of slopes and in more strongly sloping positions. Typically, the surface layer is dark brown loamy sand about 4 inches thick. The subsurface layer is dark yellowish brown loamy sand to a depth of 10 inches. The subsoil, to a depth of 49 inches, is reddish brown sandy clay in the upper part and red clay loam in the lower part. The substratum, to a depth of 62 inches, is stratified red and reddish brown sandy loam that has few thin strata of light gray clay.

Important properties of the Luverne soil—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6.0 feet
Flooding: None

Included in mapping are a few small areas of Bibb, Blanton, Bonifay, and Mantachie soils. The poorly drained Bibb soils and the somewhat poorly drained Mantachie soils are in narrow drainageways. Blanton and Bonifay soils are on narrow ridgetops and the upper parts of slopes. They have a thick, sandy surface layer. Also included are soils on narrow ridges, areas of eroded Cowarts and Luverne soils, small areas of soils that have a surface layer of sandy loam, and small areas of Cowarts soils that have 15 to 20 percent ironstone fragments in the surface layer. Included soils make up about 15 percent of mapped areas, but individual areas generally are less than 5 acres in size.

Most areas of this map unit are used as woodland. A few areas have been cleared and are used as pasture.

This map unit is not suited to cultivated crops. The complex, moderately steep slopes are a severe limitation for the use of equipment, and erosion is a severe hazard. Gullies form readily in areas that have a concentrated water flow. If the soils are used for cultivated crops, all tillage should be on the contour. Areas that have smooth slopes can be terraced and farmed on the contour.

This map unit is poorly suited to pasture and hay. The slope is a severe limitation that restricts the use of equipment. The seedbed should be prepared on the contour or across the slope if practical. Native grasses are best suited to the more steeply sloping areas. Pasture rotation helps to maintain the quality of forage.

This map unit is fairly well suited to the production of loblolly pine. Other species that grow in areas of these soils include shortleaf pine, water oak, and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 85 on the Cowarts soil and 90 on the Luverne soil. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year in areas of the Cowarts soil and 131 cubic feet, or 655 board feet, per acre year in areas of the Luverne soil, as measured when the mean annual increment culminates. The understory vegetation consists mainly of bluestems, greenbriar, panicums, huckleberry, waxmyrtle, muscadine, and flowering dogwood.

This map unit has moderate limitations for the management of timber. The limitations are the restricted use of equipment and the hazard of erosion because of the slope. Management activities should include conservation practices that help to control erosion. Site preparation methods that minimize soil disturbance should be used. Tracked equipment can be used on steep slopes, where it is unsafe to operate wheeled equipment. Plant competition is moderate in areas of the Cowarts soil and severe in areas of the Luverne soil. Plant competition can reduce the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This map unit is poorly suited to most urban uses. The soils have moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the moderate shrink-swell potential of the Luverne soil, the slow and moderately slow permeability, and the low strength if used for roads. Septic tank absorption fields may not function properly because of the slope and the slow to moderately slow permeability. These limitations can be overcome by increasing the size of the absorption area or by using an alternate system of waste disposal. Absorption lines should be installed on the contour. If buildings are constructed in areas of the Luverne soil, properly designing foundations and footings helps to prevent the structural damage that results from shrinking and swelling. Roads should be designed to offset the limited ability of the Luverne soil to support a load.

This map unit has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

The Cowarts and Luverne soils are in land capability subclass VIIe. The Cowarts soil is in woodland ordination group 8A, and the Luverne soil is in woodland ordination group 9C.

EaB—Eunola loamy sand, 1 to 3 percent slopes. This very deep, moderately well drained, nearly level soil is on stream terraces. Individual areas are generally broad. They range from 15 to 75 acres in size. Slopes are long and smooth.

Typically, the surface layer is brown loamy sand about 8 inches thick. The subsurface layer is pale yellow loamy sand to a depth of 14 inches. The subsoil, to a depth of 58 inches, is yellowish brown sandy clay loam that has mottles of pale yellow, strong brown, and light gray in the upper part; is mottled yellowish brown, light gray, yellowish red, and red in the middle part; and is mottled light gray, yellowish brown, and yellowish red sandy loam in the lower part. The substratum, to a depth of 64 inches, is sandy loam and sandy clay loam. It is mottled in shades of brown, red, and gray.

Important properties of the Eunola soil—

Permeability: Moderate in the B horizon and rapid below that depth
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.5 to 2.5 feet from November through March
Flooding: None

Included in mapping are a few small areas of Goldsboro, Lynchburg, and Minter soils. Goldsboro soils are in landscape positions similar to those of the Eunola soil, and they have a thicker subsoil. The somewhat poorly drained Lynchburg soils and the poorly drained Minter soils are in slightly lower positions on the landscape. Also included in the lower parts of the landscape are a few areas of soils that are subject to rare or occasional flooding. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 3 acres in size.

Most areas of this soil are used as woodland or for cultivated crops. A few areas are used for pasture or hay.

This soil is well suited to cultivated crops. It has few limitations for this use; however, erosion is a moderate hazard in the more sloping areas adjacent to drainageways. Limiting the tillage needed for seedbed preparation and weed control reduces the runoff rate and the hazard of erosion. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help to maintain tilth and the content of organic matter. Crops respond well to applications of lime and fertilizer.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of fertilizer and lime are needed for the optimum production of forage.

This soil is well suited to the production of loblolly pine (fig. 6). Other species that grow in areas of this soil include water oak, sweetgum, and yellow poplar. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, waxmyrtle, yellow jessamine, panicums, huckleberry, and sweetgum.

This soil has moderate limitations for the use of equipment. Plant competition is severe. The wetness restricts the use of wheeled equipment to periods when the soil is dry. Competition from undesirable species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

Figure 6.—A well managed stand of loblolly pine, in an area of Eunola loamy sand, 1 to 3 percent slopes.

This soil is fairly well suited to most urban uses. It has severe limitations for building sites and most sanitary facilities and has moderate limitations for local roads and streets. The wetness is the main limitation. A seasonal high water table is present during winter and spring, and a drainage system should be provided if buildings are constructed. A deep drainage system helps to reduce the wetness. Septic tank absorption fields do not function properly during rainy periods because of the wetness. Mounding soil material over the absorption field helps to compensate for the high water table.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat for whitetailed deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Eunola soil is in land capability subclass IIe and in woodland ordination group 9W.

GoA—Goldsboro loamy fine sand, 0 to 2 percent slopes. This very deep, moderately well drained, nearly level soil is on low stream terraces. Slopes are long, smooth, and slightly convex. The mapped areas are generally broad. They range from 10 to 150 acres in size.

Typically, the surface layer is light brownish gray loamy fine sand about 9 inches thick. The subsurface layer, to a depth of 17 inches, is pale yellow sandy loam. The upper part of the subsoil is olive yellow sandy loam to a depth of 22 inches. The middle part is brownish yellow sandy clay loam that has light brownish gray mottles to a depth of 42 inches. The lower part of the subsoil, to a depth of 60 inches, is mottled brownish yellow, light brownish gray, and yellowish red sandy clay loam.

Important properties of the Goldsboro soil—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 2.0 to 3.0 feet from December through April
Flooding: None

Included in mapping are a few small areas of Lynchburg, Minter, and Ocilla soils. Also included are soils that are along drainageways and have short slopes of more than 2 percent. The somewhat poorly drained Lynchburg soils and the poorly drained Minter soils are in slightly lower positions on the landscape than the Goldsboro soil. Ocilla soils are in landscape positions similar to those of the Goldsboro soil, and they have a thick, sandy surface layer. A few areas of soils that are subject to rare flooding are on the lower parts of the landscape. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for cultivated crops. A few areas are used as pasture or woodland.

This soil is well suited to cultivated crops. The main limitation is the wetness. The soil is friable and is easy to keep in good tilth. It can be worked over a wide range of moisture content. Field ditches and vegetated outlets are needed to remove the excess surface water. Land grading and smoothing also help to remove the excess water. In areas that have suitable water available, supplemental irrigation can prevent crop stress from droughty conditions and can increase production in most years. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help to maintain tilth and the content of organic matter. Crops respond well to applications of lime and fertilizer.

This soil is well suited to pasture and hay. The wetness is a moderate limitation. The excess water on the surface can be removed by a system of shallow ditches. Deferred grazing during wet periods helps to prevent soil compaction and helps to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include sweetgum and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of waxmyrtle, American holly, greenbriar, huckleberry, and flowering dogwood.

The main limitation for the management of timber is plant competition, which is severe because of the high quality of the site. Competition from undesirable plants reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is fairly well suited to most urban uses. It has moderate limitations for building sites and local roads and streets and has severe limitations for most sanitary facilities. The main limitation is the wetness. A seasonal high water table is present during winter and spring, and a drainage system should be provided if buildings and roads are constructed. Septic tank absorption fields may not function properly during rainy periods because of the wetness and the moderate to moderately slow peremeability. Mounding soil material over the septic tank absorption field helps to compensate for the high water table.

This soil has good potential for use as habitat for openland and woodland wildlife and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Goldsboro soil is in land capability subclass IIw and in woodland ordination group 9A.

HoA—Houlka clay, 0 to 1 percent slopes, frequently flooded. This very deep, somewhat poorly drained, nearly level soil is on flood plains in the Blackland Prairie. Individual areas are subject to flooding for brief periods one or more times each year. The mapped areas are generally long and narrow in shape. They range from 10 to 250 acres in size.

Typically, the surface layer is very dark grayish brown clay about 5 inches thick. The subsoil, to a depth of 62 inches, is dark grayish brown and gray clay in the upper part. In the middle and lower parts, it is light brownish gray clay loam. It has mottles in shades of yellow and brown.

Important properties of the Houlka soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 2.0 feet from January through March
Flooding: Frequent

Included in mapping are a few small areas of Minter and Sucarnoochee soils. The poorly drained Minter soils are in slightly higher positions on the landscape than the Houlka soil. Sucarnoochee soils are in slightly higher positions, and they are alkaline throughout. The included soils make up about 10 percent of the map unit, but individual areas generally are less than 8 acres in size.

Most areas of this soil are used for cultivated crops or pasture.

This soil is poorly suited to cultivated crops. The wetness and flooding are the main limitations. Only those crops that are planted late, such as soybeans or grain sorghum, are suited to the soil (fig. 7). Flooding delays planting or damages crops in some years. Proper row arrangement, field ditches, and vegetated outlets are necessary to remove the excess surface water. The soil is sticky when wet and is hard when dry. It becomes cloddy if tilled when it is too wet or too dry. Using minimum tillage and returning all crop residue to the soil improve fertility and help to maintain tilth and the content of organic matter.

This soil is poorly suited to pasture and hay. The wetness and the frequent flooding limit the choice of suitable plants and the period of grazing. Flooding is difficult to control; however, shallow surface ditches help to remove the excess water and reduce the wetness. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to the production of sweetgum and green ash. Other species that grow in areas of this soil include water oak and American sycamore. On the basis of a 50-year site curve, the site index for sweetgum is 105. Sweetgum is capable of growing 156 cubic feet, or 530 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of sedges, greenbriar, panicums, green ash, blackgum, and red maple.

Limitations for the management of timber are moderate for the windthrow hazard and severe for the use of equipment, the seedling mortality rate, and plant competition. The wetness and flooding are management concerns. Avoiding heavy thinning reduces the hazard of windthrow. Mechanical operations should be performed during the drier periods of the year to help overcome the equipment limitation. The seedling mortality rate is high because of the wetness. It can be reduced by increasing the planting rate or by planting the trees on raised beds. Competition from undesirable plant species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This soil is not suited to most urban uses. It is generally not feasible to control the frequent flooding. Other limitations include the wetness, the very slow permeability, the high shrink-swell potential, and the low strength if used for roads.

This soil has good potential as habitat for woodland wildlife and fair potential as habitat for openland and wetland wildlife habitat. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Houlka soil is in land capability subclass IVw and in woodland ordination group 11W.

KpB2—Kipling fine sandy loam, 1 to 3 percent slopes, eroded. This very deep, somewhat poorly drained soil is on nearly level areas in the uplands and on toe slopes on high terraces of the Blackland Prairie. Slopes are generally long, smooth, and slightly concave. In most areas, the surface layer of this soil is thin. It is commonly a mixture of the original surface layer and material from the subsoil. In some places, all of the original surface layer has been removed. Some

Figure 7.—Short-season crops, such as grain sorghum, can be grown in areas of Houlka clay, 0 to 1 percent slopes, frequently flooded, in some years.

areas have few to common rills and shallow gullies. The mapped areas are irregularly shaped. They range from 20 to 150 acres in size.

Typically, the surface layer is light olive brown fine sandy loam about 2 inches thick. The subsurface layer, to a depth of 5 inches, is pale brown fine sandy loam. The subsoil, to a depth of 55 inches, is yellowish red and yellowish brown clay in the upper part; mottled red, strong brown, and light brownish gray clay in the middle part; and yellowish brown clay that has red, brown, and gray mottles in the lower part. The substratum, to a depth of 65 inches, is light brownish gray clay. It has mottles in shades of red, yellow, and brown.

Important properties of the Kipling soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid in the upper part; very strongly acid to slightly alkaline in the lower part

Organic matter content: Moderately low
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 1.5 to 3.0 feet, from January through March
Flooding: None

Included in mapping are a few small areas of Maytag, Oktibbeha, Sucarnoochee, and Vaiden soils. The moderately well drained Maytag and Oktibbeha soils are on slightly higher, more convex slopes. Sucarnoochee soils are in lower positions adjacent to drainageways. They are alkaline throughout. Vaiden soils are in landscape positions similar to those of the Kipling soil. They have more clay in the subsoil. The included soils make up about 10 percent of the map unit, but individual areas generally are less than 5 acres in size.

Most areas of this soil are used as woodland. A few areas are used for cultivated crops, pasture, or hay.

This soil is fairly well suited to cultivated crops. Erosion is a hazard if the soil is used for row crops. The surface layer of this soil is friable, but it is difficult to keep the soil in good tilth in areas where the clayey subsoil has been mixed with the original surface layer as a result of cultivation. Tilth and fertility can be improved by returning crop residue to the soil. Practices that help to control erosion are seeding the grain crops in early fall, using minimum tillage, stripcropping, and growing cover crops. All tillage should be on the contour or across the slope.

This soil is well suited to pasture and hay, and it has few limitations for these uses. The seedbed should be prepared on the contour or across the slope if practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include sweetgum and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 85. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of pinehill bluestem, panicums, blackberry, blackgum, greenbriar, persimmon, poison ivy, and sumac.

This soil has moderate limitations for management of timber. The limitations are the restricted use of equipment, the seedling mortality rate, and plant competition. The moderate limitation for the use of equipment is a result of the clayey texture of the subsoil. Management activities should be performed when the soil is dry. Compaction and rutting can occur if the soil is worked while wet. The moderate seedling mortality rate is caused by the wetness. It can be reduced by increasing the tree planting rate. Competition from undesirable plants reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the wetness, the very slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Septic tank absorption fields do not function properly because of the wetness and the very slow permeability. Increasing the size of the absorption area helps to overcome these limitations; however, an alternate system of sewage disposal may be needed. Roads should be designed to offset the limited ability of the soil to support a load.

This soil has good potential as habitat for openland and woodland wildlife and poor potential as habitat for wetland wildlife. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Kipling soil is in land capability subclass IIIe and in woodland ordination group 9C.

LnB—Luverne loamy sand, 2 to 8 percent slopes. This very deep, well drained, gently sloping soil is on ridges and side slopes in the uplands of the Coastal Plain. Slopes are generally long, smooth, and convex. Individual areas are irregular in shape. They range from 20 to 250 acres in size.

Typically, the surface layer is dark yellowish brown loamy sand about 8 inches thick. The subsurface layer is light yellowish brown loamy sand to a depth of 12 inches. The subsoil, to a depth of 48 inches, is yellowish red clay in the upper part; reddish brown and yellowish red clay in the middle part; and mottled red, strong brown, brownish yellow, and very pale brown sandy clay in the lower part. The substratum, to a depth of 64 inches, is mottled red, strong brown, brownish yellow, and light gray sandy clay loam and sandy loam.

Important properties of the Luverne soil—

Permeability: Moderately slow

Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few areas of Alaga, Blanton, Bonifay, Cowarts, and Conecuh soils. Alaga, Blanton, and Bonifay soils are on the higher parts of ridges. They have a thick, sandy surface layer and subsurface layer. Cowarts soils are in slightly higher positions on the landscape. They are loamy throughout. Conecuh soils are in landscape positions similar to those of the Luverne soil. The clay in the subsoil of the Conecuh soils is dominantly montmorillinitic. The included soils make up about 15 percent of the map unit, but individual areas generally are less than 5 acres in size.

Most areas of this soil are used as woodland or pasture. A few areas are used for cultivated crops.

This soil is poorly suited to cultivated crops. The slope is the main limitation. Erosion is a severe hazard if this soil is used for row crops. Practices that help to control erosion include seeding cool-season cover crops in the early fall; using minimum tillage; and constructing terraces, diversions, and grassed waterways. Drop structures can be installed in grassed waterways where they are needed to prevent gullying. All tillage should be on the contour or across the slope. Returning crop residue to the soil reduces the runoff rate and helps to maintain tilth and the content of organic matter.

This soil is well suited to pasture and hay. The seedbed should be prepared on the contour or across the slope if practical. Applications of fertilizer and lime are needed for the optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during prolonged wet or dry periods help to keep the pasture in good condition.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include sweetgum and shortleaf pine. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, poison oak, huckleberry, muscadine, waxmyrtle, and flowering dogwood.

This soil has moderate limitations for the use of equipment. Plant competition is severe. The clayey texture of the subsoil restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. Competition from undesirable plants reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is fairly well suited to most urban uses. It has moderate limitations for building sites and has severe limitations for local roads and most sanitary facilities. The main limitations are the moderate shrink-swell potential, the moderately slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Septic tank absorption fields may not function properly because of the moderately slow permeability. Increasing the size of the absorption area helps to overcome this limitation; however, an alternate system of sewage disposal may be needed. Roads should be designed to offset the limited ability of the soil to support a load.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Luverne soil is in land capability subclass IVe and in woodland ordination group 9C.

LnE2—Luverne loamy sand, 8 to 20 percent slopes, eroded. This very deep, well drained, strongly sloping to moderately steep soil is on narrow ridges, side slopes, and hill slopes in the uplands of the Coastal Plain. Well defined drainageways dissect most areas of this map unit. Slopes are generally short and complex. The mapped areas are irregular in shape. They range from 75 to 250 acres in size.

Typically, the surface layer is dark yellowish brown loamy sand about 3 inches thick. The subsurface layer is strong brown loamy sand to a depth of 6 inches. The subsoil, to a depth of 35 inches, is red clay in the upper part. In the middle and lower parts, it is red clay loam that has strong brown mottles. The substratum is stratified and is mottled red, light grayish brown, and brownish yellow clay and clay loam to a depth of 64 inches.

Important properties of the Luverne soil—

Permeability: Moderately slow
Available water capacity: High

Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few areas of Alaga, Blanton, Bonifay, Bibb, Cowarts, and Conecuh soils. Alaga, Blanton, and Bonifay soils are on the high parts of ridges. They have a thick, sandy surface layer. The poorly drained Bibb soils are in narrow drainageways. Cowarts soils are on the higher parts of slopes. They are loamy throughout. Conecuh soils are in landscape positions similar to those of the Luverne soil. The clay in the subsoil of the Conecuh soils is dominantly montmorillinitic. The included soils make up about 10 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few areas are used for pasture or hay.

This soil is not suited to cultivated crops. The complex, moderately steep slopes are a severe limitation for the use of equipment. Erosion is a severe hazard. Gullies form readily in areas that have a concentrated water flow. If the soil is cultivated, all tillage should be on the contour. Areas that have smooth slopes can be terraced and farmed on the contour; however, terraces are difficult to establish and maintain.

This soil is poorly suited to pasture and hay. The slope is a severe limitation for the use of equipment. The seedbed should be prepared on the contour or across the slope if practical. Grasses that require low levels of maintenance are best suited to the more steeply sloping areas. Rotation grazing helps to maintain the quality of forage.

This soil is fairly well suited to the production of loblolly pine. Other species that grow in areas of this soil include sweetgum and shortleaf pine. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, poison oak, huckleberry, muscadine, waxmyrtle, and flowering dogwood.

This soil has a moderate limitations for timber management. The limitations are the use of equipment and the hazard of erosion. Plant competition is severe. The use of equipment is a limitation because of the moderately steep slopes and the clayey texture of the subsoil. Management activities should be performed when the soil is dry. The hazard of erosion is moderate because of the slope. Good management includes conservation practices that help to control erosion. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Plant competition is severe because of the high quality of the site. The competing vegetation reduces the growth of trees and can prevent adequate reforestation. It can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has moderate to severe limitations for building sites and has severe limitations for roads and most sanitary facilities. The main limitations are the slope, the moderate shrink-swell potential, the moderately slow permeability, and the low strength if used for roads. Access roads must be designed to provide an adequate cut-slope grade, and drains must be used to control the surface runoff. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Septic tank absorption fields may not function properly because of the slope and the moderately slow permeability. These limitations can be overcome by increasing the size of the absorption area or by using an alternate system of waste disposal. Absorption lines should be installed on the contour. Roads should be designed to offset the limited ability of the soil to support a load.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Luverne soil is in land capability subclass VIIe and in woodland ordination group 9C.

LoE—Luverne-Blanton loamy sands, 5 to 20 percent slopes. This map unit consists of the very deep, well drained Luverne soil and the moderately well drained Blanton soil. These soils are on side slopes and narrow ridges in the uplands of the Southern Coastal Plain. Well defined drainageways dissect the map unit in most places. Slopes are generally short and complex. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this unit range from 400 to 1,000 acres in size. They are about 50 percent Luverne soil and 30 percent Blanton soil.

The Luverne soil is generally on the steeper side slopes and on narrow ridges in lower areas on the landscape. Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsoil, to a depth of 43 inches, is yellowish red clay in the upper part and red clay in the lower part. The substratum is stratified yellow, red, brown, and gray sandy clay that extends to a depth of 62 inches.

Important properties of the Luverne soil—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

The Blanton soil is generally on the higher parts of ridgetops and on the upper slopes. The slopes are generally less than 10 percent. Typically, the surface layer is yellowish brown loamy sand about 7 inches thick. The subsurface layer is very pale brown loamy sand to a depth of 58 inches. The subsoil, to a depth of 65 inches, is strong brown sandy clay loam that has mottles in shades of red, brown, and gray.

Important properties of the Blanton soil—

Permeability: Moderate and moderately slow
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table Perched at a depth of 4.0 to 6.0 feet, from March through August
Flooding: None

Included in mapping are a few small areas of Bibb, Bonifay, Conecuh, Cowarts, and Eunola soils. The poorly drained Bibb soils are in narrow drainageways and depressions. Bonifay soils are in landscape positions similar to those of the Blanton soil. They have plinthite in the subsoil. Conecuh soils are in landscape positions similar to those of the Luverne soil. The clay in the subsoil of the Conecuh soils is dominantly montmorillinitic. Cowarts soils are on upper slopes. They are loamy throughout. Eunola soils are at lower elevations, and they are loamy throughout. The included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this map unit are used as woodland. A few small areas have been cleared and are used as pasture or for truck crops.

This map unit is not suited to cultivated crops. The complex topography and the strongly sloping to moderately steep slopes are severe limitations for the use of equipment. Erosion is a severe hazard. The sandy texture and droughtiness are additional limitations in areas of the Blanton soil. If the soils are cultivated, all tillage should be on the contour. Gullies form readily in areas that have a concentrated water flow. Areas that have smooth slopes can be terraced and farmed on the contour; however, terraces are difficult to establish and maintain.

This map unit has poor suitability for pasture and hay. The main limitations are the slope and the droughtiness of the Blanton soil. Erosion is a severe hazard when the soil is bare during the establishment of pastures. The seedbed should be prepared on the contour or across the slope if practical. Drought-tolerant grasses are best suited to areas of the Blanton soil, and native grasses are best suited to the more steeply sloping areas. Proper stocking rates and rotation grazing help to maintain the quality of forage.

This map unit is fairly well suited to production of loblolly pine. Other species that grow in areas of these soils include longleaf pine, shortleaf pine, sweetgum, and southern red oak. On the basis of a 50-year site curve, the site index on the Luverne soil is 90 and the site index on the Blanton soil is 95. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year in areas of the Luverne soil and 142 cubic feet, or 710 board feet, per acre per year in areas of the Blanton soil, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, poison oak, panicums, muscadine, flowering dogwood, waxmyrtle, sweetgum, and blackberry.

This map unit has moderate limitations for the use of equipment during planting and harvesting operations. The main limitations are the clayey texture of subsoil in the Luverne soil and the sandy texture of the Blanton soil. If possible, the Luverne soil should be selected as a site for logging roads and landings during dry seasons and the Blanton soil should be selected as a site during wet seasons. Because of the slope, the hazard of erosion is severe during harvesting and planting operations. Good management includes conservation practices that help to control erosion. Soil disturbance should be minimized during site preparation. The seedling mortality rate is high in areas of the Blanton soil because of droughtiness. It can be partially overcome by increasing the tree planting rate. Plant competition reduces the growth of trees and can prevent adequate reforestation. It can be controlled by mechanical methods, applications of herbicide, or by prescribed burning.

This map unit is poorly suited to most urban uses. The soils have slight to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations for the Luverne soil are the slope, the moderate shrink-swell potential, the moderately slow permeability, and the low strength if used for roads. The main limitations for the Blanton soil are the slope and wetness. If buildings are constructed, areas of the Blanton soil should be selected as a site. During rainy periods, septic tank absorption fields may not function properly on either of the soils because of the wetness and the moderately slow permeability. Increasing the size of the absorption areas helps to overcome these limitations; however, an alternate system of sewage disposal may be needed. Absorption lines should be installed on the contour. The moderate shrink-swell potential of the Luverne soil can be overcome by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Roads should be designed to offset the limited ability of the soils to support a load.

This map unit has good to very poor potential as habitat for wildlife. The Luverne soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. The Blanton soil has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

The Luverne soil is in land capability subclass VIIe, and the Blanton soil is in land capability subclass VIs. The Luverne soils is in woodland ordination group 9C, and the Blanton soil is in woodland ordination group 11S.

LtF—Luverne-Blanton-Cowarts complex, 15 to 45 percent slopes. This map unit consists of the very deep, well drained Luverne and Cowarts soils and the very deep, moderately well drained Blanton soil. These soils are on moderately steep to steep hill slopes in the uplands of the Southern Coastal Plain. Well defined drainageways dissect the map unit in most places. Slopes are generally long and complex. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this unit range from 500 to 1000 acres in size. They are about 40 percent Luverne soil, 30 percent Blanton soil, and 20 percent Cowarts soil.

The Luverne soil is generally on the upper and mid parts of steep side slopes. Typically, the surface layer is dark brown sandy loam about 4 inches thick. The subsurface layer is strong brown loamy sand to a depth of 9 inches. The subsoil, to a depth of 41 inches, is red sandy clay in the upper part and is red sandy clay loam in the lower part. The substratum, to a depth of 62 inches, is stratified red, light gray, and yellowish brown sandy loam and sandy clay loam that has mottles in shades of red, brown, and gray.

Important properties of the Luverne soil—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid to extremely acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6.0 feet
Flooding: None

The Blanton soil is generally on the less sloping, narrow ridgetops, the upper parts of side slopes, and benches. Slopes are up to 20 percent. Typically, the surface layer is dark brown loamy sand about 5 inches thick. The subsurface layer, to a depth of 50 inches, is yellowish brown and brownish yellow loamy sand. The subsoil, to a depth of 62 inches, is yellowish brown sandy clay loam that has mottles in shades of red, brown, and gray.

Important properties of the Blanton soil—

Permeability: Moderate and moderately slow
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Perched at a depth of 4.0 to 6.0 feet, from March through August
Flooding: None

The Cowarts soil is generally in less sloping areas on the lower parts of side slopes. Slopes are up to 25 percent. Typically, the surface layer is yellowish brown sandy loam about 7 inches thick. The subsoil, to a depth of 37 inches, is brownish yellow sandy clay loam. The substratum, to a depth of 62 inches, is yellowish brown sandy clay loam that has gray mottles. Thin strata of sandy loam are common.

Important properties of the Cowarts soil—

Permeability: Moderate in the upper part; moderately slow in the lower part
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Bibb, Conecuh, Eunola, and Mantachie soils. Also included are a few small areas of poorly drained soils near seep springs. The poorly drained Bibb soils and the somewhat poorly drained Mantachie soils are in narrow drainageways. Conecuh soils are in landscape positions similar to those of the Luverne soil. The clay in the subsoil of the Conecuh soils is dominantly montmorillinitic. Eunola soils are on toe slopes. They are moderately well drained. Included soils make up about 10 percent of the map unit, but individual areas are less than 5 acres in size.

Most areas of this map unit are wooded and are used as wildlife habitat. A few areas are used for the commercial production of timber.

This map unit is not suited to cultivated crops. It is poorly suited to pasture. The complex topography and the moderately steep to steep slopes are severe limitations for the use of equipment. Erosion is a severe hazard. The sandy texture and droughtiness are additional limitations in areas of the Blanton soil. Because seedbed preparation is difficult or impractical, native grasses are best suited to this unit.

This map unit is fairly well suited to the production of loblolly pine. Other species that grow in areas of these soils include shortleaf pine, water oak, sweetgum, and southern red oak. On the basis of a 50-year site curve, the site index for loblolly pine is 85 on the Cowarts soil, 90 on the Luverne soil, and 95 on the Blanton soil. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year in areas of the Cowarts soil; 131 cubic feet, or 655 board feet, per acre per year in areas of the Luverne soil; and 142 cubic feet, or 710 board feet, per acre per year in areas of the Blanton soil, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, poison oak, panicums, muscadine, flowering dogwood, waxmyrtle, sweetgum, and blackberry.

The hazard of erosion and the restricted use of equipment are moderate limitations for the management of timber in areas of the Blanton and Cowarts soils. The slope is a severe limitation in areas of the Luverne soil. Good management includes practices that help to control erosion. Soil disturbance should be minimized during site preparation. Tracked equipment can be used on steep slopes, where wheeled equipment cannot be operated safely. The seedling mortality rate is moderate in areas of the Blanton soil because of droughtiness. It can be reduced by increasing the tree planting rate. Plant competition is moderate in areas of the Blanton and Cowarts soils and is severe in areas of the Luverne soil. It reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This map unit is not suited to urban uses. The soils have severe limitations for building sites, local roads and streets, and most sanitary facilities. The major limitation is the moderately steep to steep slopes. Overcoming this limitation is difficult and expensive.

This map unit has good to very poor potential as habitat for wildlife. All of the soils have very poor potential as habitat for wetland wildlife. The Luverne and Blanton soils have fair potential as habitat for openland wildlife, and the Cowarts soil has good potential. The Luverne and Cowarts soils have good potential as habitat for woodland wildlife, and the Blanton soil has fair potential. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oaks and suitable understory plants.

The Luverne and Cowarts soils are in land capability subclass VIIe, and the Blanton soil is in land capability subclass VIs. The Luverne soil is in woodland ordination group 9R, the Blanton soil is in woodland ordination group 11S, and the Cowarts soil is in woodland ordination group 8R.

LyA—Lynchburg-Ocilla complex, 0 to 2 percent slopes, rarely flooded. This map unit consists of very deep, somewhat poorly drained soils on nearly level, low stream terraces that are subject to rare flooding. Slopes are generally long and smooth. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this map unit range from 5 to 150 acres in size. They are about 55 percent Lynchburg soil and 30 percent Ocilla soil.

The Lynchburg soil is generally on the lower, smoother slopes and in slight depressions. Typically, the surface layer is dark gray fine sandy loam about 5 inches thick. The subsurface layer is pale brown loamy sand to a depth of 15 inches. The subsoil, to a depth of 62 inches, is yellowish brown sandy loam in the upper part and is light brownish gray sandy clay loam in the middle and lower parts. It has mottles in shades of yellow, brown, and gray.

Important properties of the Lynchburg soil—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 0.5 to 1.5 feet from November through April
Flooding: Rare

The Ocilla soil is generally on narrow, convex ridges and the upper parts of slopes. Typically, the surface layer is grayish brown loamy fine sand about 8 inches thick. The subsurface layer is yellowish brown and very pale brown loamy fine sand to a depth of 36 inches. The subsoil, to a depth of 57 inches, is brownish yellow sandy loam that has mottles in shades of gray, brown, and red in the upper and middle parts. The lower part, to a depth of 75 inches, is mottled brown, yellow, red, and gray sandy loam and sandy clay loam.

Important properties of the Ocilla soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 2.5 feet from December through April
Flooding: Rare

Included in mapping are a few small areas of Bibb, Eunola, Goldsboro, Mantachie, and Minter soils. Also included are soils that are similar to the Lynchburg soil but are more clayey, soils that are similar to the Lynchburg soil but have a surface layer of loamy sand, and soils in depressions that are ponded for long periods. The moderately well drained Eunola and Goldsboro soils are in slightly higher positions on the landscape. The poorly drained Minter soils are in lower positions on the landscape, and they are more clayey throughout. Bibb and Mantachie soils are in drainageways. They do not have a well developed subsoil. The included soils make up about 15 percent of the map unit, but individual areas generally are less than 3 acres in size.

Most areas of this map unit are used as woodland or for cultivated crops. A few areas are used for pasture or hay.

This map unit is well suited to cultivated crops. The wetness is the main limitation. Most of the climatically adapted crops can be grown if drainage is provided. Land grading and smoothing improve the surface drainage and permit the more efficient use of farm equipment. A tillage pan forms easily if the soils are tilled when wet, but it can be broken up by deep plowing or chiseling. Returning crop residue to the soil or regularly adding other organic matter improves the fertility, reduces crusting, and increases the water intake rate. Crops generally respond well to applications of lime and a complete fertilizer.

This map unit is well suited to pasture and hay. The wetness limits the choice of suitable plants and the period of grazing. In most years, droughtiness is a management concern in areas of the Ocilla soil, and only adapted plants should be planted. Excess water on the surface can be removed by a system of shallow ditches or tile drains. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This map unit is well suited to the production of loblolly pine, sweetgum, and water oak. Other species that grow in areas of this map unit include shortleaf pine and blackgum. On the basis of a 50-year site curve, the site index for loblolly pine is 85 on the Lynchburg and Ocilla soils. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of gallberry, panicums, sedges, red maple, and green ash.

This map unit has moderate limitations for the management of timber. The limitations are the restricted use of equipment and plant competition. The seedling mortality rate is moderate in areas of the Ocilla soil because of droughtiness. The seasonal high water table restricts the use of equipment during wetter periods. Harvesting and other management activities should be scheduled when the soil is dry. Competition from undesirable species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This map unit is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the wetness and flooding. Controlling the flooding is generally not feasible. A seasonal high water table is present during the winter and spring, so a drainage system should be provided if buildings are constructed. A deep drainage system reduces the wetness. Septic tank absorption fields do not function properly during rainy periods because of the wetness. Mounding soil material over the absorption field helps to compensate for the high water table.

This map unit has fair potential as habitat for openland and woodland wildlife and has fair potential as habitat for wetland wildlife. Habitat for deer, turkey, and squirrel can be improved by planting or encouraging the growth of existing oaks and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

The Lynchburg soil is in land capability subclass IIw, and the Ocilla soil is in land capability subclass IIIw. The Lynchburg and Ocilla soils are in woodland ordination group 8W.

MBA—Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded. This map unit consists of the very deep, somewhat poorly drained Mantachie soil, the moderately well drained Iuka soil, and the poorly drained Bibb soil. These soils are on the flood plains of streams. They are subject to flooding for brief periods several times a year. The composition of this unit is variable, but the mapping was sufficiently controlled to evaluate the soils for the expected uses. Some areas mainly consist of the Mantachie soil, some areas consist of the Iuka soil or the Bibb soil, and other areas contain all three soils in variable proportions. The mapped areas are generally long and narrow. They range from 500 to more than 2,000 acres in size.

The somewhat poorly drained Mantachie soil is on smooth, slightly convex parts of the flood plain. This soil makes up about 50 percent of the map unit. Typically, the surface layer is very dark grayish brown clay loam about 3 inches thick. The subsoil, to a depth of 62 inches, is mottled grayish brown, yellowish brown, and strong brown sandy clay loam in the upper part; gray sandy clay loam in the middle part; and gray clay loam in the lower part. The subhorizons of the subsoil have few or common mottles in shades of brown.

Important properties of the Mantachie soil—

Permeability: Moderate
Available water capacity: Very high
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 1.5 feet from December through March
Flooding: Frequent

The moderately well drained Iuka soil is on flood plains. This soil makes up about 20 percent of the map unit. Typically, the surface layer is dark brown loam about 3 inches thick. The substratum, to a depth of 65 inches, is strong brown sandy loam in the upper part; brown sandy loam in the middle part; and mottled light gray, light brownish gray, and light yellowish brown sandy loam in the lower part. The upper and middle parts of the substratum have common mottles in shades of yellow, brown, and gray.

Important properties of the Iuka soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 3 feet from December through April
Flooding: Frequent

The poorly drained Bibb soil is on flood plains. This soil makes up about 15 percent of the map unit. Typically, the surface is very dark grayish brown sandy loam about 6 inches thick. The substratum, to a depth of 62 inches, is dark gray sandy loam in the upper and middle parts and is stratified very dark gray sandy loam and light brownish gray loamy sand in the lower part. It has common mottles in shades of brown.

Important properties of the Bibb soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 0.5 to 1.5 feet from December through April
Flooding: Frequent

Included in mapping are a few small areas of Eunola, Ocilla, Riverview, and Urbo soils. Eunola and Ocilla soils are on low terraces. They do not flood frequently. The well drained Riverview soils are on the convex parts of natural levees. The somewhat poorly drained Urbo soils are on the low parts of broad flood plains. Also included are areas of Mantachie and Iuka soils that

Figure 8.—Most areas of Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded, are wooded. Although the frequent flooding is a severe limitation for most uses, areas of this map unit provide valuable habitat for woodland and wetland wildlife.

do not flood frequently. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

This map unit is mostly used as woodland (fig. 8). A few small areas are used for pasture, hay, or cultivated crops.

This map unit is not suited to cultivated crops. The wetness and the hazard of flooding are severe limitations that are difficult to overcome.

This map unit is poorly suited to pasture and hay. Grasses that tolerate the wetness and flooding are recommended. Common bermudagrass is a suitable grass to plant. Deferred grazing during wet periods helps keep the soil and sod in good condition.

This map unit is fairly well suited to the production of loblolly pine, sweetgum, and water oak. Other species that grow in areas of these soils include American sycamore, green ash, blackgum, and sweetbay. On the basis of a 50-year site curve, the site index for loblolly pine is 100 on the Mantachie and Iuka soils. Loblolly pine is capable of growing 154 cubic feet, or 770 board feet, per acre per year, as measured when the mean annual increment culminates. The site index for loblolly pine, on the basis of a 50-year site curve, is 90 on the

Bibb soil. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of gallberry, blackgum, panicums, green ash, and red maple.

The restricted use of equipment, the seedling mortality rate, and plant competition are severe limitations for the management of timber in areas of the Bibb and Mantachie soils. The restricted use of equipment and the seedling mortality rate are moderate limitations, and the plant competition is a severe limitation in areas of the Iuka soil. The wetness is a management concern. Management activities should be performed when the soil is dry. Seedling mortality can be overcome by planting trees on beds or by increasing the planting rate. Plant competition is severe, and it can prevent adequate natural or artificial reforestation. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This map unit is not suited to most urban uses. The wetness and the hazard of flooding are severe limitations that are difficult to overcome. Buildings can be placed on pilings or on mounds to elevate them above the expected flood level.

This map unit provides habitat for many species of wildlife. The soils have fair potential as habitat for openland wildlife. The Mantachie and Iuka soils have good potential as habitat for woodland wildlife, and the Bibb soil has fair potential. Habitat for wetland wildlife is good in areas of the Bibb soil, poor in areas of the Iuka soil, and fair in areas of the Mantachie soil. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

All of the soils are in land capability subclass Vw. The Mantachie and Iuka soils are in woodland ordination group 11W, and the Bibb soil is in woodland ordination group 9W.

MgB2—Maytag silty clay, 1 to 3 percent slopes, eroded. This very deep, moderately well drained, nearly level soil is in the uplands of the Blackland Prairie. Slopes are generally long, smooth, and slightly convex. The mapped areas range from 20 to 150 acres in size.

Typically, the surface is olive silty clay about 7 inches thick. The subsoil, to a depth of 65 inches, is light olive brown silty clay in the upper part, olive yellow clay in the middle part, and pale olive clay in the lower part. Soft accumulations and hard nodules of calcium carbonate are throughout the subsoil.

Important properties of the Maytag soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Slightly acid to moderately alkaline in the upper part of the subsoil; slightly alkaline or moderately alkaline in the lower part of the subsoil
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Kipling, Oktibbeha, Sucarnoochee, and Vaiden soils. Also included are areas of Maytag soils that are not eroded, a few areas of Maytag soils that have a surface texture of silty clay loam or clay, and areas of soils that have slopes of more than 3 percent. Kipling soils are in lower positions on the landscape. They are somewhat poorly drained and have an acid subsoil. The somewhat poorly drained Sucarnoochee soils are in drainageways. The Oktibbeha soils are in slightly higher positions on the landscape. They have an acid subsoil. The somewhat poorly drained Vaiden soils are in lower positions on the landscape. They have an acid subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for pasture, hay, or cultivated crops. A few areas are managed for wildlife habitat.

This soil is fairly well suited to cultivated crops. The main crops grown are soybeans, grain sorghum, wheat, and cotton (fig. 9). The main limitation is the clayey surface texture that can limit the use of equipment during wet periods. The soil is difficult to keep in good tilth. It is sticky when wet, is hard when dry, and becomes cloddy if it is tilled when too wet or too dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Erosion is a severe hazard if the soil is used for row crops. The hazard of erosion can be reduced if fall grain or winter pasture grasses are seeded early and if tillage and seeding are done on the contour or across the slope. Waterways should be shaped and seeded to perennial grasses. Most crops respond well to applications of a complete fertilizer. Applications of lime are generally not needed.

This soil is well suited to hay and pasture, and it has few limitations for these uses. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain

Figure 9.—Soybeans in an area of Maytag silty clay, 1 to 3 percent slopes, eroded.

uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species. Applications of recommended fertilizer promote the growth of forage plants.

This soil is fairly well suited to the production of eastern redcedar. It is not suited to the production of pine because of the high pH. Other species that commonly grow in areas of this soil include hackberry. On the basis of a 50-year site curve, the site index for eastern redcedar is 40. Eastern redcedar is capable of growing 43 cubic feet, or 200 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of Macartney rose, sedges, pancium, Johnsongrass, locust, and hackberry.

This soil has moderate limitations for the management of timber. The limitations are plant competition, the restricted use of equipment, and the seedling mortality rate. The clayey texture of the soil restricts the use of wheeled equipment to periods when the soil is dry. Seedling mortality can be overcome by increasing the tree planting rate.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the slow permeability, and the low strength if used for roads. If buildings are constructed in areas of this soil, properly designing foundations and footings and diverting runoff away from the buildings help to prevent the structural damage that results from shrinking and swelling. Septic tank absorption fields do not function properly, especially during rainy periods, because of the slow permeability. Using sandy backfill for the trenches and increasing the length of absorption lines help to overcome the slow permeability. An alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat and mink.

This Maytag soil is in land capability subclass IVe and in woodland ordination group 4C.

MgD2—Maytag silty clay, 3 to 8 percent slopes, eroded. This very deep, moderately well drained, gently sloping soil is in the uplands of the Blackland Prairie. Slopes are generally long, smooth, and convex. Individual areas range from 25 to 250 acres in size.

Typically, the surface layer is dark grayish brown silty clay about 6 inches thick. The subsoil, to a depth of 62 inches, is light olive brown silty clay in the upper part, olive yellow silty clay in the middle part, and light olive gray silty clay in the lower part. The substratum, to a depth of 72 inches, is light brownish gray silty clay. Soft accumulations and nodules of calcium carbonate are throughout the profile.

Important properties of the Maytag soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Slightly acid to moderately alkaline in the upper part; slightly alkaline or moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Houlka, Kipling, Oktibbeha, Sucarnoochee, and Vaiden soils. Also included are areas of Maytag soils that have not been eroded and areas of soils that have slopes of more than 8 percent. The somewhat poorly drained Houlka and Sucarnoochee soils are in drainageways. Kipling soils are on the more convex slopes. They have an acid subsoil. Oktibbeha and Vaiden soils are in slightly higher positions on the landscape. They have an acid subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for pasture or cultivated crops. A few areas are used for hay or are managed for wildlife habitat.

This soil is poorly suited to cultivated crops. The main limitations are the slope, poor tilth, and the hazard of erosion. Erosion is a severe hazard in cultivated areas. Good management is required to reduce excessive erosion. In areas that have a concentrated water flow, the soil is subject to gully erosion. Conservation tillage, contour farming, stripcropping, crop rotation, and the use of cover crops reduce the runoff rate and help to control erosion. Returning crop residue to the soil helps to maintain tilth and increases the water-holding capacity.

This soil is well suited to hay and pasture. The hazard of erosion is severe during the establishment of pasture grasses. All tillage should be across the slope. Deferred grazing during wet periods helps to prevent soil compaction and helps to keep the pasture and soil in good condition. Rotation grazing during dry periods helps to maintain the established sod and improves the quality of the forage. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species. Applications of recommended fertilizers promote the good growth of forage plants.

This soil is fairly well suited to the production of eastern redcedar. It is not suited to the production of pine because of the high pH. Other species that commonly grow in areas of this soil include hackberry. On the basis of a 50-year site curve, the site index for eastern redcedar is 40. Eastern redcedar is capable of growing 43 cubic feet, or 200 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of Macartney rose, sedges, panicums, Johnsongrass, locust, and hackberry.

This soil has moderate limitations for the management of timber. The limitations are plant competition, the restricted use of equipment, and seedling mortality. The clayey texture of the soil restricts the use of wheeled equipment to periods when the soil is dry. Seedling mortality is a result of the droughtiness. It can be overcome by increasing the tree planting rate.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the slow permeability, and the low strength if used for roads. If buildings are constructed in areas of this soil, properly designing foundations and footings and diverting runoff away from the building help to prevent the structural damage that results from shrinking and swelling. Septic tank absorption fields do not function properly, especially during rainy periods, because of the slow permeability. Using sandy backfill for the trenches and increasing the length of absorption lines help to overcome the slow permeability. An alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat and mink.

This Maytag soil is in land capability subclass VIe and in woodland ordination group 4C.

MgE2—Maytag silty clay, 8 to 12 percent slopes, eroded. This deep, moderately well drained, strongly sloping soil is on short side slopes and hill slopes of the Blackland Prairie. Well defined drainageways dissect the unit in most places. Slopes are generally short and complex. Individual areas range from 15 to 150 acres in size.

Typically, the surface layer is olive brown silty clay about 4 inches thick. The subsoil, to a depth of 49 inches, is olive yellow silty clay in the upper part, light yellowish brown silty clay in the middle part, and light olive brown silty clay in the lower part. It has mottles and coatings on peds in shades of yellow and brown. The substratum, to a depth of 62 inches, is mottled olive brown, light yellowish brown, and olive yellow silty clay. Soft accumulations and nodules of calcium carbonate are throughout the subsoil and substratum.

Important properties of the Maytag soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Slightly acid to moderately alkaline in the upper part; slightly alkaline or moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Houlka, Oktibbeha, and Sucarnoochee soils. Also included are areas of soils that have slopes of less than 8 percent or more than 12 percent. The somewhat poorly drained Houlka and Sucarnoochee soils are in drainageways. Oktibbeha soils are on the more convex slopes. They have an acid subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as pasture. A few areas support woodland that is of poor quality. Eastern redcedar is the dominant tree species in wooded areas.

This soil is not suited to cultivated crops. The main limitations are the clayey texture, poor tilth, and short, complex slopes. Erosion is a severe hazard if the soil is tilled.

This soil is fairly well suited to pasture and hay. The short, irregular slopes and the occasional gullies can limit the use of equipment. Erosion is a severe hazard during the establishment of pasture grasses. All tillage should be across the slope. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth.

This soil is fairly well suited to the production of eastern redcedar. It is not suited to the production of pine because of the high pH. Other species that commonly grow in areas of this soil include hackberry. On the basis of a 50-year site curve, the site index for eastern redcedar is 40. Eastern redcedar is capable of growing 43 cubic feet, or 200 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of Macartney rose, sedges, panicums, Johnsongrass, locust, and hackberry.

This soil has moderate limitations for the management of timber. The limitations are plant competition, the restricted use of equipment, and the seedling mortality rate. The clayey texture of the soil can restrict the use of wheeled equipment to periods when the soil is dry. Seedling mortality can be overcome by increasing the tree planting rate.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the high shrink-swell potential, the slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. The slow permeability and the slope are limitations for installing septic tank absorption lines. Increasing the size of the absorption area and installing the absorption lines on the contour help to overcome these limitations; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Maytag soil is in land capability subclass VIe and in woodland ordination group 4C.

MkE2—Maytag-Oktibbeha complex, 3 to 12 percent slopes, eroded. This map unit consists of the very deep, moderately well drained Maytag soil and the moderately well drained Oktibbeha soil on uplands of the Blackland Prairie. The soils in this map unit occur as areas so intricately mixed that mapping them separately was not practical. Individual areas of this complex range from 250 to 500 acres in size. They are about 50 percent Maytag soil and 30 percent Oktibbeha soil. Slopes are generally short and choppy, but some are long and smooth.

The moderately well drained Maytag soil is generally on the upper parts of gently sloping side slopes and on narrow ridges. Typically, the surface layer is dark brown silty clay about 3 inches thick. The subsoil, to a depth of 60 inches, is olive yellow and light olive brown silty clay in the upper part; mottled light yellowish brown, pale yellow, and olive yellow silty clay in the middle part; and olive silty clay in the lower part. Soft accumulations and nodules of calcium carbonate are common throughout the profile.

Important properties of the Maytag soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Slightly acid to moderately alkaline in the upper part; slightly alkaline or moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

The moderately well drained Oktibbeha soil is generally on the more strongly sloping side slopes and on convex toe slopes. Typically, the surface layer is grayish brown clay loam about 3 inches thick. The subsoil, to a depth of 50 inches, is red clay in the upper part, yellowish red clay in the middle part, and yellowish red clay that has common olive gray mottles in the lower part. The substratum, to a depth of 60 inches, is mottled brownish gray, yellowish red, and olive yellow clay. The substratum has common or many soft accumulations and hard nodules of calcium carbonate.

Important properties of the Oktibbeha soil—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in upper part; neutral to moderately alkaline in lower part
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: 40 to 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Houlka, Kipling, and Sucarnoochee soils. Also included are small areas of Maytag and Oktibbeha soils that are not eroded and areas of soils that have slopes of more than 12 percent. The somewhat poorly drained Houlka and Sucarnoochee soils are in drainageways. Kipling soils are in landscape positions similar to those of the Oktibbeha soil. They are less clayey than the Oktibbeha soil, and they are redder than the Maytag soil. Included soils make up about 20 percent of the unit, but individual areas are generally less than 5 acres in size.

This map unit is mainly used for pasture or hay. A few areas are used for cultivated crops or are managed for wildlife habitat.

This map unit is not suited to cultivated crops. The main limitations are the slope, poor tilth, and the configuration of slopes. Erosion is a severe hazard if the soils are tilled. Conservation practices are necessary to control runoff and reduce erosion. Conservation tillage, stripcropping, crop rotation, and the use of winter cover crops help to reduce the rate of erosion and keep the soils in good condition.

This map unit is fairly well suited to pasture and hay. The short, irregular slopes and the occasional gullies can limit the use of equipment. Erosion is a severe hazard during the establishment of grasses. All tillage should be across the slope. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species.

The Maytag soil, which makes up most areas of this map unit, is not suited to the production of pine. It is suited to the production of eastern redcedar. Other species that grow in areas of the Maytag soil include hackberry. The Oktibbeha soil, which makes up about 30 percent of the map unit, is suited to the production of loblolly pine. Other species that grow in areas of the Oktibbeha soil include shortleaf pine, eastern redcedar, and sweetgum. On the basis of a 50-year site curve, the site index for eastern redcedar in areas of the Maytag soil is 40. Eastern redcedar is capable of growing 43 cubic feet, or 200 board feet, per acre per year in areas of the Maytag soil, as measured when the mean annual increment culminates. On the basis of a 50-year site curve, the site index for loblolly pine is 80 in areas of the Oktibbeha soil. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year in areas of the Oktibbeha soil. The understory vegetation consists mainly of panicums, sedges, Macartney rose, Johnsongrass, hackberry, hawthorn, and greenbriar.

This map unit has moderate limitations for the management of timber. The limitations are plant competition, the restricted use of equipment, and the seedling mortality rate. The clayey texture restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. Seedling mortality can be overcome by increasing the tree planting rate.

This map unit is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the high shrink-swell potential, the slow and very slow permeability, and the low strength if used for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. The slow and very slow permeability and the slope are limitations for installing septic tank absorption lines. Increasing the size of the absorption area and installing the absorption lines on the contour help to overcome these limitations; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This map unit has fair potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

The Maytag and Oktibbeha soils are in land capability subclass VIIe. The Maytag soil is in woodland ordination group 4C, and the Oktibbeha soil is in woodland ordination group 8C.

MnA—Minter loam, 0 to 1 percent slopes, occasionally flooded. This very deep, poorly drained, nearly level soil is on low stream terraces and flood plains. Slopes are generally long and smooth. Individual areas are generally broad. They range from 25 to 250 acres in size.

Typically, the surface layer is dark grayish brown loam about 9 inches thick. The subsurface layer, to a depth of 13 inches, is light brownish gray fine sandy loam. The subsoil, to a depth of 65 inches, is gray clay loam in the upper part, gray clay in the middle part, and gray clay loam in the lower part. It has few to many mottles in shades of red, yellow, brown, and gray.

Important properties of the Minter soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, from 3 feet above the surface to a depth of 1.0 foot from November through January
Flooding: Occasional

Included in mapping are a few small areas of Goldsboro, Houlka, Lynchburg, Sucarnoochee, and Urbo soils. Also included are small areas of Minter soils that have a surface layer of silt loam. The moderately well drained Goldsboro soils and the somewhat poorly drained Lynchburg soils are in slightly higher positions on the landscape. They have a loamy subsoil. The somewhat poorly drained Houlka, Sucarnoochee, and Urbo soils are on the slightly lower parts of flood plains. The included soils make up about 15 percent of the map unit, but individual areas are less than 5 acres in size.

Most areas of this soil are used as woodland or for cultivated crops. A few areas are used for pasture.

This soil is poorly suited to early-season cultivated crops. The wetness and flooding are severe limitations. The main crops grown are soybeans and grain sorghum. Flooding delays planting and damages crops in some years. Land grading and shaping and installing surface ditches help to remove the excess water. Returning crop residue to the soil and using minimum tillage reduce the surface crusting and the soil compaction. Most crops respond well to applications of fertilizer. Applications of lime are generally needed.

This soil is poorly suited to pasture and hay. The wetness and flooding are the main limitations. Only those grasses that can tolerate flooding and wetness should be planted. Deferred grazing during wet periods helps to prevent soil compaction and helps to keep the sod and soil in good condition.

This soil is fairly well suited to the production of loblolly pine, water oak, and sweetgum. Other species that grow in areas of this soil include blackgum and red maple. On the basis of a 50-year site curve, the site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of sedges, greenbriar, palmetto, green ash, and red maple.

This soil has severe limitations for the management of timber. The limitations are the restricted use of equipment and the seedling mortality because of the wetness and flooding. Because of the equipment limitation, management activities should be performed when the soil is relatively dry. Planting trees on beds and increasing the tree planting rate help to reduce the seedling mortality rate. The hazard of windthrow is moderate because of the shallow rooting depth that is a result of the high water table. Heavy thinnings should be avoided in areas of this soil. Plant competition is severe as a result of the high quality of the site and the wetness. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This soil is not suited to most urban uses. The wetness, the slow permeability, and the flooding are severe limitations that are difficult to overcome. Buildings can be placed on pilings or on mounds to elevate them above the expected flood level.

This soil has fair potential as habitat for openland and woodland wildlife and has good potential as habitat for wetland wildlife. Habitat for openland and woodland wildlife can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat, mink, and otter.

This Minter soil is in land capability subclass IVw and in woodland ordination group 9W.

OcA—Ocilla loamy fine sand, 0 to 2 percent slopes, rarely flooded. This very deep, somewhat poorly drained, nearly level soil is on stream terraces. Slopes are generally long and smooth. Individual areas range from 10 to 150 acres in size.

Typically, the surface layer is grayish brown loamy fine sand about 8 inches thick. The subsurface layer is yellowish brown and very pale brown loamy fine sand to a depth of 36 inches. The upper and middle parts of the subsoil, to a depth of 57 inches, are brownish yellow sandy loam that has mottles in shades of gray, brown, and red. The lower part, to a depth of 75 inches, is mottled in shades of brown, yellow, red, and gray. It is sandy loam and sandy clay loam.

Important properties of the Ocilla soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 2.5 feet from December through April
Flooding: Rare

Included in mapping are a few small areas of Blanton, Eunola, Goldsboro, and Lynchburg soils. Blanton soils are in slightly higher positions on the landscape. They have a sandy surface layer more than 40 inches thick. Eunola, Goldsboro, and Lynchburg soils are in slightly higher positions on the landscape. They do not have a thick, sandy surface layer. Also included are small areas of Ocilla soils that have a surface layer of loamy sand. The included soils make up about 10 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as pasture or for cultivated crops. Large areas have been planted to loblolly pine.

This soil is fairly well suited to cultivated crops. The main limitations are the wetness in spring and the droughtiness in summer. Unless a system of surface drainage is provided, mid to late season crops are best suited. During periods of prolonged drought, the growth of plants is slowed and yields are reduced. In areas that have suitable water available, supplemental irrigation can prevent crop stress during dry periods in most years. Returning crop residue to the soil improves tilth, helps to maintain fertility, and increases the water-holding capacity of the soil. Most crops respond well to applications of lime and a complete fertilizer.

This soil is well suited to hay and pasture. The main limitations are wetness in spring and droughtiness in summer. Proper stocking rates, pasture rotation, and restricted grazing during wet or very dry periods help to keep the pasture and soil in good condition. Periodic mowing helps to maintain uniform growth, discourages selective grazing, and reduces the clumpy growth and undesirable species. Applications of lime and frequent applications of fertilizer promote the good growth of forage.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include longleaf pine and water oak. On the basis of a 50-year site curve, the site index for loblolly pine is 85. Loblolly pine is capable of growing 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of waxmyrtle, gallberry, and palmetto.

This soil has moderate limitations for the management of timber. The limitations are the restricted use of equipment, the seedling mortality rate, and plant competition. The sandy texture of the surface layer restricts the use of wheeled equipment, especially when the soil is very dry. Harvesting and management activities should be performed when the soil is moist. The seedling mortality rate is moderate because of the droughtiness. It can be reduced by increasing the tree planting rate. Competition from undesirable plant species reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has moderate to severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the flooding and the wetness. Controlling the flooding is generally not feasible; however, buildings can be placed on pilings or mounds to elevate them above the expected flood level. Septic tank absorption fields may not function properly during rainy periods because of the seasonal high water table. Increasing the size of the absorption area or mounding soil material over the absorption field helps to overcome the high water table.

This soil has fair potential as habitat for openland and wetland wildlife and good potential as habitat for woodland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Ocilla soil is in land capability subclass IIIw and in woodland ordination group 8W.

OkB2—Oktibbeha clay loam, 1 to 3 percent slopes, eroded. This very deep, moderately well drained, nearly level soil is on narrow ridgetops in the uplands of the Blackland Prairie. Slopes are generally smooth and slightly convex. Individual mapped areas range from 10 to 150 acres in size.

Typically, the surface layer is very dark grayish brown clay loam about 3 inches thick. The subsoil, to a depth of 45 inches, is yellowish red clay in the upper part; red clay that has dark yellowish brown and light brownish gray mottles in the middle part; and light olive brown and olive clay in the lower part. The substratum, to a depth of 80 inches, is pale olive and olive yellow clay that is mottled in shades of gray, olive, and brown. Soft masses and concretions of calcium carbonate are in the lower part of the subsoil and in the substratum.

Important properties of the Oktibbeha soil—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in upper part; neutral to moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Kipling, Maytag, and Vaiden soils. Also included are areas of Oktibbeha soils that are not eroded and areas of soils that have slopes of more than 3 percent. The somewhat poorly drained Kipling soils are in landscape positions similar to those of the Oktibbeha soil. They have less clay in the subsoil. Maytag soils are in slightly lower positions on the landscape. They have an alkaline subsoil. Vaiden soils are on lower, less convex slopes. They are somewhat poorly drained and are yellow in the upper part of the subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used as woodland. A few small areas are used for cultivated crops, pasture, or hay.

This soil is fairly well suited to cultivated crops. The main crops are soybeans, grain sorghum, wheat, and cotton. The soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content, and it becomes cloddy if worked when it is too wet or too dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Erosion is a moderate hazard if the soil is used for row crops. Conservation tillage, stripcropping, and cover crops reduce the runoff rate and help to control erosion. Waterways should be shaped and seeded to perennial grasses. Most crops respond well to applications of a complete fertilizer. Applications of lime are generally needed.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species. Applications of lime and fertilizer promote the good growth of forage plants.

This soil is fairly well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, eastern redcedar, and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 80. Loblolly pine is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of panicums, greenbriar, blackberry, sedges, and hawthorn.

The restricted use of equipment and the seedling mortality rate are moderate limitations for the management of timber. The plant competition is severe. The clayey subsoil restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. The seedling mortality can be overcome by increasing the tree planting rate. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation may be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the very slow permeability, and the low strength if used for roads. If buildings are constructed in areas of this soil, properly designing foundations and footings and diverting runoff away from the buildings help to prevent the structural damage that results from shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Using sandy backfill for the trenches and increasing the length of absorption lines help to overcome the very slow permeability; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland wildlife, good potential as habitat for woodland wildlife, and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Oktibbeha soil is in land capability subclass IIIe and in woodland ordination group 8C.

OkD2—Oktibbeha clay loam, 3 to 8 percent slopes, eroded. This very deep, moderately well drained, gently sloping soil is in the uplands of the Blackland Prairie. Slopes are generally long, smooth, and convex. Individual mapped areas range from 20 to 200 acres in size.

Typically, the surface layer is yellowish brown clay loam about 4 inches thick. The subsoil, to a depth of 48 inches, is strong brown clay in the upper part. In the middle and lower parts, it is red clay that has mottles in shades of gray and brown. The substratum, to a depth of 65 inches, is mottled red, gray, and yellowish brown silty clay. Soft masses and concretions of calcium carbonate are in the substratum. Common fragments of chalk are in the lower part of the substratum.

Important properties of the Oktibbeha soil—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the upper part; neutral to moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Kipling, Maytag, Sucarnoochee, and Vaiden soils. Also included are areas of Oktibbeha soils that are not eroded and soils that have slopes of more than 8 percent. Kipling soils are in landscape positions similar to those of the Oktibbeha soil. They have less clay in the subsoil. Maytag soils are on the upper parts of slopes. They have an alkaline subsoil. The somewhat poorly drained Sucarnoochee soils are in drainageways. Vaiden soils are on the less convex slopes. They are somewhat poorly drained and are yellow in the upper part of the

Figure 10.—An area of Oktibbeha clay loam, 3 to 8 percent slopes, eroded. Areas of this soil are managed as habitat for openland wildlife and are used for the production of timber.

subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for pasture or cultivated crops. Large areas are also used as woodland and as wildlife habitat (fig. 10).

This soil is poorly suited to cultivated crops. The main limitations are the slope, poor tilth, and the hazard of erosion. Erosion is a severe hazard if this soil is tilled. Good management is necessary to reduce excessive soil loss. Crop rotation, contour farming, and conservation tillage reduce the runoff rate and help to control erosion. The soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content, and it becomes cloddy if worked when it is too wet or too dry. Returning crop residue to the soil improves tilth and increases the water-holding capacity. Most crops respond well to applications of a complete fertilizer. Applications of lime are generally needed.

This soil is well suited to pasture and hay (fig. 11). The hazard of erosion is severe when the soil is bare during the establishment of pasture grasses. All tillage

Figure 11.—An area of Oktibbeha clay loam, 3 to 8 percent slopes, eroded. This soil is well suited to pasture and woodland.

and seeding operations should be across the slope. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species. Applications of lime and fertilizer promote the good growth of forage plants.

This soil is fairly well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, eastern redcedar, and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 80. Loblolly pine is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of panicums, greenbriar, blackberry, sedges, and hawthorn.

The restricted use of equipment and the seedling mortality rate are moderate limitations for the management of timber. The plant competition is severe. The clayey subsoil restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. The seedling mortality can be overcome by increasing the tree planting rate. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation may be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the high shrink-swell potential, the very slow permeability, and the low strength if used for roads. If buildings are constructed in areas of this soil, properly designing foundations and footings and diverting runoff away from the buildings help to prevent the structural damage that results from shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Using sandy backfill for the trenches and increasing the length of absorption lines help to overcome for the very slow permeability; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland wildlife, good potential as habitat for woodland wildlife, and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Oktibbeha soil is in land capability subclass IVe and in woodland ordination group 8C.

OkE2—Oktibbeha clay loam, 8 to 15 percent slopes, eroded. This very deep, moderately well drained, strongly sloping soil is on the side slopes and hill slopes of the Blackland Prairie. Well defined drainageways dissect the unit in most places. Slopes are generally short and complex. Individual mapped areas range from 150 to 200 acres in size.

Typically, the surface layer is dark brown clay loam about 2 inches thick. The subsoil, to a depth of 48 inches, is red clay in the upper part; mottled red, light brownish gray, and yellowish brown clay in the middle part; and mottled light brownish gray, red, and yellowish brown clay in the lower part. The substratum, to a depth of 65 inches, is mottled light brownish gray, red, and yellowish brown silty clay. Soft masses and concretions of calcium carbonate are in the substratum.

Important properties of the Oktibbeha soil—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the upper part; neutral to moderately alkaline in the lower part
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Depth to seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Houlka, Maytag, and Sucarnoochee soils. Also included are soils that have slopes of less than 8 percent or more than 15 percent. The somewhat poorly drained Houlka and Sucarnoochee soils are in drainageways. Maytag soils are in the less convex, more gently sloping areas. They have an alkaline subsoil. The included soils make up about 20 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for pasture or hay. A few large areas are used as woodland.

This soil is not suited to cultivated crops. The main limitations are the steepness of the slope, poor tilth, and the slope configuration. Erosion is a severe hazard in cultivated areas. The short, irregular slopes restrict the use of equipment, and conservation practices are difficult to implement and maintain.

This soil is fairly well suited to hay and pasture. The short, irregular slopes and the occasional gullies can limit the use of equipment. Erosion is a severe hazard. During the establishment of pasture grasses, all tillage should be across the slope. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce the clumpy growth and undesirable species. Applications of lime and fertilizer promote the good growth of forage plants.

This soil is fairly well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine, eastern redcedar, and sweetgum. On the basis of a 50-year site curve, the site index for loblolly pine is 80. Loblolly pine is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of panicums, greenbriar, blackberry, sedges, and hawthorn.

The restricted use of equipment, the hazard of erosion, and the seedling mortality rate are moderate limitations for the management of timber. Plant competition is severe. The slope and the clayey subsoil are management concerns in areas of this soil. The clayey subsoil restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. Good management includes conservation practices that help to control erosion. Site preparation methods that minimize soil disturbance should be used. The seedling mortality can be overcome by increasing the tree planting rate. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the high shrink-swell potential, the very slow permeability, and the low strength for roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. The very slow permeability and the slope are limitations for installing septic tank absorption lines. Increasing the size of the absorption area and installing the absorption lines on the contour help to overcome these limitations; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the subsoil.

This soil has fair potential as habitat for openland wildlife, good potential as habitat for woodland wildlife, and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

This Oktibbeha soil is in land capability subclass VIe and in woodland ordination group 8C.

OrB2—Orangeburg loamy sand, 2 to 5 percent slopes, eroded. This very deep, well drained, nearly level to gently sloping soil is in the uplands. Slopes are generally long, smooth, and slightly convex. Individual mapped areas range from 10 to 25 acres in size.

Typically, the surface layer is brown loamy sand about 5 inches thick. The subsoil, to a depth of 64 inches, is yellowish red sandy clay loam in the upper part and is red sandy clay loam in the middle and lower parts.

Important properties of the Orangeburg soil—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: More than 6 feet
Flooding: None

Included in mapping are a few small areas of Blanton, Cowarts, and Luverne soils. Blanton soils are on the higher parts of ridges. They have a sandy surface layer more than 40 inches thick. Cowarts soils are in landscape positions similar to those of the Orangeburg soil. They have a subsoil less than 60 inches thick. Luverne soils are in lower positions on the landscape than the Orangeburg soil, and they are more clayey in the upper part of the subsoil. Also included are small areas of Orangeburg soils that have a surface layer of sandy loam. The included soils make up about 15 percent of the map unit, but individual areas generally are less than 5 acres in size.

Most areas of this soil are used for cultivated crops or pasture. A few small areas are used as woodland.

This soil is well suited to cultivated crops, and it has few limitations for this use. Erosion is a moderate hazard in tilled areas. Gullies form readily in areas that have a concentrated flow of surface water. If the soil is cultivated, conservation tillage, contour farming, stripcropping, and cover crops reduce the runoff rate and help to control erosion. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help to maintain tilth and the content of organic matter. Most crops respond to applications of lime and a complete fertilizer.

This soil is well suited to pasture and hay, and it has few limitations for these uses. Grasses such as coastal bermudagrass or bahiagrass are well suited to these soils. Proper stocking rates, pasture rotation, and restricted grazing during prolonged dry periods help to keep the pasture and soil in good condition. Applications of lime and fertilizer help to overcome the low fertility and promote the good growth of forage plants.

This soil is well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine and sweetgum. On the basis of a 50-year site curve, the mean site index for loblolly pine is 90. Loblolly pine is capable of growing 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of bluestem, yellow jessamine, huckleberry, greenbriar, and flowering dogwood.

The only limitation for the management of timber is the moderate plant competition, which reduces the growth of trees and can prevent adequate reforestation. The competing vegetation can be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is well suited to most urban uses, and it has no significant limitations.

This soil has good potential as habitat for openland and woodland wildlife and very poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Orangeburg soil is in land capability subclass IIe and in woodland ordination group 9A.

Pt—Pits. This miscellaneous area is in nearly level to strongly sloping upland areas in the Coastal Plain. A horseshoe-shaped, vertical wall about 3- to 20-feet high is around most areas. Individual areas are generally rectangular in shape. They range from 2 to 20 acres in size.

Pits are open excavations from which soil and part of the underlying material has been removed. The excavated areas, which were left after Blanton, Compass, Cowarts, and Luverne soils were removed for fill material, are called borrow pits, gravel pits, or sand pits. Some areas are partially filled with water during winter and spring. Most areas are reopened each year, and the adjacent soil material is removed.

Important properties of Pits—

Permeability: Variable
Available water capacity: Variable
Soil reaction: Variable
Organic matter content: Very low
Natural fertility: Very low
Depth to bedrock: More than 60 inches
Root zone: Variable
Depth to seasonal high water table: More than 6 feet
Flooding: None; ponding in some areas

Included in mapping are a few areas of Blanton, Compass, Cowarts, and Luverne soils. Included soils make up about 15 percent of the map unit. They support vegetation consisting of pine trees, grasses, and forbs.

Most areas of Pits are idle. A few areas have been planted to loblolly pine. Most of the areas do not support vegetation, and erosion is a severe hazard.

Pits are not suited to cultivated crops and are poorly suited to pasture and hay. The main limitations are the droughtiness, poor tilth, and low fertility.

Pits are poorly suited to woodland. They have a severe hazard of erosion, and the seedling mortality rate is high because of the droughtiness. Those trees that survive in these areas have a very slow growth rate.

Areas of Pits are not suited to urban uses. Onsite investigation is needed if they are considered for use in urban development.

Areas of Pits have a very limited potential as habitat for wildlife.

Pits are in capability subclass VIIIs. They are not assigned to a woodland ordination group.

ScA—Sucarnoochee silty clay, 0 to 1 percent slopes, frequently flooded. This very deep, somewhat poorly drained, nearly level soil is on the flood plains of the Blackland Prairie. Slopes are smooth and slightly concave. Individual mapped areas are narrow to broad. They range from 50 to 250 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown silty clay about 5 inches thick. The lower part is olive silty clay loam to a depth of 10 inches. The subsoil, to a depth of 64 inches, is dark grayish brown clay that has strong brown, yellowish brown, and gray mottles.

Important properties of the Sucarnoochee soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Neutral to moderately alkaline
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 0.5 to 1.5 feet from November through February
Flooding: Frequent

Included in mapping are a few small areas of Goldsboro, Lynchburg, Maytag, Minter, and Oktibbeha soils. Goldsboro and Lynchburg soils are on low terraces. They are loamy throughout. The well drained Maytag soils and the moderately well drained Oktibbeha soils are on adjacent slopes. The poorly drained Minter soils are on low terraces. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 3 acres in size.

Most areas of this soil are used for pasture or cultivated crops. A few small areas are used as woodland.

This soil is poorly suited to early-season cultivated crops. The main limitations are the wetness, flooding, and poor tilth. Suitable crops are soybeans and grain sorghum. Flooding delays planting and damages crops in some years. Proper row arrangement, field ditches, and vegetated outlets are necessary to remove the excess surface water. The soil is difficult to keep in good tilth, and it can be worked only within a narrow range of moisture content. It is sticky when wet, is hard when dry, and becomes cloddy if tilled when it is too wet or too dry.

This soil is poorly suited to pasture and hay. The wetness and frequent flooding are the main limitations. Only those grasses that tolerate the wetness and flooding should be planted. Grazing when the soil is wet results in the compaction of the surface layer, ponding of water on the surface, and damage to the plant community. Excess water on the surface can be removed with a system of shallow ditches or tile drains. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to the production of sweetgum and green ash. Other species that grow in areas of this soil include American sycamore, green ash, and water oak. On the basis of a 50-year site curve, the mean site index for sweetgum is 100. Sweetgum is capable of growing 106 cubic feet, or 530 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of panicums, sedges, Johnsongrass, Osage-orange, honeylocust, blackberry, and hackberry.

The restricted use of equipment and the plant competition are severe limitations for the management of timber. The seedling mortality rate is a moderate limitation. The use of equipment is restricted because of the flooding and wetness. Management activities should be performed when the soil is dry. The seedling mortality is a result of the wetness and flooding. It can be overcome by planting trees on beds or by increasing the planting rate. The plant competition prevents adequate natural or artificial reforestation. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This soil is not suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the frequent flooding and the very slow permeability. Controlling the flooding is generally not feasible; however, the buildings can be placed on pilings or mounds to elevate them above the expected flood level. Other limitations include the wetness, the high shrink-swell potential, and the inability of the soil to support a load if used for local roads and streets.

This soil has poor potential as habitat for openland wildlife and fair potential as habitat for woodland and wetland wildlife. Habitat for openland and woodland wildlife can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat, mink, and otter.

This Sucarnoochee soil is in land capability subclass IVw and in woodland ordination group 7W.

URA—Urbo and Riverview soils, 0 to 1 percent slopes, frequently flooded. This map unit consists of the very deep, somewhat poorly drained Urbo soil and the very deep, well drained Riverview soil on the flood plains of major streams. These soils are subject to flooding for brief periods several times a year. The composition of this unit is variable, but the mapping was sufficiently controlled to evaluate the soils for the expected uses. Some areas mainly consist of the Urbo soil, some areas mainly consist of the Riverview soil, and other areas contain both soils in variable proportions. The mapped areas are generally long and narrow. They range from 500 acres to several thousand acres in size.

The somewhat poorly drained Urbo soil is on flat to slightly concave areas on the lower parts of the flood plain. This soil makes up about 50 percent of the unit. Typically, the surface layer, to a depth of 15 inches, is very dark grayish brown clay loam in the upper part and brown clay loam in the lower part. The subsoil, to a depth of 65 inches, is dark grayish brown clay loam in the upper part, light brownish gray clay in the middle part, and gray clay loam in the lower part. The subsoil has mottles in shades of brown, gray, yellow, and red.

Important properties of the Urbo soil—

Permeability: Very slow
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 2.0 feet from January through March
Flooding: Frequent

The well drained Riverview soil makes up about 30 percent of the unit. This soil is on the high parts of natural levees, adjacent to stream channels. Typically, the surface layer is yellowish brown sandy loam about 4 inches thick. The subsoil, to a depth of 58 inches, is yellowish brown and dark yellowish brown sandy clay loam in the upper part; brown sandy clay loam that has light yellowish brown mottles in the middle part; and mottled brownish yellow, light yellowish brown, pale brown, and strong brown sandy clay loam in the lower part. The substratum, to a depth of 70 inches, is brownish yellow sandy loam that has mottles in shades of brown.

Important properties of the Riverview soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderately low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 3.0 to 5.0 feet from December through March
Flooding: Frequent

Included in mapping are a few small areas of Goldsboro, Houlka, Lynchburg, and Sucarnoochee soils. Also included are a few areas of Urbo and Riverview soils that have several inches of recently deposited loamy or sandy material in the surface layer. Goldsboro and Lynchburg soils are on low terraces. They do not flood frequently. Houlka and Sucarnoochee soils are on slightly lower parts of the flood plain than the Urbo soil. They have more clay in the subsoil. Also included are small areas of Riverview soils that have a surface layer of loam or silt loam and areas of soils that have a subsoil of sandy loam. Included soils make up about 20 percent of the unit, but individual areas are generally less than 5 acres in size.

Most areas of this map unit are used as woodland. A few small areas support native pasture or are managed for wildlife habitat.

This map unit is poorly suited to cultivated crops. The wetness and flooding are the main limitations. Flooding delays planting and damages crops in some years. Most of the climatically adapted crops can be grown if the soils are protected from flooding late in spring and early in summer and if adequate surface drainage is provided.

This map unit is poorly suited to pasture and hay. The wetness and the flooding limit the choice of suitable plants and the grazing period. Excess water on the surface can be removed with a system of shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. It is generally not practical to apply high rates of fertilizer or lime to pastures because of the hazard of frequent overflow.

This map unit is fairly well suited to the production of loblolly pine, sweetgum, and water oak. Other species that grow in areas of these soils include American sycamore, green ash, and yellow poplar. On the basis of a 50-year site curve, the site index for loblolly pine is 100 on the Urbo and Riverview soils. Loblolly pine is capable of growing 154 cubic feet, or 770 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of greenbriar, sedges, poison oak, hawthorn, red maple, and green ash.

This map unit has moderate to severe limitations for the management of timber. The limitations are the restricted use of equipment and the seedling mortality because of the wetness and flooding. Because of the equipment limitation, management activities should be performed when the soil is relatively dry. The seedling mortality rate in areas of the Urbo soil can be reduced by planting trees on beds or by increasing the tree planting rate. Plant competition is a severe limitation because of the wetness and the high quality of the site. The competing vegetation can be controlled by mechanical methods or by applications of herbicide.

This map unit is not suited to most urban uses. The soils have severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the wetness, the flooding, and the very slow permeability in the Urbo soil. Controlling flooding is generally not feasible; however, the buildings can be placed on pilings or mounds to elevate them above the expected flood level.

Areas of the Urbo soil have fair potential as habitat for openland, woodland, and wetland wildlife. The Riverview soil has good potential as habitat for openland and woodland wildlife and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers.

The Urbo and Riverview soils are in land capability subclass IVw. The Urbo soil is in woodland ordination group 10W, and the Riverview soil is in woodland ordination group 9A.

VaA—Vaiden silty clay, 0 to 2 percent slopes. This very deep, somewhat poorly drained, nearly level soil is in the uplands of the Blackland Prairie. Slopes are generally long, smooth, and slightly concave. Individual mapped areas are broad. They range from 25 to 150 acres in size.

Typically, the surface layer is very dark grayish brown silty clay about 6 inches thick. The subsoil, to a depth of 49 inches, is yellowish brown clay that has light brownish gray mottles in the upper part and is mottled yellowish brown and gray clay in the middle part. The lower part, to a depth of 65 inches, is clay that is mottled in shades of gray, red, yellow, and brown.

Important properties of the Vaiden soil—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the upper part; very strongly acid to slightly alkaline in the lower part
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: More than 60 inches
Seasonal high water table: Apparent, at a depth of 1.0 to 2.0 feet from November through March
Flooding: None

Included in mapping are a few small areas of Houlka, Kipling, Maytag, Oktibbeha, and Sucarnoochee soils. Also included are a few small areas of soils that have slopes of more than 2 percent. Houlka and Sucarnoochee soils are in narrow drainageways. They are subject to flooding. The moderately well drained Maytag and Oktibbeha soils are in slightly higher positions on the landscape than the Vaiden soil. Kipling soils are in landscape positions similar to those of the Vaiden soil, and they have less clay in the subsoil. The included soils make up about 15 percent of the map unit, but individual areas are generally less than 5 acres in size.

Most areas of this soil are used for cultivated crops. A few areas are used as woodland.

This soil is fairly well suited to cultivated crops. The main limitations are the wetness, poor tilth, and the high content of clay in the surface layer. Land grading and smoothing and installing shallow ditches help to remove the excess surface water. The soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content, and it becomes cloddy if worked when it is too wet or too dry. Using minimum tillage and returning all crop residue to the soil improve the fertility and help to maintain tilth and the content of organic matter. Most crops respond well to applications of a complete fertilizer. Applications of lime are generally needed.

This soil is fairly well suited to pasture and hay. The wetness is the main limitation. Grazing when the soil is wet results in ponding and damage to the plant community. Excess water on the surface can be removed with a system of shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Applications of fertilizer and lime are needed for the optimum production of forage.

This soil is fairly well suited to the production of loblolly pine. Other species that grow in areas of this soil include shortleaf pine and eastern redcedar. On the basis of a 50-year site curve, the site index for loblolly pine is 80. Loblolly pine is capable of growing 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation consists mainly of panicums, greenbriar, blackberry, sedges, winged elm, and hawthorn.

This soil has moderate limitations for the management of timber. The limitations are the restricted use of equipment, the seedling mortality rate, and plant competition because of the clayey subsoil. The clayey subsoil restricts the use of equipment when the soil is wet. Management activities should be performed when the soil is dry. The seedling mortality can be overcome by increasing the tree planting rate. Plant competition reduces the growth of trees and can prevent adequate reforestation. The competing vegetation may be controlled by mechanical methods, applications of herbicide, or prescribed burning.

This soil is poorly suited to most urban uses. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are the very high shrink-swell potential, the wetness, the very slow permeability, and the inability of the soil to support a load. If buildings are constructed in areas of this soil, properly designing foundations and footings and diverting runoff away from the buildings help to prevent the structural damage that results from shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the high water table and the very slow permeability. Increasing the size of the absorption area helps to overcome the very slow permeability; however, an alternate method of sewage disposal may be needed. Roads and streets can be built if they are designed to compensate for the instability of the soil.

This soil has fair potential as habitat for openland wildlife, good potential as habitat for woodland wildlife, and poor potential as habitat for wetland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years, rotated among several small tracts of land, can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey.

This Vaiden soil is in land capability subclass IIIw and in woodland ordination group 8C.

Prime Farmland

In this section, prime farmland is defined, and the soils in Bullock County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent.

The following map units are considered prime farmland in Bullock County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine if the limitations have been overcome by corrective measures.

The soils identified as prime farmland in Bullock County are:

CaB	Compass loamy fine sand, 0 to 5 percent slopes
CeB2	Conecuh sandy loam, 2 to 5 percent slopes, eroded
CoB2	Cowarts sandy loam, 2 to 6 percent slopes, eroded
EaB	Eunola loamy sand, 1 to 3 percent slopes
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes
KpB2	Kipling fine sandy loam, 1 to 3 percent slopes, eroded
MgB2	Maytag silty clay, 1 to 3 percent slopes, eroded
OkB2	Oktibbeha clay loam, 1 to 3 percent slopes, eroded
OrB2	Orangeburg loamy sand, 2 to 5 percent slopes, eroded
VaA	Vaiden silty clay, 0 to 2 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Kenneth M. Rogers, conservation agronomist, Natural Resources Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1982, approximately 69,100 acres of cropland and 64,300 acres of pasture were in Bullock County *(19)*. Approximately 2,700 acres of corn, 11,100 acres of soybeans, 1,400 acres of sorghum, and 7,400 acres of wheat were planted in Bullock County in 1982. Also, 4,700 acres of hay was harvested *(2)*. A small acreage of truck crops is grown in the county. The total acreage used for cultivated crops has been decreasing for several years. Presently, marginal cropland in the Blackland Prairie part of Bullock County is being converted to pasture, and marginal cropland in the Coastal Plain is being converted to forest land.

The potential in Bullock County for the increased production of food and fiber is good. About 40,000 acres of land that is currently used for pasture and woodland could be used for cultivated crops *(19)*. The yields can be increased in cultivated areas if the most current technology is applied. This soil survey will help land users make sound management decisions and facilitate the application of crop production technology.

The field crops that are suited to the soils and climate in Bullock County include many crops that are not commonly grown because of economic considerations. Corn, soybeans, and peanuts are the main row crops. Grain sorghum, vegetable crops, and similar crops can be grown if economic conditions are favorable. The specialty crops grown in the county include sweet potatoes, peas, okra, melons, and turnips. They are well suited to soils such as Blanton, Bonifay, Compass, Lynchburg, and Ocilla soils. If economic conditions are suitable, a large acreage of these crops can be grown. Pecans are the only orchard crop that is grown commercially in the county. Wheat and oats are the only close-growing crops that are planted for grain, although barley and rye can be grown. Information and suggestions about growing field specialty and orchard crops can be obtained from the local office of the Cooperative Extension Service or the Natural Resources Conservation Service.

Soil erosion is a major management concern on about one-half of the cropland in the county. If the slope is more than two percent, erosion is a potential hazard. Blanton, Bonifay, Compass, Luverne, Oktibbeha, and Maytag soils are some of the sloping soils that are presently cultivated and that require erosion-control practices.

Soil erosion can reduce production significantly, and it can lead to the increased pollution of streams. Productivity is reduced as the surface layer of the soil erodes and more of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging in areas of soils that have a clayey subsoil, such as Luverne, Oktibbeha, and Maytag soils. Sediment from erosion causes offsite damage. Controlling erosion on farmland minimizes the pollution of streams by sediment and improves the quality of water for municipal uses, for recreational uses, and for fish and wildlife.

Erosion-control practices provide a protective surface cover, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil losses to amounts that will not reduce the productive capacity of the soils. A cropping system that includes perennial grasses and legumes helps to control erosion. It can also provide nitrogen, increase the rooting depth, and improve soil tilth for the crops that follow in the rotation.

Conservation tillage, stripcropping, and leaving crop residue on the surface help to increase the water infiltration rate and reduce the runoff rate and the hazard of erosion. Using conservation tillage to produce corn, grain sorghum, soybeans, and other crops reduces erosion in sloping areas, especially in areas where topographic conditions are unfavorable for terracing and contouring. This practice can be adapted to most of the soils in the county.

Terraces and diversions help to control runoff and erosion. They are most practical on deep, well drained soils such as the sloping areas of Eunola and Luverne soils. Blanton and Bonifay soils are not suitable for terracing because they are subject to a severe hazard of erosion when water is concentrated on the surface. Also, soils that have complex slopes or have a very clayey subsoil are not well suited to terraces. Grassed waterways or underground tile outlets are essential to safely drain the concentrated water from fields in areas where terraces and diversions are installed. Diversions can be used to intercept surface runoff from adjacent, hilly uplands and to divert the water around fields to vegetated disposal areas.

Contour farming is a very effective erosion-control method in cultivated areas when it used in conjunction with a water-disposal system. It is best suited to soils that have smooth, uniform slopes, such as Compass and Eunola soils.

Information about the design of erosion-control practices is available at the local office of the Natural Resources Conservation Service.

Bullock County has an adequate amount of rainfall for the crops commonly grown. Prolonged droughts are rare, but the distribution of rainfall during spring and summer is generally such that droughty periods occur during the growing season of most years. Irrigation is needed during these periods to reduce plant stress. Only the sandy soils in the Coastal Plain area that are used for cultivated crops, such as Alaga, Blanton, Bonifay, and Compass soils, are suited to irrigation. Soils in the Blackland Prairie area, such as Oktibbeha and Maytag soils, have a slow infiltration rate that limits the potential for irrigation.

Most of the soils used for crops in Bullock County have a surface layer of sandy loam or silty clay loam. The surface layer is light or dark in color and has a low content of organic matter. The structure of these soils ranges from weak to strong, and intense rainstorms often cause the formation of a weak crust on the surface. The crust is hard when dry and is somewhat impervious to water. It reduces the infiltration rate and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can help to improve soil structure and reduce crust formation, thus improving the infiltration of water.

The use of heavy equipment during tillage results in the compaction of the subsurface layer in Coastal Plain soils, such as Blanton, Bonifay, Compass, Lynchburg, and Ocilla soils. This compacted layer is generally 2 to 12 inches below the surface. It is called a traffic pan, and it restricts the infiltration of water and the growth of plant roots.

Soil tilth is an important factor in plant growth, and it influences the rate of water infiltration into the soil. Soils that have good tilth have a granular and porous surface layer. Tilth is affected by past farming operations and by the degree of erosion that has already occurred. Incorporating crop residue and other organic matter into the plow layer improves the tilth.

Soil drainage is needed on some areas of cropland and pasture in the county. Many of the soils are too wet in their natural state for the production of crops and pasture plants. Draining these soils increases yields and facilitates management. Soils that may require a drainage system are Lynchburg, Mantachie, Minter, Ocilla, and Sucarnoochee soils. In many areas, however, the soils cannot be drained because of inadequate outlets.

The most common type of drainage system is surface ditches. Underground tile systems, however, are increasingly used because they do not interfere with tillage operations. A drainage system should be planned and designed by technicians who know soils well and who are thoroughly trained in drainage survey and design.

Natural fertility is low in most of the soils in Bullock County. The soils on flood plains are higher in natural fertility than the soils on uplands. Sucarnoochee and Maytag soils are generally alkaline; all of the other soils in the county are naturally acid. The acid soils require applications of agricultural limestone, which raise and maintain the pH level sufficiently for the optimum utilization of commercial fertilizer by plants. Crops on all of the soils respond well to applications of fertilizer. Soils vary in their natural levels of phosphorus and potassium; therefore, all additions of lime and fertilizer should be based on the results of a current soil test. Leaching is a concern in areas of very sandy soils, such as Alaga, Blanton, and Bonifay soils. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Pasture and hay are important in Bullock County. Bahiagrass, dallisgrass, fescue, hybrid bermudagrass, and Johnsongrass are the main perennial grasses grown for pasture and hay (fig. 12). White clover is generally planted with perennial cool-season grasses. Rye, ryegrass, and wheat are grown for annual cool-season grass forage. Millet, sorghum, and hybrid forage sorghum provide most of the annual warm-season grass forage. These annuals are generally grown in areas of cropland for temporary grazing or for hay. Arrowleaf clover, crimson clover, ball clover, red clover, and other cool-season legumes can be grown in the county, especially if agricultural limestone is applied in proper amounts. Alfalfa, a warm-season legume, is well suited to well drained soils, such as Maytag soils.

Several management practices are needed on all of the soils that are used for pasture and hay production. Such practices include proper grazing, control of weeds, proper fertilization, rotation grazing, and scattering of animal droppings. Cool-season perennial grasses, such as tall fescue, should be rested in the summer so that food reserves will be stored in the plants for fall and early spring growth. Some soils, such as Eunola, Houlka, Lynchburg, Minter, Ocilla, and Sucarnoochee soils, are better suited to summer grazing because of the wetness or flooding during the winter and early spring. Overgrazing and low fertilizer rates are the main problems associated with pasture production. They result in weak plants and poor stands that are quickly infested with weeds. Maintaining a good, dense ground cover that has the desired pasture species is the most effective method of preventing weeds from becoming established.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops,

Figure 12.—An area of Maytag-Oktibbeha complex, 3 to 12 percent slopes, eroded. Areas of this map unit are well suited to growing Johnsongrass for hay.

and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*, *s*, or *c*.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and is shown in table 6.

Woodland Management and Productivity

Jerry Johnson, forester, Natural Resources Conservation Service, helped to prepare this section.

Commercial forest land makes up about 267,600 acres, or about 67 percent, of the total land area in Bullock County. The forested acreage increased about 15 percent from 1972 to 1982, primarily because of the conversion of marginal cropland and the reforestation of idle land. Private landowners own approximately 87 percent of the forest land in the county. Of this privately owned acreage, about 47 percent is owned by farmers. The forest industry owns about 13 percent of the forest land *(21)*.

The forest types in Bullock County include 98,900 acres of loblolly-shortleaf pine, 46,500 acres of oak-pine, 98,900 acres of oak-hickory, and 23,300 acres of oak-gum-cypress. The forest land in Bullock County contains 122,200 acres of sawtimber, 58,200 acres of pole timber, and 87,300 acres of seedlings and saplings *(21)*.

Hardwood species grow best on bottom land sites along streams or drainage areas. The hardwoods that grow on the poorly suited upland sites are generally of poor quality. About 232,700 acres in the county is best suited to pines, and about 34,900 acres is best suited to hardwoods. In 85 percent of the forest land in the county, the site index for loblolly pine is 85 or higher *(21)*.

Forestry makes up a significant portion of the economy of Bullock County. In 1985, the value of forest products at the first primary processing point was $5,806,000 *(1)*. Forestry accounted for 35 percent of the total revenue from forestry and agricultural commodities.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, C, and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, and the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest managment equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the periods when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail systems may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on published data *(6, 7, 8, 9, 10, 16, 18).*

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment. Cubic feet per acre can be converted to cubic meters per acre by dividing by 14.3. It can be converted to board feet by multiplying by a factor of about 5. For example, a productivity of 110 means the soil can be expected to produce 550 cubic feet per acre per year at the point where mean annual increment culminates.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Tommy Counts, wildlife biologist, Natural Resources Conservation Service, helped to prepare this section.

Bullock County is dominantly a rural area that has suitable habitat for many kinds of wildlife. The county is about 70 percent forest land, but it is interspersed with areas of cropland, pasture, and hayland.

The common species of wild game found in Bullock County are the eastern wild turkey, bobwhite quail, whitetailed deer, eastern cottontail rabbit, mourning dove, Canada geese, and ducks.

The nongame wildlife species in the county include armadillos, snakes, egrets, herons, crows, blackbirds, hawks, owls, and songbirds, such as cardinals, thrushes, bluejays, meadowlarks, mockingbirds, sparrows, woodpeckers, vireos, and warblers.

The forest stands generally consist of loblolly pines or mixed pine-hardwoods, except in areas along the major creeks and rivers that have bottom land hardwoods. The forest types and their associated plant communities are of major importance to wildlife. Many of these forest areas are managed primarily to provide habitat for various species of wildlife, such as the bobwhite quail. Management practices that benefit wildlife, such as prescribed burning, forest openings, and stand thinnings are common throughout the county. Cropland and pasture are often interspersed with the forest land. The open areas are very important to many species of wildlife. The areas of cropland are primarily used for agricultural commodities, such as cotton and peanuts. The pasture and hayland areas are generally used for perennial grasses, such as bahiagrass or bermudagrass.

Wetlands are used by many kinds of wildlife, but many of the furbearers and wading birds depend upon these areas almost exclusively. Natural depressions and areas of saturated soils along creeks and rivers, bodies of open water, and beaver ponds make up most of the wetland areas in the county. They are found mostly along the Old Town, Bughall, Panther, and Line Creeks and in areas that are adjacent to the Conecuh and Pea Rivers.

Some of the furbearers in the county include beaver, muskrat, river otter, mink, bobcat, foxes, oppossum, coyote, raccoon, and skunks. Waterfowl and wading birds are numerous during certain times of the year in wetland areas, especially in those areas along the Conecuh and Pea Rivers.

The wildlife species in Bullock County that the Federal government has listed as threatened or endangered include the gray bat, the Indiana bat, the American alligator, and the red-cockaded woodpecker.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, wheat, oats, sorghum, barley, millet, cowpeas, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, bermudagrass, Johnsongrass, lespedeza, fescue, lovegrass, clover, vetches, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are dewberry, blackberry, crotons, pokeweed, partridge peas, crabgrass, goldenrod, beggarweed, and paspalums.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, yellow-poplar, cherry, sweetgum, apple, hawthorn, dogwood, persimmon, sassafras, sumac, holly, hickory, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive, pyracantha, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and cypress.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, cattails, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, beaver ponds, and other ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, warblers, vireos, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, rails, kingfishers, otter, turtles, muskrat, mink, and beaver.

Aquaculture

H.D. Kelley, biologist, Natural Resources Conservation Service, helped to prepare this section.

Aquaculture is the controlled production and harvest of animals or plants grown in or upon water. In Bullock County, catfish farming (channel catfish) and sport fish production (bass and bream) are the most common types of aquaculture. The channel catfish, *Ictalurus punctatus*, is produced either in cages in ponds or in open ponds. Open-pond culture is the most common method used in the county. The pond culture of catfish currently involves about 200 acres in Bullock County. About 3,420 acres of bass and bream ponds are in the county.

Other species of fish are being studied for pond production. The future growth of fish farming promises to provide an excellent source of additional income for those landowners who possess land with suitable physical features. Since ponds are the foundation for fish farming, the soils will determine the success of fish farming or other aquaculture practices.

The soils of Bullock County are named or otherwise grouped, and the known qualities or characteristics of each soil are described and displayed in the tables that indicate soil use limitations. These tables are of considerable value when considering sites for ponds. Table 13 gives soil limitations for pond or reservoir areas and embankments, dikes, and levees.

Indications of flooding frequency and water table levels are listed in table 16. These tables and the detailed soil maps can help in evaluating a selected location for its pond-building and water-retaining potential. Areas in a map unit, however, may also include dissimilar soils. Once the pond site is selected, additional soil borings should be made. A knowledge of soil characteristics is important in determining the true potential of a pond site. Conecuh, Kipling, Maytag, Minter, Oktibbeha, and Vaiden soils are generally suited to pond construction.

The construction of buildings and the accessibility of the area are important considerations in evaluating the pond site. Depending upon the size and planned use of the site, road systems must be planned to accommodate harvest trucks. Large trucks are used for commercial operations, and smaller trucks are used for fingerling farms. Feed trucks or similar equipment also require suitable access to the fish farm. If the farm is planned for fingerling production, a hatchery building will probably be on the site. Other buildings may be needed to store equipment or feed. Table 10 gives soil limitations affecting roads and building sites.

The quality of water in the pond is influenced by the soil. Several variables of water quality affect the production of fish. Total alkalinity, for example, is directly influenced by the soil. Total alkalinity values ranging from 30 parts per million to 150 parts per million are preferred. Fish production can be acceptable in ponds that have low alkalinity values—less than 20 parts per million—provided that the fish are well fed. Other complicating factors, however, affect fish production when alkalinity values are below 20 parts per million. The application of agricultural lime can often prevent production problems associated with low alkalinity values.

The soils in pond basins should be analyzed before the basins are limed and filled with water. The amount of lime needed should be based upon the results of the analysis, and the lime should be applied before the ponds are filled with water. Thereafter, annual applications of lime, even in ponds full of water, should range from 20 to 25 percent of the original application to maintain desirable levels of alkalinity. The importance of proper alkalinity levels in fish culture cannot be overemphasized. Most of the soils that are suitable for pond construction in Bullock County require applications of lime.

The source and amounts of water should also be considered when evaluating a site for a pond or a fish farm. For example, if runoff water is to be used, the watershed must also be evaluated.

Fish farming requires financial resources and hard work. It should be evaluated from the standpoint of diversifying the use and conservation of soil and water resources, as well as providing income for the landowner. Technical assistance in solving site and production problems is available from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm, dense layer; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a slowly permeable layer, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a slowly permeable layer, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a slowly permeable layer, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils.

Permeability, depth to a high water table, depth to bedrock or to a slowly permeable layer, and flooding affect absorption of the effluent. Large stones and bedrock or a slowly permeable layer interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a slowly permeable layer, flooding, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and a slowly permeable layer can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a slowly permeable layer, depth to a water table, slope, and flooding affect both types of landfill. Texture and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a slowly permeable layer, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a slowly permeable layer, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(5)* and the system adopted by the American Association of State Highway and Transportation Officials *(4)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than a 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian*, or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a cemented or indurated subsurface layer within a depth of 5 feet. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated, or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated, or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analyses of several typical pedons in the survey area are given in table 17 and the results of chemical analyses in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Agronomy and Soils Mineralogy Laboratory, Auburn University, Auburn, Alabama.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(12)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).

Extractable bases—method of Hajek, Adams, and Cope *(12)*.

Extractable acidity—method of Hajek, Adams, and Cope *(12)*.
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—method of Hajek, Adams, and Cope *(12)*.
Reaction (pH)—1:1 water dilution (8C1c).

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. Some of the pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The locations of the other pedons are described in the footnotes in table 19. The soil samples were tested by the Alabama Highway Department, Bureau of Materials and Tests, Montgomery, Alabama.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(17)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and soil reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(22)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(17)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alaga Series

The Alaga series consists of very deep, somewhat excessively drained, rapidly permeable soils on uplands in the Coastal Plain. These soils formed in sandy

Coastal Plain sediments. Slopes range from 2 to 8 percent. The soils of the Alaga series are thermic, coated Typic Quartzipsamments.

Alaga soils are geographically associated with Blanton, Bonifay, and Compass soils. Blanton and Bonifay soils are on similar, adjacent landscapes. They have loamy sand surface and subsurface layers that are 40 to 60 inches thick. Bonifay soils have plinthite in the subsoil. Compass soils have a coarse-loamy control section that has 5 percent or more plinthite in the subsoil. They are in slightly higher landscape positions than the Alaga soils.

Typical pedon of Alaga loamy sand, 2 to 8 percent slopes, in an idle field about 2½ miles south of High Ridge, off County Road 13, about 1,350 feet east and 500 feet south of the northwest corner of sec. 17, T. 12 N., R. 22 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

C1—7 to 32 inches; brownish yellow (10YR 6/6) loamy sand; single grained; loose; many fine roots; about 5 percent soft dark bodies; pockets of clean very pale brown (10YR 7/3) sand; very strongly acid; gradual wavy boundary.

C2—32 to 52 inches; yellowish brown (10YR 5/8) loamy sand; single grained; loose; common fine roots; about 5 percent soft dark bodies 1 to 2.5 millimeters in diameter; pockets of clean very pale brown (10YR 7/3) sand grains; very strongly acid; gradual wavy boundary.

C3—52 to 61 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine roots; pockets of very pale brown (10YR 7/3) clean sand; very strongly acid; gradual wavy boundary.

C4—61 to 80 inches; very pale brown (10YR 8/3) sand; single grained; loose; very strongly acid.

Reaction ranges from moderately acid to very strongly acid, except in areas where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. Some pedons have chroma of 2 or less below a depth of 40 inches. The texture is loamy sand or sand.

Bibb Series

The Bibb series consists of very deep, poorly drained, moderately permeable soils that formed in stratified sandy alluvial deposits. These soils are on flood plains. Slopes range from 0 to 1 percent. The soils of the Bibb series are coarse-loamy, siliceous, acid, thermic Typic Fluvaquents.

Bibb soils are geographically associated with Iuka and Mantachie soils. Iuka and Mantachie soils are in slightly higher positions on the flood plain, are better developed, and are better drained than the Bibb soils. Mantachie soils have a fine-loamy control section.

Typical pedon of Bibb sandy loam, in an area of Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded; in a wooded area, 2 miles east of Ox Level, off County Road 18, about 900 feet north and 100 feet east of the northwest corner of sec. 13, T. 12 N., R. 24 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; friable; strongly acid; gradual wavy boundary.

Cg1—6 to 14 inches; dark gray (10YR 4/1) sandy loam; massive; friable; many medium and large roots; strongly acid; gradual wavy boundary.

Cg2—14 to 40 inches; dark gray (10YR 4/1) sandy loam that has thin strata or pockets of light brownish gray (10YR 6/2) loamy sand; massive; friable; few large roots; common medium distinct strong brown (7.5YR 5/6) stains along old root channels; very strongly acid; gradual wavy boundary.

Cg3—40 to 62 inches; stratified very dark gray (10YR 3/1) sandy loam and light brownish gray (10YR 6/2) loamy sand; massive; common medium distinct strong brown (7.5YR 5/6) stains along old root channels; very strongly acid.

Reaction is strongly acid or very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 1 to 3. It is loamy sand, sandy loam, or fine sandy loam.

The Cg horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 or 2 or is neutral in hue and has value of 3 to 6. It is sandy loam, fine sandy loam, loam, or silt loam or is stratified with these textures. Most pedons have pockets or strata of loamy sand in some part of the Cg horizon.

Blanton Series

The Blanton series consists of very deep, moderately well drained, moderately slowly permeable soils that formed in sandy and loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 2 to 20 percent. The soils of the Blanton series are loamy, siliceous, thermic Grossarenic Paleudults.

Blanton soils are geographically associated with

Alaga, Bonifay, Compass, Conecuh, and Luverne soils. Alaga soils are in slightly higher landscape positions than the Blanton soils. They are loamy sand and sand to a depth of 80 inches or more. Bonifay soils are in landscape positions similar to those of the Blanton soils. They have plinthite in the subsoil. Compass soils have sandy surface and subsurface layers that are less than 20 inches thick. Conecuh and Luverne soils have a clayey argillic horizon.

Typical pedon of Blanton loamy sand, in an area of Blanton-Bonifay loamy sands, 2 to 8 percent slopes; in a cultivated field, 2 miles southwest of Midway, off County Road 34, about 2,800 feet north and 1,050 feet west of the southeast corner of sec. 32, T. 13 N., R. 25 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; very friable; few medium and fine roots; moderately acid; clear wavy boundary.

E1—7 to 13 inches; pale brown (10YR 6/3) loamy sand; weak fine granular structure; very friable; few fine and medium roots; strongly acid; gradual wavy boundary.

E2—13 to 46 inches; very pale brown (10YR 7/3) loamy sand; single grained; loose; many uncoated sand grains; few fine roots; strongly acid; clear smooth boundary.

Bt1—46 to 59 inches; yellowish brown (10YR 5/6) sandy loam; few medium faint brownish yellow (10YR 6/6) and few medium prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of some peds; very strongly acid; clear smooth boundary.

Bt2—59 to 66 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium prominent light brownish gray (10YR 6/2) and common medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; common fine pores; few slightly brittle peds; few faint clay films on faces of some peds; very strongly acid; clear smooth boundary.

Bt3—66 to 70 inches; yellowish brown (10YR 5/6) sandy loam; few medium prominent light gray (10YR 7/2) and few medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable, firm; few distinct clay films on faces of some peds; very strongly acid.

The thickness of the solum is 70 inches or more. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 3 to 7, and chroma of 2 or 4.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6. It is loamy sand or loamy fine sand.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 6 to 8 or is mottled in shades of red, gray, yellow, and brown in the lower part of most pedons. It is sandy loam, fine sandy loam, or sandy clay loam. In some pedons the lower part of the Bt horizon has slightly compact, brittle areas.

Bonifay Series

The Bonifay series consists of very deep, well drained, moderately slowly permeable soils that formed in sandy and loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 2 to 8 percent. The soils of the Bonifay series are loamy, siliceous, thermic Grossarenic Plinthic Paleudults.

Bonifay soils are geographically associated with Alaga, Blanton, Compass, Conecuh, and Luverne soils. Alaga soils are in slightly higher landscape positions than the Bonifay soils. They are loamy sand and sand to a depth of 80 inches or more. Blanton soils are in lower landscape positions, and they have less than 5 percent plinthite within a depth of 60 inches. Compass soils are in landscape positions similar to those of the Bonifay soils. They have a coarse-loamy control section and have sandy surface and subsurface layers that are less than 20 inches thick. Conecuh and Luverne soils are in lower landscape positions. They have a clayey argillic horizon.

Typical pedon of Bonifay loamy sand, in an area of Blanton-Bonifay loamy sands, 2 to 8 percent slopes; in an area of planted pines, 1 mile west of Pine Grove, about 1,800 feet east and 1,950 feet north of the southwest corner of sec. 12, T. 12 N., R. 24 E.

Ap—0 to 5 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many medium and fine roots; strongly acid; gradual wavy boundary.

E1—5 to 19 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; few medium roots; strongly acid; gradual wavy boundary.

E2—19 to 33 inches; pale brown (10YR 6/3) loamy sand; single grained; loose; few fine roots; few pockets of clean sand grains; strongly acid; gradual wavy boundary.

E3—33 to 42 inches; light yellowish brown (10YR 6/4) loamy sand; few medium faint pale brown (10YR 6/3) mottles; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

E4—42 to 53 inches; brownish yellow (10YR 6/6) loamy sand; few fine distinct strong brown (7.5YR 5/6) mottles; single grained; loose; few medium roots; few pockets of clean sand grains; strongly acid; gradual wavy boundary.

Btv1—53 to 62 inches; strong brown (7.5YR 5/6) sandy loam; many medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable and about 5 percent, by volume, firm and compact; few faint clay films on faces of some peds; about 15 percent, by volume, plinthite nodules; strongly acid; gradual wavy boundary.

Btv2—62 to 70 inches; strong brown (7.5YR 5/8) sandy clay loam; few fine prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable and about 5 percent, by volume, firm and compact; few faint clay films on faces of some peds; about 15 percent, by volume, plinthite nodules; strongly acid.

The thickness of the solum is 60 inches or more. Reaction is strongly acid or very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6. It is loamy sand, sand, or loamy fine sand. Pockets of clean sand grains are in most pedons.

The Btv horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy loam or sandy clay loam. In some pedons, the lower part of the Btv horizon is mottled in shades of red, brown, and gray. In other pedons, it is firm and compact. The content of plinthite nodules ranges from about 5 to 20 percent, by volume.

Compass Series

The Compass series consists of very deep, moderately well drained, moderately slowly permeable soils that formed in loamy and sandy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 5 percent. The soils of the Compass series are coarse-loamy, siliceous thermic Plinthic Paleudults.

Compass soils are geographically associated with Blanton, Bonifay, and Luverne soils. Blanton and Bonifay soils have a sandy epipedon to a depth of more than 40 inches. Blanton soils are in slightly lower landscape positions, and the Bonifay soils are in landscape positions similar to those of the Compass soils. Luverne soils have a clayey argillic horizon, and they are in lower landscape positions than the Compass soils.

Typical pedon of Compass loamy fine sand, 0 to 5 percent slopes, in an idle field about 3 miles southwest of Midway, about 2,900 feet west and 850 feet north of the southeast corner of sec. 32, T. 13 N., R. 25 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; slightly acid; gradual wavy boundary.

E—9 to 17 inches; yellowish brown (10YR 5/4) loamy fine sand; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

Bt—17 to 32 inches; yellowish brown (10YR 5/6) sandy loam; common medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; few fine and medium roots; few faint clay films on faces of some peds; about 2 percent, by volume, iron concretions 2 to 20 millimeters in diameter; very strongly acid; clear smooth boundary.

Btv1—32 to 53 inches; yellowish brown (10YR 5/6) sandy loam; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; few faint clay films on faces of some peds; about 10 percent, by volume, plinthite nodules; very strongly acid; clear wavy boundary.

Btv2—53 to 62 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/2) sandy clay loam; moderate medium subangular blocky structure; friable, firm; few fine roots; few faint clay films on faces of some peds; about 15 percent, by volume, plinthite nodules; strongly acid.

The thickness of the solum is 62 inches or more. Reaction is strongly acid or very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 4, and chroma of 1 or 2.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. It is loamy fine sand or loamy sand.

The Bt horizon has hue of 2.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Some pedons have mottles in shades of brown and gray. The horizon is sandy loam, fine sandy loam, or sandy clay loam.

The Btv horizon has hue of 7.5YR or 10YR, value of 5 to 8, chroma of 6 or 8, and mottles in shades of red, yellow, gray, and brown; or it is mottled in shades of red, yellow, gray, and brown. The content of plinthite ranges from 5 to 15 percent, by volume. The horizon is sandy clay loam or sandy loam.

Conecuh Series

The Conecuh series consists of very deep, moderately well drained, very slowly permeable soils that formed in clayey marine sediments. These soils are on ridgetops and hill slopes of the Coastal Plain. Slopes range from 2 to 20 percent. The soils of the Conecuh series are clayey, montmorillonitic, thermic Aquic Hapludults.

Conecuh soils are geographically associated with Blanton, Bonifay, Compass, and Luverne soils. Blanton and Bonifay soils have a sandy layer to a depth of more than 40 inches. They are in higher positions on the landscape than the Conecuh soils. Compass soils are coarse-loamy and are in higher landscape positions. Luverne soils are in landscape positions similar to those of the Conecuh soils. They have mixed mineralogy.

Typical pedon of Conecuh sandy loam, 2 to 5 percent slopes, eroded, in a wooded area about 75 feet south of Alabama Power Company transmission pole no. 28, in the northwest ¼ of the northwest ¼ of the northwest ¼ of sec. 5, T. 9 N., R. 8 E.

Ap—0 to 5 inches; brown (10YR 4/3) sandy loam; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium granular structure; friable; many fine and medium roots; very strongly acid; clear wavy boundary.

Bt1—5 to 9 inches; reddish brown (5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; many fine roots; few fine pores; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—9 to 17 inches; red (2.5YR 4/6) clay; moderate fine angular blocky structure; firm; few fine and medium roots; few fine pores; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—17 to 31 inches; red (2.5YR 4/6) clay; common medium prominent olive gray (5Y 5/2) and pale olive (5Y 6/3) mottles; strong fine angular blocky structure; firm; few fine roots; few fine pores; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bt4—31 to 39 inches; mottled red (2.5YR 4/6), yellowish red (5YR 5/8), gray (10YR 6/1), and light brownish gray (10YR 6/2) clay; moderate fine angular blocky structure; firm; few fine roots; few fine pores; common distinct clay films on faces of peds; few fine flakes of mica; extremely acid; clear wavy boundary.

Btg—39 to 50 inches; light brownish gray (10YR 6/2) clay; many medium prominent red (10R 4/6) and few medium prominent reddish yellow (7.5YR 6/8) mottles; strong fine and medium angular blocky structure; firm; few fine roots; few fine pores; few distinct clay films on faces of most peds; common fine flakes of mica; extremely acid; abrupt smooth boundary.

C—50 to 63 inches; stratified gray (10YR 6/1) clayey shale and mottled brown (10YR 4/3) and red (2.5YR 5/6) clay loam; moderate medium platy structure; firm; common fine roots; many fine flakes of mica; extremely acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from extremely acid to strongly acid, except in areas where the surface layer has been limed.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4.

The upper part of the Bt horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 4 to 8. It is clay loam, clay, or silty clay. The lower part of the Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It has common or many mottles in shades of gray, red, and brown or has no dominant matrix color and is mottled in shades of red, gray, and brown. It is clay or silty clay.

The Btg horizon, which is present in some pedons, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has mottles in shades of red or brown. It is clay, silty clay, silty clay loam, clay loam, or sandy clay loam.

The C horizon is variable in color, ranging from gray to red. It is massive or has a platy rock structure. It is commonly stratified with textures that range from sandy loam to clay. Most pedons have strata of clayey shale.

Cowarts Series

The Cowarts series consists of very deep, well drained, slowly permeable soils that formed in loamy marine sediments. These soils are on ridgetops and short side slopes in the uplands of the Coastal Plain. Slopes range from 2 to 25 percent. The soils of the Cowarts series are fine-loamy, siliceous, thermic Typic Kanhapludults.

Cowarts soils are geographically associated with Blanton, Compass, and Luverne soils. Blanton soils have a sandy layer to a depth of more than 40 inches. They are in landscape positions similar to those of the Cowarts soils. Compass soils have a coarse-loamy control section that has 5 to 15 percent plinthite. They are on low side slopes and toe slopes. Luverne soils have a clayey control section, and they are in lower landscape positions than the Cowarts soils.

Typical pedon of Cowarts sandy loam, 2 to 6 percent slopes, eroded, in a wooded area about 1 mile north of Corinth, about 2,300 feet south and 400 feet east of the northwest corner of sec. 20, T. 11 N., R. 23 E.

A—0 to 5 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; friable; common fine and medium roots; strongly acid; abrupt wavy boundary.

Bt1—5 to 20 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of most peds; strongly acid; gradual wavy boundary.

Bt2—20 to 25 inches; strong brown (7.5YR 5/6) sandy clay loam; few medium distinct red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable, firm; few faint clay films on faces of most peds; strongly acid; gradual wavy boundary.

Bt3—25 to 31 inches; strong brown (7.5YR 5/6) sandy clay loam; few fine distinct pale brown (10YR 6/3) and few medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable, firm; few faint clay films on faces of most peds; 10 percent iron concretions; strongly acid; gradual wavy boundary.

BC—31 to 40 inches; mottled yellowish red (5YR 5/6), red (2.5YR 4/6), and yellow (10YR 7/6) sandy clay loam; weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

C—40 to 64 inches; mottled strong brown (7.5YR 5/6), yellow (10YR 7/6), red (2.5YR 4/6), and light gray (10YR 7/1) sandy loam; massive; firm; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Some pedons have 0 to 15 percent, by volume, iron concretions or quartz gravel, 2 millimeters to 7 centimeters in diameter, in the A and B horizons. Reaction is very strongly acid or strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is sandy loam or loamy sand.

The BE horizon, if it occurs, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy clay loam or clay loam. Some pedons are sandy clay in the lower part of the horizon.

The BC horizon, which is present in most pedons, has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 1 to 8 or is mottled in shades of yellow, red, gray, or brown. It is sandy loam or sandy clay loam.

The C horizon has colors similar to those of the BC horizon. It has pockets and strata of fine and coarse materials. When mixed, the texture is fine sandy loam, sandy loam, or sandy clay loam.

Eunola Series

The Eunola series consists of very deep, moderately well drained, moderately permeable soils that formed in loamy and sandy fluvial and marine sediments. These soils are on toe slopes in the uplands and on stream terraces. Slopes range from 1 to 3 percent. The soils of the Eunola series are fine-loamy, siliceous, thermic Aquic Hapludults.

Eunola soils are geographically associated with Bibb, Blanton, Bonifay, Compass, Conecuh, Cowarts, and Luverne soils. Blanton and Bonifay soils have a loamy sand layer to a depth of 40 inches or more. They are in higher positions on the landscape than the Eunola soils. Compass soils have a coarse-loamy control section that has more than 5 percent plinthite. They are in the uplands. Conecuh and Luverne soils have a clayey control section. They are on side slopes and toe slopes in higher positions on the landscape than the Eunola soils. Cowarts soils are well drained soils in the uplands.

Typical pedon of Eunola loamy sand, 1 to 3 percent slopes, in a cultivated field about 2 miles southwest of Mt. Zion Church, about 2,400 feet north and 2,600 feet east of the southwest corner of sec. 9, T. 13 N., R. 24 E.

Ap—0 to 8 inches; brown (10YR 5/3) loamy sand that has pockets of light yellowish brown (2.5Y 6/4) loamy sand; weak fine granular structure; very friable; few medium and fine roots; strongly acid; gradual wavy boundary.

E—8 to 14 inches; pale yellow (2.5Y 7/4) loamy sand; weak fine granular structure; very friable; few medium and fine roots; strongly acid; abrupt wavy boundary.

Bt1—14 to 20 inches; yellowish brown (10YR 5/6) sandy loam; few fine distinct pale yellow (2.5Y 7/4) and few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few medium roots; few fine pores; few faint clay films on some faces of peds; strongly acid; gradual wavy boundary.

Bt2—20 to 27 inches; yellowish brown (10YR 5/6) sandy clay loam; common coarse distinct light gray (10YR 7/2) and few medium distinct red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few faint clay films on some faces of peds; very strongly acid; gradual wavy boundary.

Bt3—27 to 42 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 7/2), yellowish red (5YR 5/6), and red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common fine pores; few faint clay films on some faces of peds; very strongly acid; gradual wavy boundary.

BC—42 to 58 inches; mottled light gray (10YR 7/2), yellowish brown (10YR 5/6), and yellowish red (5YR 5/6) sandy loam; weak coarse subangular blocky structure; friable; few fine pores; very strongly acid; gradual wavy boundary.

C—58 to 64 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 7/2), yellowish red (5YR 5/6), and red (2.5YR 5/6) stratified sandy loam and sandy clay loam; massive; friable, slightly firm; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed. Mottles that have chroma of 2 or less are in the upper 20 inches of the argillic horizon.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is sandy loam, fine sandy loam, or loamy sand.

The Bt horizon has hue of 10YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, or sandy loam. In most pedons, the lower part of the Bt horizon is mottled in shades of brown, yellow, red, and gray.

The BC horizon has colors similar to those of the Bt horizon, or it is mottled in shades of red, brown, yellow, and gray. It is sandy loam or sandy clay loam.

The C horizon has colors similar to those of the BC horizon. Texture is loamy sand or sandy loam, or these textures are stratified with sandy clay loam.

Goldsboro Series

The Goldsboro series consists of very deep, moderately well drained, moderately permeable soils that formed in loamy and sandy marine sediments. These soils are on uplands. Slopes range from 0 to 2 percent. The soils of the Goldsboro series are fine-loamy, siliceous, thermic Aquic Paleudults.

Goldsboro soils are geographically associated with Lynchburg, Minter, and Ocilla soils. Minter and Lynchburg soils are in slightly lower positions on the landscape than the Goldsboro soils. Minter soils have a clayey control section. Minter and Lynchburg soils are more poorly drained than the Goldsboro soils. Ocilla soils are in landscape positions similar to those of the Goldsboro soils, or they are slightly lower on the landscape. They have a sandy layer at a depth of 20 to 40 inches.

Typical pedon of Goldsboro loamy fine sand, 0 to 2 percent slopes, in a cultivated field about 6 miles north of Thompson Station, about 2,000 feet north and 500 feet east of the southwest corner of sec. 10, T. 14 N., R. 22 E.

Ap—0 to 9 inches; light brownish gray (10YR 6/2) loamy fine sand; weak fine granular structure; friable; many fine and medium roots; moderately acid; clear smooth boundary.

E—9 to 17 inches; pale yellow (2.5Y 7/4) sandy loam; weak medium granular structure; friable; few fine and many medium roots; strongly acid; clear wavy boundary.

Bt1—17 to 22 inches; olive yellow (2.5Y 6/6) sandy loam; few fine distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; few faint films on faces of some peds; very strongly acid; gradual wavy boundary.

Bt2—22 to 42 inches; brownish yellow (10YR 6/8) sandy clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of some peds; very strongly acid; gradual wavy boundary.

Bt3—42 to 60 inches; mottled brownish yellow (10YR 6/8), light brownish gray (10YR 6/2), and yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of some peds; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction is strongly acid or very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is loamy sand or sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is sandy clay loam, sandy loam, or clay loam. Some pedons have sandy clay in the lower part of the Bt horizon. Mottles in shades of brown, yellow, red, and gray are in the upper and lower parts of the Bt horizon. Some pedons are mottled in shades of red, yellow, gray, and brown in the lower part of the Bt horizon.

Houlka Series

The Houlka series consists of very deep, somewhat poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on flood plains. Slopes range from 0 to 1 percent. The soils of the Houlka series are fine, montmorillonitic, acid, thermic Aeric Epiaquerts.

Houlka soils are geographically associated with Goldsboro, Lynchburg, Minter, Riverview, Sucarnoochee, and Urbo soils. Goldsboro and Lynchburg soils are in slightly higher positions on the landscape than the Houlka soils. They have a fine-loamy control section. Minter soils have an argillic horizon. Riverview soils are loamy throughout. They are better drained than the Houlka soils. Urbo soils have mixed mineralogy.

Typical pedon of Houlka clay, 0 to 1 percent slopes, frequently flooded, in a field about 5.5 miles north of Union Springs, about 1,100 feet south and 400 feet west of the northeast corner of sec. 3, T. 14 N., R. 23 E.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) clay; moderate medium granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

Bt—5 to 8 inches; dark grayish brown (10YR 4/2) clay; common medium faint brown (10YR 5/3) mottles; moderate fine blocky and moderate fine subangular blocky structure; firm; few fine roots; few faint slickensides that have a thin striated surface; strongly acid; gradual wavy boundary.

Bgss1—8 to 13 inches; gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine blocky structure; firm; few fine roots flattened on the primary surface; common distinct large intersecting slickensides that have a thick polished and grooved surface; very strongly acid; gradual wavy boundary.

Bgss2—13 to 41 inches; light brownish gray (2.5Y 6/2) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine blocky structure; firm; common distinct large intersecting slickensides that have a thick polished and grooved surface; very strongly acid; gradual wavy boundary.

Bgss3—41 to 62 inches; light brownish gray (2.5Y 6/2) clay loam; common coarse distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct large intersecting slickensides that have a thick polished and grooved surface; very strongly acid.

Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2 or is neutral in hue and has value of 3 or 4.

The Bt horizon commonly has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. Some pedons have a thin horizon that has chroma of 3 or 4. Most pedons have few to many mottles in shades of brown and gray or are mottled in shades of brown and gray. The horizon is clay loam, silty clay, or clay.

The Bgss horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It has few to many mottles in shades of gray and brown. It is clay loam, silty clay, or clay.

Iuka Series

The Iuka series consists of very deep, moderately well drained, moderately permeable soils that formed in stratified loamy and sandy alluvial sediments. These soils are on flood plains. Slopes range from 0 to 1 percent. The soils of the Iuka series are coarse-loamy, siliceous, acid, thermic Aquic Udifluvents.

Iuka soils are geographically associated with Bibb and Mantachie soils. Bibb and Mantachie soils are in slightly lower positions on the landscape and are more poorly drained than the Iuka soils. Mantachie soils have a fine-loamy control section.

Typical pedon of Iuka loam, in an area of Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded; in a wooded area ¼ mile south of Omega, about 2,400 feet north and 2,400 feet east of the southwest corner of sec. 31, T. 12 N., R. 23 E.

A—0 to 3 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable; few medium and fine roots; strongly acid; gradual wavy boundary.

C1—3 to 11 inches; strong brown (7.5YR 5/6) sandy loam; common medium distinct yellowish brown (10YR 5/6) and few fine faint brownish yellow mottles; massive; friable; few medium and fine roots; very strongly acid; gradual wavy boundary.

C2—11 to 18 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; few coarse roots; very strongly acid; gradual wavy boundary.

C3—18 to 30 inches; brown (10YR 5/3) sandy loam; common fine distinct light gray (10YR 7/1) mottles; massive; friable; very strongly acid; gradual wavy boundary.

Cg—30 to 65 inches; mottled light gray (10YR 7/1), light brownish gray (10YR 6/2), and dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; pockets and thin lenses of yellowish brown (10YR 5/4) coarse sand; very strongly acid.

Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 4. It is sandy loam, loam, or fine sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. It has mottles in shades of brown, yellow, and gray. Mottles that have chroma of 2 or less are within a depth of 20 inches. The horizon is sandy loam, fine sandy loam, or loam.

The Cg horizon has hue of 10YR, value of 5 to 7, chroma of 1, and mottles in shades of yellow, brown, and red; or it is mottled in shades of gray, brown, red, and yellow. It is sandy loam, fine sandy loam, loam, or loamy sand. Some pedons may have strata of coarser textured materials in the lower part of the Cg horizon.

Kipling Series

The Kipling series consists of very deep, somewhat poorly drained, very slowly permeable soils that formed in clayey sediments of the Blackland Prairie. These soils are in nearly level upland areas and on toe slopes on high terraces. Slopes range from 1 to 3 percent. The soils of the Kipling series are fine, montmorillonitic, thermic Vertic Paleudalfs.

Kipling soils are geographically associated with Maytag, Oktibbeha, Sucarnoochee, and Vaiden soils. Maytag soils are in higher positions in the landscape and are better drained than the Kipling soils. They are calcareous to the surface. Oktibbeha soils are in higher positions on the landscape. Sucarnoochee soils are in drainageways. They are alkaline throughout. Vaiden soils are in landscape positions similar to those of the Kipling soils. Oktibbeha and Vaiden have more clay in the argillic horizon than the Kipling soils.

Typical pedon of Kipling fine sandy loam, 1 to 3 percent slopes, eroded, in a wooded area about 4 miles south of Fitzpatrick, about 2,700 feet north and 400 feet east of the southwest corner of sec. 23, T. 14 N., R. 21 E.

A—0 to 2 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; common fine and medium roots; strongly acid; abrupt wavy boundary.

E—2 to 5 inches; pale brown (10YR 6/3) fine sandy loam; pale yellow (2.5Y 7/4) coatings on faces of peds; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; gradual wavy boundary.

Bt1—5 to 10 inches; yellowish red (5YR 4/6) clay; few medium distinct red (2.5YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate or strong coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few medium roots; few faint clay films on faces of most peds; very strongly acid; gradual wavy boundary.

Bt2—10 to 17 inches; yellowish brown (10YR 5/6) clay; common medium distinct yellowish red (5YR 4/8) and few fine distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; few faint films on faces of most peds; strongly acid; gradual wavy boundary.

Bt3—17 to 47 inches; mottled red (2.5YR 4/8), light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) clay; moderate coarse angular blocky structure parting to moderate fine subangular blocky; firm; few faint clay films on faces of peds; few faint intersecting slickensides that have a thin striated surface; very strongly acid; gradual wavy boundary.

Bt4—47 to 55 inches; yellowish brown (10YR 5/6) clay; common medium distinct light brownish gray (2.5Y 6/2), common fine distinct red (2.5YR 4/8), and few fine distinct strong brown (7.5YR 5/6) mottles; medium coarse angular blocky structure parting to weak fine subangular blocky; very firm; few faint clay films on faces of peds; common faint intersecting slickensides that have a thin striated surface; very strongly acid; gradual wavy boundary.

Btss—55 to 65 inches; light brownish gray (2.5Y 6/2) clay; few fine distinct strong brown (7.5YR 5/6), common medium distinct yellowish brown (10YR 5/8), and common fine distinct red (2.5YR 4/8) mottles; massive; firm; common distinct intersecting slickensides that have a thick polished and grooved surface; very strongly acid.

The thickness of the solum ranges from 40 to 55 inches. The depth to chalk or marl is more than 60 inches. Reaction is strongly acid or very strongly acid in the Bt horizon and ranges from very strongly acid to mildly alkaline in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. It is silt loam, loam, or fine sandy loam.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 or 5, chroma of 4 to 8, and few to many mottles in shades of gray, yellow, brown, and red; or it is mottled in shades of red, brown, yellow, and gray. It is clay, silty clay, or clay loam.

The Btss horizon has hue of 10YR to 5Y, value of 5 or 6, chroma of 1 or 2, and mottles in shades of brown and yellow; or it is mottled in shades of yellow, gray, red, and brown. It is silty clay or clay.

The C horizon, if it occurs, consists of horizontally bedded clay or weathered soft chalk at a depth of more than 60 inches.

Luverne Series

The Luverne series consists of very deep, well drained, moderately slowly permeable soils that formed in stratified marine sediments. These soils are on dissected uplands of the Coastal Plain. Slopes range from 2 to 45 percent. The soils of the Luverne series are clayey, mixed, thermic Typic Hapludults.

Luverne soils are geographically associated with the Blanton, Bonifay, Compass, Conecuh, Cowarts, and Eunola soils. Blanton and Bonifay soils are in higher positions on the landscape than the Luverne soils. They have a loamy sand epipedon about 40 to 60 inches thick. Compass soils, in slightly higher positions on the landscape, have a coarse-loamy control section. Conecuh soils are in landscape positions similar to those of the Luverne soils. They have montmorillonitic mineralogy and are moderately well drained. Cowarts soils are in landscape positions similar to those of the Blanton soils. They have a fine-loamy control section. Eunola soils are in lower positions on the landscape. They have a fine-loamy control section.

Typical pedon of Luverne loamy sand, 2 to 8 percent slopes, 5 miles east of Blue's Old Stand, about 1,000 feet south and 1,950 feet east of the northwest corner of sec. 30, T. 12 N., R. 24 E.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loamy sand; weak fine granular structure; friable; many fine and medium roots; extremely acid; clear smooth boundary.

E—8 to 12 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular blocky structure; friable; many medium roots; common fine pores; extremely acid; clear smooth boundary.

Bt1—12 to 21 inches; yellowish red (5YR 5/6) clay; few medium distinct red (2.5YR 4/8) and common medium prominent strong brown (7.5YR 5/8) mottles; strong coarse subangular blocky structure parting to strong fine subangular blocky; firm; few fine roots; few wormcasts; common distinct clay films on most faces of peds; few fine mica flakes; extremely acid; clear wavy boundary.

Bt2—21 to 32 inches; reddish brown (2.5YR 4/4) clay in the interior of peds, yellowish red (5YR 5/6) clay on the exterior of peds; few medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; few fine pores; common distinct clay films on faces of most peds and in root channels; few fine mica flakes; very strongly acid; clear wavy boundary.

Bt3—32 to 39 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/6), brownish yellow (10YR 6/8), and very pale brown (10YR 7/3) sandy clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; few faint clay films on faces of some peds; few fine mica flakes; very strongly acid; gradual wavy boundary.

Bt4—39 to 48 inches; mottled red (2.5YR 4/8), strong brown (7.5YR 5/8), brownish yellow (10YR 6/8), and very pale brown (10YR 7/3) sandy clay; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; firm; few faint clay films on faces of some peds; few fine mica flakes; very strongly acid; gradual wavy boundary.

C—48 to 64 inches; mottled red (2.5YR 4/8), strong brown (7.5YR 5/8), brownish yellow (10YR 6/8), and light gray (10YR 7/2) stratified sandy clay loam and sandy loam; massive; friable; common fine mica flakes; extremely acid.

The thickness of the solum ranges from 20 to 50 inches. Reaction is extremely acid or strongly acid throughout the profile, except in areas that have been limed. Some pedons contain up to 15 percent ironstone fragments on the surface and up to 10 percent in the solum.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is sandy loam or loamy sand.

The E horizon, which is present in most pedons, has hue of 7.5YR or 10YR, value of 4 or 6, and chroma of 5 or 6. It is sandy loam or loamy sand.

The upper part of the Bt horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 4 to 8. The lower part has similar colors or is mottled in shades of red, brown, and yellow. The horizon is clay loam, clay, or sandy clay.

The C horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 8. It has mottles in shades of red, brown, yellow, and gray or has no dominant matrix color and is mottled in shades of red, brown, yellow, and gray. It is stratified with loamy sand, sandy loam, sandy clay loam, sandy clay, or clay.

Lynchburg Series

The Lynchburg series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in loamy alluvial and fluvial sediments. These soils are on low stream terraces. Slopes range from 0 to 2 percent. The soils of the Lynchburg series are fine-loamy, siliceous, thermic Aeric Paleaquults.

Lynchburg soils are geographically associated with Goldsboro, Minter, and Ocilla soils. Minter soils are in landscape positions similar to those of the Lynchburg soils. They have a clayey argillic horizon. Ocilla soils are in slightly higher landscape positions, and they have a loamy sand epipedon that is 20 to 40 inches thick. Goldsboro soils are in slightly higher landscape positions and are moderately well drained.

Typical pedon of Lynchburg fine sandy loam, in an area of Lynchburg-Ocilla complex, 0 to 2 percent slopes, rarely flooded; in a wooded area about 2 miles south of Fort Davis, 500 feet north and 900 feet east of the southwest corner of sec. 6, T. 14 N., R. 23 E.

A—0 to 5 inches; dark gray (10YR 4/1) fine sandy loam; few medium faint pale brown (10YR 6/3) mottles; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

E1—5 to 11 inches; pale brown (10YR 6/3) loamy sand; weak medium subangular blocky structure; very friable; few fine and medium roots; strongly acid; gradual wavy boundary.

E2—11 to 15 inches; pale brown (10YR 6/3) loamy sand; few medium distinct light gray (10YR 7/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few medium roots; strongly acid; gradual wavy boundary.

Bt—15 to 21 inches; common coarse distinct light brownish gray (10YR 6/2) sandy loam on the exterior of peds, yellowish brown (10YR 5/6) sandy loam in the interior of peds; moderate medium subangular blocky structure; friable; few fine pores; few faint clay films on some faces of peds; very strongly acid; gradual wavy boundary.

Btg1—21 to 47 inches; light brownish gray (10YR 6/2) sandy clay loam; many medium distinct yellowish brown (10YR 5/6) and few fine prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few faint clay films on some faces of peds; very strongly acid; gradual wavy boundary.

Btg2—47 to 62 inches; light brownish gray (10YR 6/2) sandy clay loam; common fine and medium prominent strong brown (7.5YR 5/6) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; few faint clay films on some faces of peds; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 4. It is loamy sand or sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is sandy clay loam, clay loam, loam, or sandy loam. It has few to many mottles that have chroma of 2 or less.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, brown, or red. It is sandy clay loam or clay loam.

Mantachie Series

The Mantachie series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in loamy alluvium. They are on flood plains along the Conecuh River and its tributaries. Slopes range from 0 to 1 percent. The soils of the Mantachie series are fine-loamy, siliceous, acid, thermic Aeric Fluvaquents.

Mantachie soils are geographically associated with Bibb and luka soils. The poorly drained Bibb soils are along drainageways that are adjacent to sandy uplands. They have a coarse-loamy control section. luka soils are moderately well drained. They are in slightly higher landscape positions and have a coarse-loamy control section.

Typical pedon of Mantachie clay loam, in an area of Mantachie, luka, and Bibb soils, 0 to 1 percent slopes, frequently flooded; in a wooded area, about 3,000 feet southeast of Inverness and 1,000 feet west of County Highway 14, about 1,410 feet south and 1,150 feet west of the northeast corner of sec. 21, T. 12 N., R. 23 E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) clay loam; weak medium granular structure; friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

Bw—3 to 12 inches; mottled grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; very strongly acid; gradual wavy boundary.

Bg1—12 to 25 inches; gray (10YR 5/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; few fine pores; very strongly acid; gradual wavy boundary.

Bg2—25 to 40 inches; gray (10YR 5/1) clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; few fine pores; very strongly acid; gradual wavy boundary.

Bg3—40 to 62 inches; gray (10YR 5/1) clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. It is sandy loam, loam, or clay loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, chroma of 2 to 6, and mottles in shades of yellow and brown; or it is mottled in shades of these colors. It is sandy clay loam, clay loam, or loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown or red. It is clay loam, loam, or sandy clay loam.

Maytag Series

The Maytag series consists of very deep, moderately well drained, slowly permeable soils that formed in residuum weathered from calcareous clay or chalk from the Blackland Prairie. These soils are on uplands. Slopes range from 1 to 12 percent. The soils of the Maytag series are fine, montmorillonitic, thermic Oxyaquic Hapluderts.

Maytag soils are geographically associated with Kipling, Oktibbeha, Sucarnoochee, and Vaiden soils. Kipling and Vaiden soils are somewhat poorly drained. They are acid in the upper part of the subsoil. They are in lower landscape positions than the Maytag soils. Oktibbeha soils have a red, clayey argillic horizon. They are in landscape positions similar to those of the Maytag soils. Sucarnoochee soils are somewhat poorly drained. They are in drainageways.

Typical pedon of Maytag silty clay, 1 to 3 percent slopes, eroded; in a cultivated field about ¼ mile north of Sedgefield headquarters, about 2,200 feet north and 550 feet east of the southwest corner of sec. 17, T. 14 N., R. 22 E.

Ap—0 to 3 inches; olive (5Y 4/3) silty clay; strong fine granular structure; firm; plastic and slightly sticky; common fine and medium roots; mildly alkaline; abrupt smooth boundary.

AB—3 to 7 inches; olive (5Y 5/3) silty clay; many coarse faint olive yellow (2.5Y 6/6) mottles; weak coarse subangular blocky structure; firm; few fine and medium roots; moderately alkaline; abrupt wavy boundary.

Bkss1—7 to 17 inches; light olive brown (2.5Y 5/6) silty clay; few faint olive yellow (2.5Y 6/6) and pale olive (5Y 6/3) coatings on faces of peds; strong coarse angular blocky structure parting to weak medium subangular blocky; very firm; common fine and medium roots that are flattened on primary surfaces; common distinct large intersecting slickensides that have thick polished and grooved surfaces; common medium soft masses of calcium carbonate and few fine and medium rounded calcium carbonate nodules; moderately alkaline; gradual wavy boundary.

Bkss2—17 to 31 inches; olive yellow (2.5Y 6/6) clay; common faint pale olive (5Y 6/3) and light brownish gray (10YR 6/2) coatings on faces of peds; strong coarse angular blocky structure parting to strong medium subangular blocky; very firm; few fine and medium roots that are flattened on the primary surface; common distinct large intersecting slickensides that have thick polished and grooved surfaces; common medium soft masses of calcium carbonate and few fine and medium calcium carbonate nodules; moderately alkaline; gradual wavy boundary.

Bkss3—31 to 53 inches; pale olive (5Y 6/3) clay; common medium distinct light yellowish brown (2.5Y 6/4) and light brownish gray (10YR 6/2) and few medium distinct olive yellow (2.5Y 6/8) mottles; strong coarse angular blocky structure parting to strong fine subangular blocky and weak medium platy; very firm; few medium roots that are flattened on the primary surface; common distinct intersecting slickensides that have thick polished and grooved surfaces; many medium soft masses of calcium carbonate and few fine and medium calcium carbonate nodules; moderately alkaline; gradual wavy boundary.

Bkss4—53 to 65 inches; pale olive (5Y 6/3) clay; common coarse prominent strong brown (7.5YR 5/8) and few medium distinct olive yellow (2.5Y 6/8) and light brownish gray (10YR 6/2) mottles; weak coarse angular blocky structure; firm; few medium roots that are flattened on primary surfaces; common distinct large intersecting slickensides that have thick polished and grooved surfaces; many fine and medium soft masses of calcium carbonate and few fine and medium calcium carbonate nodules; moderately alkaline.

The thickness of the solum ranges from 45 to 60 inches or more. The depth to chalk is more than 60 inches. In some pedons, the content of calcium carbonate nodules and soft accumulations is few or common in the Ap horizon, is common or many in the upper part of the solum, and is many in the lower part of the solum and in the substratum. Reaction ranges from slightly acid to moderately alkaline in the upper part of the subsoil and is mildly alkaline or moderately alkaline in the lower part.

The Ap horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It is clay loam, silty clay loam, silty clay, or clay. Reaction ranges from slightly acid to moderately alkaline.

The AB horizon, which is present in most pedons, or the BA horizon, if it occurs, has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 3 or 4. It is clay or silty clay.

The upper part of the Bkss horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 3 to 8. It has mottles in shades of yellow, brown, olive, and gray. The lower part of the Bkss horizon has colors similar to the upper part, or it is mottled in shades of yellow, brown, olive, and gray. It is silty clay, clay, or silty clay loam.

The C horizon, if it occurs, has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 to 6 or is mottled in shades of yellow, brown, olive, and gray. It is silty clay, clay, or silty clay loam.

Minter Series

The Minter series consists of deep, poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium. They are on low stream terraces and are subject to flooding. Slopes range from 0 to 1 percent. The soils of the Minter series are fine, mixed, thermic Typic Endoaqualfs.

Minter soils are geographically associated with Goldsboro, Houlka, Lynchburg, Sucarnoochee, and Urbo soils. Goldsboro and Lynchburg soils are on stream terraces in higher landscape positions than the Minter soils. They have a fine-loamy control section, and they are better drained than the Minter soils. Houlka soils do not have an argillic horizon, and they are better drained than the Minter soils. Sucarnoochee soils are on flood plains. They are calcareous and do not have an argillic horizon. Urbo soils are on flood plains. They are somewhat poorly drained and do not have an argillic horizon.

Typical pedon of Minter loam, 0 to 1 percent slopes, occasionally flooded, in a cultivated field about 3.5 miles northeast of Sedgefield on County Road 115, about 1,800 feet north and 1,600 feet east of the southwest corner of sec. 5, T. 14 N., R. 24 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; few fine roots; slightly acid; gradual wavy boundary.

A—4 to 9 inches; dark grayish brown (10YR 4/2) loam; many fine faint grayish brown (10YR 5/2) mottles; weak medium granular structure; friable; few fine roots; medium acid; gradual wavy boundary.

E—9 to 13 inches; light brownish gray (10YR 6/2) fine sandy loam; common coarse distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; friable; few fine roots; medium acid; gradual wavy boundary.

Btg1—13 to 17 inches; gray (10YR 6/1) clay loam; common coarse distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—17 to 30 inches; gray (10YR 6/1) clay; few medium distinct yellowish brown (10YR 5/6) and common coarse distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; few fine pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—30 to 53 inches; gray (10YR 6/1) clay; few medium distinct brownish yellow (10YR 6/8) and common medium prominent red (2.5YR 4/6) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—53 to 65 inches; gray (10YR 6/1) clay loam; many medium distinct yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; strongly acid.

The thickness of the solum is more than 60 inches. Reaction ranges from very strongly acid to strongly acid throughout the profile, except in areas where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2.

The A horizon, which is present in most pedons, has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is loam, silt loam, or clay loam. Most pedons have mottles in shades of brown, yellow, and gray.

The E horizon, which is present in most pedons, has hue of 10YR or 2.5Y, value of 5 to 6, and chroma of 1 or 2. It has mottles in shades of brown and gray. It is loam, sandy loam, or fine sandy loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It has few to many mottles in shades of yellow, red, and brown. It is clay, silty clay, or clay loam.

Ocilla Series

The Ocilla series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in sandy and loamy marine sediments. These soils are on broad, low stream terraces that are subject to rare flooding. Slopes range from 0 to 2 percent. The soils of the Ocilla series are loamy, siliceous, thermic Aquic Arenic Paleudults.

Ocilla soils are geographically associated with Bibb, Eunola, Goldsboro, Lynchburg, and Mantachie soils. Bibb and Mantachie soils are on slightly lower landforms than the Ocilla soils. They do not have an argillic horizon. Eunola, Goldsboro, and Lynchburg soils have a fine-loamy control section. They do not have a sandy upper layer to a depth of more than 20 inches. Eunola and Goldsboro soils are in slightly higher landscape positions. Lynchburg soils are in lower positions or are in landscape positions similar to those of the Ocilla soils.

Typical pedon of Ocilla loamy fine sand, 0 to 2 percent slopes, rarely flooded, in an idle field about 2 miles south of Three Notch, about 2,425 feet east and 1,950 feet north of the southwest corner of sec. 30, T. 13 N., R. 25 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy fine sand; weak fine granular structure; friable; many fine roots; strongly acid; gradual smooth boundary.

E1—8 to 21 inches; yellowish brown (10YR 5/4) loamy fine sand; few fine faint very pale brown mottles; single grained; loose; many fine and medium roots; strongly acid; gradual smooth boundary.

E2—21 to 36 inches; very pale brown (10YR 7/3) loamy fine sand; common coarse faint light gray (10YR 7/2) and few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few fine and medium roots; strongly acid; abrupt wavy boundary.

Bt1—36 to 48 inches; brownish yellow (10YR 6/6) sandy loam; few fine distinct light brownish gray (10YR 6/2) and few medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few faint clay films on faces of some peds; strongly acid; gradual smooth boundary.

Bt2—48 to 57 inches; brownish yellow (10YR 6/6) sandy loam; common medium distinct light gray (10YR 7/2) and few medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine pores; few fine roots; few faint clay films on faces of some peds; strongly acid; gradual smooth boundary.

Bt3—57 to 64 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and yellowish red (5YR 4/6) sandy loam; weak medium subangular blocky structure; friable; few faint clay films on faces of some peds; few pockets of clean sand; very strongly acid; gradual smooth boundary.

Bt4—64 to 75 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), brownish yellow (10YR 6/8), and yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of some peds; few small pockets of clean sand; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction ranges from strongly acid to very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 4. It is sand, loamy fine sand, or loamy sand. Some pedons have mottles in shades of brown, gray, or olive.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, chroma of 5 to 8, and mottles in shades of gray, yellow, brown, or red; or the matrix is mottled in shades of red, brown, yellow, and gray. The horizon is sandy loam or sandy clay loam.

Oktibbeha Series

The Oktibbeha series consists of very deep, moderately well drained, very slowly permeable soils that formed in materials weathered from calcareous clay or chalk in the Blackland Prairie. These soils are on uplands. Slopes range from 1 to 15 percent. The soils of the Oktibbeha series are very-fine, montmorillonitic, thermic Chromic Dystruderts.

Oktibbeha soils are geographically associated with Kipling, Maytag, and Vaiden soils. Kipling and Vaiden soils are somewhat poorly drained. They are in lower positions on the landscape than the Oktibbeha soils. Maytag soils are in landscape positions similar to those of the Oktibbeha soils. They are calcareous throughout and do not have an argillic horizon.

Typical pedon of Oktibbeha clay loam, 1 to 3 percent slopes, eroded, in a pasture about 1.5 miles southeast of Fitzpatrick on Highway 110, 100 feet west, in a pasture, about 2,100 feet south and 800 feet east of the northwest corner of sec. 18, T. 14 N., R. 22 E.

Ap—0 to 3 inches; very dark grayish brown (10YR 3/2) clay loam; moderate medium granular structure; friable; many medium roots; moderately acid; gradual smooth boundary.

Bt1—3 to 9 inches; yellowish red (5YR 4/6) clay; many fine distinct dark brown (7.5YR 4/4) and yellowish brown (10YR 5/6) mottles; strong coarse angular blocky structure parting to moderate medium subangular blocky; firm; many fine roots; strongly acid; gradual wavy boundary.

Bt2—9 to 28 inches; red (2.5YR 4/6) clay; common medium distinct dark yellowish brown (10YR 4/4) and light yellowish brown (10YR 6/4) mottles; strong coarse subangular blocky structure parting to weak fine subangular blocky; firm; common medium roots; distinct pressure faces on the surface of peds; strongly acid; clear wavy boundary.

Bss—28 to 45 inches; light olive brown (2.5Y 5/6) clay; strong coarse subangular blocky structure parting to moderate medium angular and subangular blocky; very firm; few fine roots; common large intersecting slickensides that have distinct polished and grooved surfaces; slightly acid; clear wavy boundary.

Bkss—45 to 48 inches; olive (5Y 5/3) clay; common medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; very firm; many fine roots; common large intersecting slickensides that have distinct polished and grooved surfaces; many soft accumulations of calcium carbonate; moderately alkaline; gradual wavy boundary.

2C1—48 to 67 inches; pale olive (5Y 6/4) clay; common coarse distinct light olive brown (2.5Y 5/4) mottles; weak fine platy structure; very firm; few fine roots; common mica flakes; common soft accumulations of calcium carbonate; few nodules of calcium carbonate; moderately alkaline; gradual wavy boundary.

2C2—67 to 80 inches; olive yellow (2.5Y 6/6) clay; common coarse distinct light gray (5Y 7/2) and few fine distinct yellowish brown (10YR 5/8) mottles; massive; very firm; few fine mica flakes; common soft accumulations of calcium carbonate; common nodules of calcium carbonate; moderately alkaline.

The thickness of the solum ranges from 20 to 50 inches. Reaction ranges from slightly acid to very strongly acid in the A and Bt horizons and from neutral to moderately alkaline in the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 8. Most pedons have mottles in shades of brown throughout the profile and have gray mottles in the lower part. The texture is clay.

The Bss horizon has hue of 10YR to 5Y and value of 4 to 6. It has chroma of 4 to 8 in the interior of peds and chroma of 2 to 4 on the exterior faces of peds or on slickenside faces. Some pedons are mottled in shades of red, brown, gray, and yellow. The texture is clay.

The Bkss horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 3 to 8. It has mottles in shades of brown and yellow. It is clay or silty clay.

The 2C horizon has hue of 10YR to 5Y, value of 5 to 7, chroma of 4 to 8, and mottles in shades of brown and gray; or it is mottled in shades of olive, gray, and brown. The horizon is clay or silty clay.

Orangeburg Series

The Orangeburg series consists of very deep, well drained, moderately permeable soils that formed in loamy marine sediments. These soils are in the uplands in the southern part of the county. Slopes range from 2 to 5 percent. The soils of the Orangeburg series are fine-loamy, siliceous, thermic Typic Kandiudults.

Orangeburg soils are geographically associated with Blanton, Bonifay, Conecuh, Luverne, and Cowarts soil. Blanton and Bonifay soils have a surface layer and a subsurface layer of loamy sand to a depth of 40 inches or more. They are in slightly higher positions on the landscape than the Orangeburg soils. Conecuh and Luverne soils have a clayey argillic horizon. They are in lower positions on the landscape. Cowarts soils are in landscape positions similar to those of the Orangeburg soils. They have a solum that is less than 60 inches thick.

Typical pedon of Orangeburg loamy sand, 2 to 5 percent slopes, eroded, in a wooded area about 1.5 miles southwest of Corinth, about 1,000 feet north and 2,300 feet east of the southwest corner of sec. 27, T. 11 N., R. 23 E.

Ap—0 to 5 inches; brown (7.5YR 5/4) loamy sand; weak medium granular structure; friable; few fine and medium roots; strongly acid; abrupt wavy boundary.

Bt1—5 to 14 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; strongly acid; gradual wavy boundary.

Bt2—14 to 29 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; few medium roots; few faint clay films on faces of peds; few mica flakes; strongly acid; gradual wavy boundary.

Bt3—29 to 64 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid.

The thickness of the solum is 60 inches or more. Reaction is strongly acid to very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 4 to 6.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. It is sandy loam or sandy clay loam in the upper part, and it is sandy clay loam and sandy clay loam or sandy clay in the lower part. Some pedons have mottles in shades of yellow or brown in the lower part.

Riverview Series

The Riverview series consists of very deep, well drained, moderately permeable soils that formed in loamy alluvium. These soils are on flood plains and are frequently flooded. Slopes range from 0 to 1 percent. The soils of the Riverview series are fine-loamy, mixed, thermic Fluventic Dystrochrepts.

Riverview soils are geographically associated with Urbo soils. Urbo soils are in slightly lower landscape positions. They have a clayey subsoil and are somewhat poorly drained.

Typical pedon of Riverview sandy loam, in an area of Urbo and Riverview soils, 0 to 1 percent slopes, frequently flooded; in a wooded area about 2 miles south of Fitzpatrick, about 1,500 feet north and 1,800 feet west of the southeast corner of sec. 18, T. 14 N., R. 22 E.

A—0 to 4 inches; yellowish brown (10YR 5/4) sandy loam; weak medium granular structure; friable; few fine and medium roots; strongly acid; gradual wavy boundary.

Bw1—4 to 24 inches; yellowish brown (10YR 5/4) sandy clay loam; few fine faint light yellowish brown mottles; weak medium subangular blocky structure; friable; many fine and medium roots; very strongly acid; gradual wavy boundary.

Bw2—24 to 28 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak coarse subangular blocky structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

Bw3—28 to 37 inches; brown (7.5YR 5/4) sandy clay loam; common coarse distinct light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

Bw4—37 to 58 inches; mottled brownish yellow (10YR 6/8), light yellowish brown (10YR 6/4), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; very strongly acid; gradual wavy boundary.

C—58 to 70 inches; brownish yellow (10YR 6/8) sandy loam; common medium distinct pale brown (10YR 6/3), light yellowish brown (10YR 6/4), and strong brown (7.5YR 5/6) mottles; massive; friable; very strongly acid.

The thickness of solum ranges from 24 to 60 inches. Reaction ranges from strongly acid to very strongly acid, except in areas where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4. It is sandy loam, loam, or silt loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8 or is mottled in shades of brown, yellow, and gray. Some pedons have mottles in shades of brown, gray, yellow, and red in the lower part of the horizon. The Bw horizon is sandy clay loam, loam, silt loam, or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 8, and chroma of 4 to 8. It is sandy loam or loamy sand. Most pedons have mottles in shades of yellow, brown, gray, and red.

Sucarnoochee Series

The Sucarnoochee series consists of very deep, somewhat poorly drained, very slowly permeable soils that formed in calcareous clayey alluvium. These frequently flooded soils are on flood plains of the Blackland Prairie. Slopes range from 0 to 1 percent. The soils of the Sucarnoochee series are fine, montmorillonitic, thermic Chromic Epiaquerts.

Sucarnoochee soils are adjacent to Kipling, Maytag, Minter, Oktibbeha, and Vaiden soils. Kipling, Maytag, Oktibbeha, and Vaiden soils are on adjacent uplands. Maytag and Oktibbeha soils are better drained than the Sucarnoochee soils. Oktibbeha soils are acid. They are reddish in the upper part of the subsoil. Minter soils do not have vertic properties. They are on adjacent stream terraces.

Typical pedon of Sucarnoochee silty clay, 0 to 1 percent slopes, frequently flooded, in a cultivated field about 6 miles north of Thompson Station, about 3,100 feet north and 2,500 feet east of the southwest corner of sec. 2, T. 14 N., R. 22 E.

Ap—0 to 5 inches; very dark grayish brown (2.5Y 3/2) silty clay; moderate medium granular structure; firm; very sticky and very plastic; many medium and fine roots; mildly alkaline; clear wavy boundary.

AB—5 to 10 inches; olive (5Y 4/3) silty clay; moderate medium subangular blocky; firm; many fine and medium roots; mildly alkaline; gradual wavy boundary.

Bgss1—10 to 38 inches; dark grayish brown (2.5Y 4/2) clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse and very coarse angular blocky structure; very firm; few medium roots flattened on primary surfaces; common distinct large intersecting slickensides that have distinct polished and grooved surfaces; moderately alkaline; gradual wavy boundary.

Bgss2—38 to 64 inches; dark grayish brown (2.5Y 4/2) clay; few medium distinct yellowish brown (10YR 5/6) and gray (N 5/0) mottles; moderate coarse and very coarse angular blocky structure; very firm; common distinct large intersecting slickensides that have distinct polished and grooved surfaces; few calcium carbonate nodules; few manganese concretions; neutral.

The thickness of the solum is 65 inches or more. Reaction ranges from neutral to moderately alkaline throughout the profile. The depth to intersecting slickensides ranges from 10 to 27 inches.

The A or Ap horizon has hue of 10YR to 5Y, value of 3 or 4, and chroma of 2 or 3.

The AB horizon, which is present in most pedons, has hue of 10YR to 5Y, value of 3 or 4, and chroma of 1 to 3. It is silty clay loam or silty clay.

The Bgss horizon has hue of 10YR to 5Y, value of 3 to 6, chroma of 1 or 2, and mottles in shades of brown, yellow, and gray; or it is mottled in shades of gray, yellow, and brown. The horizon is silty clay or clay. Most pedons have few or common calcium carbonate nodules and manganese concretions.

Urbo Series

The Urbo series consists of very deep, somewhat poorly drained, very slowly permeable soils that formed in clayey alluvium. These frequently flooded soils are on flood plains. Slopes range from 0 to 1 percent. The soils of the Urbo series are fine, mixed, acid, thermic Vertic Epiaquepts.

Urbo soils are geographically associated with Houlka, Riverview, and Sucarnoochee soils. Houlka soils have montmorillonitic mineralogy and have a high shrink-swell potential. Riverview soils have a fine-loamy control section. They are in slightly higher landscape positions, and they are well drained. Sucarnoochee soils are in landscape positions similar to those of the Urbo soils. They have intersecting slickensides within a depth of 27 inches.

Typical pedon of Urbo clay, in an area of Urbo and Riverview soils, 0 to 1 percent slopes, frequently flooded; in a wooded area about 2 miles south of Fitzpatrick, about 1,500 feet north and 1,200 feet west of the southeast corner of sec. 18, T. 14 N., R. 22 E.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) clay loam; few fine faint dark grayish brown mottles; moderate medium granular structure; friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

A2—4 to 15 inches; brown (10YR 5/3) clay loam; common coarse faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few yellowish brown (10YR 5/4) stains around root channels; very strongly acid; gradual wavy boundary.

Bg1—15 to 27 inches; dark grayish brown (2.5Y 4/2) clay loam; common coarse distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable, firm; few medium roots; very strongly acid; gradual wavy boundary.

Bg2—27 to 37 inches; light brownish gray (10YR 6/2) clay; common coarse distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; very strongly acid; gradual wavy boundary.

Bg3—37 to 65 inches; gray (10YR 5/1) clay loam; common medium distinct strong brown (7.5YR 5/6) and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine slickensides that do not intersect; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction is strongly acid or very strongly acid throughout the profile, except in areas where the surface layer has been limed.

The A1 and A2 horizons have hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. Most pedons have few or common mottles in shades of brown and gray. The A1 horizon is less than 6 inches thick if the value is 3. The A1 and A2 horizons are clay, clay loam, or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is silty clay loam, clay loam, or clay. It has mottles in shades of brown, yellow, and gray. Some pedons have few or common manganese concretions.

Vaiden Series

The Vaiden series consists of very deep, somewhat poorly drained, very slowly permeable soils on uplands of the Blackland Prairie. These soils formed in thick beds of acid clay that were generally underlain by chalk or calcareous clay. Slopes range from 0 to 2 percent. The soils of the Vaiden series are very-fine, montmorillonitic, thermic Aquic Dystruderts.

Vaiden soils are geographically associated with Kipling, Maytag, Oktibbeha, and Sucarnoochee soils. Kipling, Maytag, and Oktibbeha soils are in higher positions on the landscape than the Vaiden soils. Kipling soils have less than 60 percent clay in the control section. Maytag soils are moderately well drained and are calcareous throughout. Oktibbeha soils do not have mottles with chroma of 2 or less in the upper 10 inches of the argillic horizon. Sucarnoochee soils are in drainageways. They are alkaline throughout.

Typical pedon of Vaiden silty clay, 0 to 2 percent slopes, in an open field about ½ mile north of Mitchell Station, about 800 feet north and 500 feet east of the southwest corner of sec. 23, T. 15 N., R. 21 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay; moderate fine granular structure; firm, hard; very sticky and very plastic; common fine roots; medium acid; abrupt wavy boundary.

Bt—6 to 18 inches; yellowish brown (10YR 5/8) clay; many medium distinct light brownish gray (10YR 6/2) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium angular blocky and subangular blocky structure; firm; few fine and medium roots; very strongly acid; clear wavy boundary.

Btss1—18 to 33 inches; mottled yellowish brown (10YR 5/8) and gray (5Y 6/1) clay; moderate fine angular blocky structure; firm; few fine and medium roots that are flattened on primary surfaces; few large intersecting slickensides that have distinct polished and grooved surfaces; very strongly acid; gradual wavy boundary.

Btss2—33 to 49 inches; yellowish brown (10YR 5/6) clay in the interior, gray (5Y 6/1) clay on the exterior; wedge-shaped aggregates that part to moderate fine angular blocky structure; firm; very sticky and very plastic; few fine roots that are flattened on primary surfaces; many large intersecting slickensides that have prominent polished and grooved surfaces; very strongly acid; gradual wavy boundary.

Btss3—49 to 65 inches; mottled gray (5Y 6/1), red (2.5YR 4/6), and yellowish brown (10YR 5/6) clay; wedge-shaped aggregates that part to weak fine angular blocky structure; firm; very plastic and very sticky; many large intersecting slickensides; very strongly acid.

The depth to alkaline material is more than 3 feet. Reaction ranges from very strongly acid to medium acid in the solum and from very strongly acid to mildly alkaline in the underlying material.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of gray, brown, and red. It is clay or silty clay.

The Btss horizon has hue of 10YR, value of 5 or 6, and chroma of 6 or 8 on the interior faces of peds; has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 on the exterior faces of peds; and has mottles in shades of yellow, brown, and red; or the horizon is mottled in shades of gray, yellow, brown, and red. The Btss horizon is clay.

The Bkss horizon, if it occurs, has hue of 2.5Y or 5Y and value of 5 or 6. It has chroma of 4 to 6 in the interior of peds and chroma of 1 or 2 on the exterior of peds or on slickenside faces. Some pedons are mottled in shades of gray and brown. The texture is clay. Some pedons have few or common soft masses and nodules of calcium carbonate. Other pedons have few or common soft masses and concretions of manganese.

Formation of the Soils

This section describes the processes of soil formation and relates the soils in Bullock County to the factors of soil formation.

Processes of Soil Formation

The processes involved in the formation of soil horizons are the accumulation of organic matter, the leaching of calcium carbonate and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. These processes can occur in combination or individually, depending on the integration of the factors of soil formation.

The A, E, B, and C horizons are the four main horizons in most soils. The A horizon is the surface layer. It has the maximum accumulation of organic matter. The E horizon, which is usually called the subsurface layer, is characterized by the maximum loss of soluble or suspended material. Blanton soils have A and E horizons. Other soils, such as Conecuh soils, have an A horizon but do not have an E horizon. Organic matter has accumulated in the surface layer of all the soils in Bullock County and formed an A horizon. The content of organic matter varies in different soils because of variations in relief, wetness, and inherent fertility.

The B horizon, or the subsoil, is directly below the A or E horizon. It has the maximum accumulation of dissolved or suspended materials, such as iron or clay. In very young soils, such as Iuka soils, a B horizon has not yet formed.

The C horizon, or the substratum, has been affected very little by soil-forming processes, but it may be somewhat modified by weathering.

Gleying is the chemical reduction and transfer of iron. It is evidenced in the wet soils of the county by a gray subsoil and gray mottles in other horizons. Some horizons in soils such as the Minter soils have reddish-brown mottles and concretions, which indicate the segregation of iron.

Carbonates and bases have been leached from most of the soils in the county. This process contributes to the development of horizons and to the inherent low fertility and acid reaction of the soils.

In uniform materials, the difference in natural soil drainage generally is closely associated with slope or relief. Soil drainage, in turn, generally affects the color of the soil. Soils that formed under good drainage conditions, such as Luverne soils, have a subsoil that is uniformly bright in color. Soils that formed under poor drainage conditions, such as Bibb soils, have a grayish color. Soils that formed where drainage is intermediate have a subsoil that is mottled with gray and brown. Goldsboro soils are an example. The grayish color persists even after artificial drainage is provided by ditches or tile drains.

In steep areas, geological erosion removes the surface soil. In low or depressional areas, soil materials often accumulate and add to the thickness of the surface soil. In some areas, the formation of soil materials and rates of removal are in equilibrium with soil development. The degree of relief is also related to the eluviation of clay from the E horizon to the Bt horizon.

Factors of Soil Formation

The combined influence of the five factors of soil formation, which are parent material, climate, plant and animal life, relief, and time, determine the characteristics and properties of a soil.

Parent Material

Parent material is the unconsolidated mass of material in which a soil forms. It greatly influences the chemical and mineral composition of the soil. In Bullock County, the soils formed mainly in three types of parent material—acid marine sediment, alluvium, and calcareous deposits. Soils in the southern part of the county, such as Blanton, Conecuh, and Luverne soils, formed in acid marine sediments. Riverview, Iuka, Mantachie, Minter, Goldsboro, and Lynchburg soils formed in alluvium along major streams and rivers and on stream terraces. Oktibbeha and Sumter soils in the uplands and Urbo, Houlka, and Sucarnoochee soils along creeks and streams formed in calcareous deposits in the northern part of the county.

Climate

The climatic conditions, to a great degree, determine the rate or speed of soil formation. Temperature and precipitation are two main factors that influence the physical, chemical, and biological parts of the soil. The average annnual precipitation is 54 inches per year in Bullock County. Summers are long and hot. Winters are short and mild, and the ground rarely freezes more than a few inches in depth.

Water affects soil formation by dissolving minerals, supporting biological activity, increasing the rate of chemical reactions, and transporting dissolved minerals and organic residues through the soil profile. Percolation, or movement of water through the soil, depends on the intensity and amount of rainfall, the relatively humidity, and the length of the frost-free period. Slope and permeability also affect the rate of percolation.

Temperature directly influences chemical reactions. If the temperatures are high, the process of decomposition is rapid. As a result, the content of organic matter is low in most of soils in the county. Temperature also influences the types of living organisms in and on the soils, their distribution, and their growth.

Plant and Animal Life

Soils and the plant and animal life that it supports have a reciprocal relationship. The living organisms, both plants and animals, help to form the soils and also depend upon the soils for their existence.

Biological activity is mainly confined to the surface layer of the soil. Earthworms, rodents, and other burrowing animals continually mix the soil, which increases the rate of water infiltration. Plant roots create channels through which air and water move more rapidly, thus improving soil structure and increasing the rate of chemical reactions in the soil.

Microorganisms also help in the decomposition of organic matter. They use organic matter as a source of food and release plant nutrients and chemicals into the soil. These nutrients are either used in additional chemical or biological processes or are leached from the soil. In the future, humans may be considered a factor of soil formation. Human activities greatly influence the plant and animal populations in the soil and the stability of existing areas of soils.

Relief

Relief influences the formation of soils through its effect on drainage, runoff, erosion, and plant cover. In Bullock County, the topography ranges from level or nearly level along creeks and rivers to moderately steep and steep in a few areas. Soils that are level or nearly level have slow runoff, remain ponded for long periods, and generally are somewhat poorly drained or poorly drained. Because the excess water slows the formation of soils, these soils are not as well developed as soils in well drained areas. As the slope increases, the rate of runoff increases. Less water enters the soils for chemical and biological weathering. Rapid runoff also reduces the growth of plants and influences the types of plants in an area. In areas of soils that have steep slopes, the rate of erosion nearly keeps pace with the rate of soil formation. These soils have less water and nutrients available for plant growth and, consequently, have less vegetative cover and a higher rate of erosion.

Time

Even with all of the other soil-forming factors in progress, time is required for distinct soil horizons to develop. Generally, less time is required for a soil to develop in a humid, warm region than in a dry or cold region. Fine-textured parent material develops into soils more slowly than coarse-textured parent material. The soils in the county range from very young to very old if horizonation is used as the criteria for age. A soil is considered young if it has not been changed enough by soil-forming processes to have well developed, genetically related horizons. Young soils often have characteristics similar to those of the parent material. Iuka and Bibb soils are examples of young soils that are along rivers and creeks.

Old soils have been in place for a long time and have undergone considerable weathering. Most are believed to be in equilibrium with the environment, and they have well developed, genetically related horizons. Blanton and Cowarts soils are examples of old soils.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

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

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but that have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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 coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

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

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

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.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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.

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.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for 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 they are wet 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.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by 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 human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

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.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

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

Foot slope. The inclined surface at the base of a hill.

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.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

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

A horizon.—The mineral horizon 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.
E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have 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 in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.
Cr horizon.—Soft, consolidated bedrock beneath the soil.
R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

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

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

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 three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

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.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

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

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Pitting (in tables). Pits are caused by melting ground ice. They form on the soil after plant cover is removed.

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 semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

Reaction, soil. A measure of the 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 degrees of acidity or alkalinity, expressed as pH values, are:

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

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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.

Sinkhole. A depression in the landscape where limestone has been dissolved.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It 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.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

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

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or 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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. 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."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or 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 loam, silt, 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."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive areas of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1961-90 at Union Springs, Alabama)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	55.3	33.2	44.2	77	8	61	4.88	2.86	6.68	7	0.3
February----	59.8	35.7	47.8	80	16	91	5.02	2.91	6.89	6	0.5
March-------	68.7	43.3	56.0	86	24	229	6.10	3.79	8.18	7	0.0
April-------	76.8	50.4	63.6	89	33	408	4.34	1.89	6.43	5	0.0
May---------	83.4	58.4	70.9	94	44	638	4.04	2.00	5.81	5	0.0
June--------	89.4	66.0	77.7	99	52	825	4.98	2.37	7.23	6	0.0
July--------	90.9	69.2	80.1	100	61	924	5.53	3.24	7.58	9	0.0
August------	90.6	68.5	79.5	98	59	901	4.13	2.10	5.90	7	0.0
September---	86.6	63.7	75.1	97	47	752	3.73	1.77	5.41	6	0.0
October-----	77.4	51.5	64.4	90	32	446	2.68	0.71	4.41	3	0.0
November----	68.3	43.2	55.7	84	23	214	3.85	2.34	5.21	5	0.1
December----	59.6	35.7	47.6	79	12	94	5.09	3.38	6.65	6	0.0
Yearly:											
Average---	75.6	51.6	63.6	---	---	---	---	---	---	---	---
Extreme---	104	-2	---	101	7	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,581	54.36	44.03	60.01	72	0.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Union Springs, Alabama)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 8	Mar. 16	Apr. 7
2 years in 10 later than--	Mar. 1	Mar. 9	Apr. 1
5 years in 10 later than--	Feb. 17	Feb. 25	Mar. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 23	Nov. 6	Oct. 28
2 years in 10 earlier than--	Nov. 29	Nov. 11	Nov. 2
5 years in 10 earlier than--	Dec. 12	Nov. 21	Nov. 11

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Union Springs, Alabama)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	267	247	215
8 years in 10	277	256	223
5 years in 10	297	273	237
2 years in 10	318	290	251
1 year in 10	328	298	259

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR SPECIFIED USES

Map unit	Extent of area	Cultivated crops	Pasture and hay	Woodland	Urban uses	Intensive recreation areas	Extensive recreation areas
	Pct						
1. Oktibbeha-Maytag	15	Fair: slope, poor tilth, too clayey.	Well suited---	Fair: too clayey, too alkaline.	Poor: high shrink-swell, percs slowly, slope.	Poor: too clayey, percs slowly, slope.	Well suited.
2. Blanton-Luverne	14	Fair: slope, droughty, too sandy.	Fair: droughty, slope.	Well suited-----	Fair: wetness, shrink-swell, slope.	Fair: too sandy, percs slowly, slope.	Well suited.
3. Cowarts-Luverne	5	Poor: slope, droughty.	Fair: slope.	Well suited-----	Poor: slope, percs slowly, shrink-swell.	Poor: slope, percs slowly.	Well suited.
4. Mantachie-Iuka-Lynchburg------	13	Poor to fair: flooding, wetness.	Poor to fair: flooding, wetness.	Well suited-----	Poor: flooding, wetness.	Poor to fair: flooding, wetness.	Fair to well suited: flooding, wetness.
5. Urbo-Riverview-Goldsboro------	10	Poor to well suited: flooding, wetness.	Poor to well suited: flooding, wetness.	Well suited-----	Poor: flooding, wetness.	Poor to well suited: flooding, wetness.	Fair to well suited: flooding, wetness.
6. Conecuh-Luverne	39	Poor: slope.	Fair: slope.	Well suited-----	Poor: high shrink-swell, percs slowly, slope.	Poor: slope, percs slowly.	Well suited.
7. Luverne-Cowarts	4	Poor: slope.	Poor: slope.	Fair: slope.	Poor: slope, percs slowly.	Poor: slope.	Fair: slope.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AgB	Alaga loamy sand, 2 to 8 percent slopes	1,946	0.5
BaE	Blanton loamy sand, 8 to 20 percent slopes	11,426	2.9
BbB	Blanton-Bonifay loamy sands, 2 to 8 percent slopes	32,841	8.2
CaB	Compass loamy fine sand, 0 to 5 percent slopes	3,235	0.8
CeB2	Conecuh sandy loam, 2 to 5 percent slopes, eroded	23,523	5.9
CeC2	Conecuh sandy loam, 5 to 8 percent slopes, eroded	30,083	7.5
CeE	Conecuh sandy loam, 8 to 20 percent slopes	31,708	7.9
CoB2	Cowarts sandy loam, 2 to 6 percent slopes, eroded	6,261	1.6
CuD2	Cowarts-Luverne loamy sands, 6 to 12 percent slopes, eroded	8,133	2.0
CuE	Cowarts-Luverne loamy sands, 12 to 25 percent slopes	2,618	0.7
EaB	Eunola loamy sand, 1 to 3 percent slopes	3,230	0.8
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	8,808	2.2
HoA	Houlka clay, 0 to 1 percent slopes, frequently flooded	3,128	0.8
KpB2	Kipling fine sandy loam, 1 to 3 percent slopes, eroded	1,872	0.5
LnB	Luverne loamy sand, 2 to 8 percent slopes	24,632	6.1
LnE2	Luverne loamy sand, 8 to 20 percent slopes, eroded	43,836	10.9
LoE	Luverne-Blanton loamy sands, 5 to 20 percent slopes	5,829	1.5
LtF	Luverne-Blanton-Cowarts complex, 15 to 45 percent slopes	9,379	2.3
LyA	Lynchburg-Ocilla complex, 0 to 2 percent slopes, rarely flooded	9,857	2.5
MBA	Mantachie, Iuka, and Bibb soils, 0 to 1 percent slopes, frequently flooded	43,840	10.9
MgB2	Maytag silty clay, 1 to 3 percent slopes, eroded	5,738	1.4
MgD2	Maytag silty clay, 3 to 8 percent slopes, eroded	4,000	1.0
MgE2	Maytag silty clay, 8 to 12 percent slopes, eroded	502	0.1
MkE2	Maytag-Oktibbeha complex, 3 to 12 percent slopes, eroded	8,459	2.1
MnA	Minter loam, 0 to 1 percent slopes, occasionally flooded	1,268	0.3
OcA	Ocilla loamy fine sand, 0 to 2 percent slopes, rarely flooded	4,927	1.2
OkB2	Oktibbeha clay loam, 1 to 3 percent slopes, eroded	8,442	2.1
OkD2	Oktibbeha clay loam, 3 to 8 percent slopes, eroded	23,676	5.9
OkE2	Oktibbeha clay loam, 8 to 15 percent slopes, eroded	8,438	2.1
OrB2	Orangeburg loamy sand, 2 to 5 percent slopes, eroded	185	0.1
Pt	Pits	145	*
ScA	Sucarnoochee silty clay, 0 to 1 percent slopes, frequently flooded	3,315	0.8
URA	Urbo and Riverview soils, 0 to 1 percent slopes, frequently flooded	22,887	5.7
VaA	Vaiden silty clay, 0 to 2 percent slopes	1,633	0.4
	Water areas more than 40 acres in size	1,200	0.3
	Total	401,000	100.0

* Less than 0.1 percent.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Soybeans	Peanuts	Grain sorghum	Wheat	Bahiagrass	Tall fescue	Improved bermudagrass
		Bu	Lbs	Bu	Bu	AUM*	AUM*	Tons
AgB------------- Alaga	IVs	---	1,800	60	30	7.0	---	4.0
BaE------------- Blanton	VIs	---	---	---	---	5.0	---	3.5
BbB------------- Blanton-Bonifay	IVs	24	2,500	80	40	7.0	---	5.0
CaB------------- Compass	IIe	25	3,000	90	50	7.5	---	7.0
CeB2------------ Conecuh	IVe	25	---	70	35	6.0	6.0	4.0
CeC2------------ Conecuh	VIe	---	---	---	---	5.0	---	3.5
CeE------------- Conecuh	VIIe	---	---	---	---	---	---	---
CoB2------------ Cowarts	IIIe	25	2,000	80	35	10.5	---	6.5
CuD2------------ Cowarts-Luverne	VIe	---	---	---	---	9.0	---	5.5
CuE------------- Cowarts-Luverne	VIIe	---	---	---	---	---	---	---
EaB------------- Eunola	IIe	35	3,100	85	45	9.0	8.0	7.0
GoA------------- Goldsboro	IIw	40	3,100	85	50	9.0	9.0	7.0
HoA------------- Houlka	IVw	30	---	80	---	---	8.0	---
KpB2------------ Kipling	IIIe	30	---	80	40	7.0	6.5	5.0
LnB------------- Luverne	IVe	25	2,000	75	40	8.0	---	5.0
LnE2------------ Luverne	VIIe	---	---	---	---	---	---	---
LoE-------------		---	---	---	---	---	---	---
Luverne--------	VIIe							
Blanton--------	VIs							
LtF-------------		---	---	---	---	---	---	---
Luverne--------	VIIe							
Blanton-------	VIs							
Cowarts-------	VIIe							

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Soybeans	Peanuts	Grain sorghum	Wheat	Bahiagrass	Tall fescue	Improved bermudagrass
		Bu	Lbs	Bu	Bu	AUM*	AUM*	Tons
LyA-------------		40	---	85	---	10.0	8.0	5.5
Lynchburg------	IIw							
Ocilla--------	IIIw							
MBA------------- Mantachie, Iuka and Bibb	Vw	---	---	---	---	---	7.0	---
MgB2------------ Maytag	IVe	25	---	75	40	---	6.5	---
MgD2------------ Maytag	VIe	---	---	---	---	---	5.5	---
MgE2------------ Maytag	VIe	---	---	---	---	---	5.0	---
MkE2------------ Maytag-Oktibbeha	VIIe	24	---	---	---	---	---	---
MnA------------- Minter	IVw	30	---	80	---	7.0	8.0	---
OcA------------- Ocilla	IIIw	35	2,200	90	40	7.5	7.5	4.0
OkB2------------ Oktibbeha	IIIe	25	---	80	40	5.0	7.0	---
OkD2------------ Oktibbeha	VIe	---	---	75	35	4.5	7.0	---
OkE2------------ Oktibbeha	VIe	---	---	---	---	4.5	6.5	---
OrB2------------ Orangeburg	IIe	40	3,600	90	50	10.5	---	7.0
Pt**------------ Pits	VIIIs	---	---	---	---	---	---	---
ScA------------- Sucarnoochee	IVw	30	---	80	---	6.0	6.0	---
URA------------- Urbo and Riverview	IVw	---	---	---	---	7.0	5.0	7.0
VaA------------- Vaiden	IIIw	30	---	80	40	7.0	4.5	4.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
AgB---------------- Alaga	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine-------	80 70	110 ---	Loblolly pine, longleaf pine.
BaE---------------- Blanton	10S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak----	95 85 85 ---	142 --- --- ---	Loblolly pine, longleaf pine.
BbB**:										
Blanton-----------	10S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak----	95 85 85 ---	142 --- --- ---	Loblolly pine, longleaf pine.
Bonifay-----------	8S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak----	85 75 85 ---	110 --- --- ---	Loblolly pine, longleaf pine.
CaB---------------- Compass	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine------- Longleaf pine------- Sweetgum------------	90 75 ---	131 --- ---	Loblolly pine, longleaf pine.
CeB2, CeC2--------- Conecuh	9C	Slight	Slight	Slight	Slight	Severe	Loblolly pine------- Water oak----------- Sweetgum------------ Shortleaf pine------	90 90 90 80	131 --- --- ---	Loblolly pine, water oak, sweetgum.
CeE---------------- Conecuh	9C	Moderate	Moderate	Slight	Slight	Severe	Loblolly pine------- Water oak----------- Sweetgum------------ Shortleaf pine------	90 90 90 80	131 --- --- ---	Loblolly pine, water oak, sweetgum.
CoB2--------------- Cowarts	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------	85 75	120 ---	Loblolly pine.
CuD2**:										
Cowarts-----------	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------	85 75	120 ---	Loblolly pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CuD2**:										
Luverne	9C	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
							Water oak	90	---	
CuE**:										
Cowarts	8A	Moderate	Moderate	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine.
							Shortleaf pine	75	---	
Luverne	9C	Moderate	Moderate	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
							Water oak	90	---	
EaB Eunola	9W	Slight	Moderate	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine, sweetgum, water oak, yellow-poplar.
							Sweetgum	90	---	
							Yellow-poplar	100	---	
							Water oak	90	---	
GoA Goldsboro	9A	Slight	Slight	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine, sweetgum, water oak.
							Sweetgum	90	---	
							Water oak	90	---	
HoA Houlka	11W	Slight	Severe	Severe	Moderate	Severe	Sweetgum	105	156	Sweetgum, American sycamore, green ash, water oak.
							Green ash	85	---	
							Water oak	105	---	
							American sycamore	110	---	
KpB2 Kipling	9C	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	85	120	Loblolly pine.
							Sweetgum	90	---	
							Water oak	85	---	
LnB Luverne	9C	Slight	Moderate	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Longleaf pine	70	---	
							Sweetgum	90	---	
LnE2 Luverne	9C	Moderate	Moderate	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
							Longleaf pine	70	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
LoE**:										
Luverne	9C	Moderate	Moderate	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
							Water oak	90	---	
Blanton	11S	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	95	142	Loblolly pine, longleaf pine.
							Longleaf pine	70	---	
							Shortleaf pine	85	---	
							Southern red oak	---	---	
LtF**:										
Luverne	9R	Severe	Severe	Slight	Slight	Severe	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
							Water oak	90	---	
Blanton	11S	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine	90	142	Loblolly pine, longleaf pine.
							Longleaf pine	70	---	
							Shortleaf pine	85	---	
							Southern red oak	---	---	
Cowarts	8R	Moderate	Moderate	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine.
							Shortleaf pine	75	---	
LyA**:										
Lynchburg	8W	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine, sweetgum, water oak.
							Shortleaf pine	75	---	
							Sweetgum	85	---	
							Water oak	---	---	
							Blackgum	---	---	
Ocilla	8W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	85	120	Loblolly pine.
							Longleaf pine	75	---	
MBA**:										
Mantachie	11W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	100	154	Loblolly pine, green ash, sweetgum, water oak, American sycamore.
							Green ash	80	---	
							Sweetgum	100	---	
							Water oak	100	---	
							American sycamore	100	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MBA**:										
Iuka	11W	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	100	154	Loblolly pine, sweetgum, water oak, American sycamore.
							Sweetgum	100	---	
							American sycamore	100	---	
							Water oak	100	---	
Bibb	9W	Slight	Severe	Severe	Moderate	Severe	Loblolly pine	100	131	Loblolly pine, sweetgum, water oak.
							Sweetgum	90	---	
							Water oak	90	---	
							Blackgum	---	---	
MgB2, MgD2, MgE2 Maytag	4C	Slight	Moderate	Moderate	Slight	Slight	Eastern redcedar	40	43	Eastern redcedar.
							Hackberry	---	---	
MkE2**:										
Maytag	4C	Slight	Moderate	Moderate	Slight	Slight	Eastern redcedar	40	43	Eastern redcedar.
							Hackberry	---	---	
Oktibbeha	8C	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	80	110	Loblolly pine.
							Shortleaf pine	70	---	
MnA Minter	9W	Slight	Severe	Severe	Moderate	Severe	Loblolly pine	90	131	Loblolly pine, sweetgum, water oak.
							Sweetgum	90	---	
							Water oak	90	---	
							Blackgum	---	---	
OcA Ocilla	8W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	85	120	Loblolly pine.
							Longleaf pine	75	---	
OkB2, OkD2, OkE2 Oktibbeha	8C	Slight	Moderate	Severe	Slight	Severe	Loblolly pine	80	131	Loblolly pine.
							Shortleaf pine	70	---	
							Eastern redcedar	45	---	
							Sweetgum	80	---	
OrB2 Orangeburg	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	90	131	Loblolly pine.
							Shortleaf pine	80	---	
							Sweetgum	90	---	
ScA Sucarnoochee	7W	Slight	Severe	Moderate	Slight	Severe	American sycamore	100	106	Sweetgum, green ash.
							Sweetgum	100	---	
							Green ash	80	---	
							Black tupelo	---	---	
							Water oak	90	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
URA**:										
Urbo	10W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	100	154	Loblolly pine, sweetgum, water oak, green ash.
							Water oak	100	---	
							Green ash	90	---	
							Sweetgum	100	---	
Riverview	9A	Slight	Slight	Slight	Slight	Severe	Loblolly pine	100	154	Loblolly pine, yellow-poplar, sweetgum, American sycamore, water oak.
							Yellow-poplar	110	---	
							Sweetgum	100	---	
							American sycamore	110	---	
							Water oak	100	---	
VaA: Vaiden	8C	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	80	110	Loblolly pine.
							Shortleaf pine	70	---	
							Eastern redcedar	45	---	

* Volume is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AgB------------------- Alaga	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
BaE------------------- Blanton	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
BbB*:					
Blanton--------------	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Bonifay--------------	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
CaB------------------- Compass	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
CeB2------------------ Conecuh	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Moderate: droughty.
CeC2------------------ Conecuh	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: droughty.
CeE------------------- Conecuh	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: droughty, slope.
CoB2------------------ Cowarts	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight----------	Moderate: droughty.
CuD2*:					
Cowarts--------------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: droughty, slope.
Luverne--------------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
CuE*:					
Cowarts--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Luverne--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
EaB------------------- Eunola	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
GoA------------------- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HoA------------------- Houlka	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: too clayey.	Severe: flooding, too clayey.
KpB2------------------ Kipling	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
LnB------------------- Luverne	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
LnE2------------------ Luverne	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
LoE*:					
Luverne--------------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Blanton--------------	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
LtF*:					
Luverne--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Blanton--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.
Cowarts--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LyA*:					
Lynchburg------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ocilla---------------	Severe: flooding.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
MBA*:					
Mantachie------------	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Iuka-----------------	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Bibb-----------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MgB2, MgD2------------ Maytag	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
MgE2------------------ Maytag	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: too clayey.
MkE2*:					
Maytag---------------	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.	Severe: too clayey.
Oktibbeha------------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: too clayey.	Severe: too clayey.
MnA------------------- Minter	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
OcA------------------- Ocilla	Severe: flooding.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
OkB2, OkD2------------ Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: too clayey.	Severe: too clayey.
OkE2------------------ Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: too clayey.	Severe: slope, too clayey.
OrB2------------------ Orangeburg	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Pt*------------------- Pits	Variable--------	Variable--------	Variable--------	Variable--------	Variable.
ScA------------------- Sucarnoochee	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
URA*:					
Urbo-----------------	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: too clayey.	Severe: flooding, too clayey.
Riverview------------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
VaA------------------- Vaiden	Severe: wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgB----------------- Alaga	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BaE----------------- Blanton	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BbB*:									
Blanton-----------	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Bonifay-----------	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
CaB----------------- Compass	Poor	Fair	Good	Fair	Poor	Poor	Fair	Fair	Poor
CeB2---------------- Conecuh	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor
CeC2, CeE---------- Conecuh	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CoB2---------------- Cowarts	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CuD2*:									
Cowarts-----------	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Luverne-----------	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CuE*:									
Cowarts-----------	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Luverne-----------	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EaB----------------- Eunola	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GoA----------------- Goldsboro	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
HoA----------------- Houlka	Poor	Fair	Fair	Good	Fair	Good	Fair	Good	Fair
KpB2---------------- Kipling	Fair	Good	Good	Good	Poor	Fair	Good	Good	Poor
LnB, LnE2---------- Luverne	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
LoE*:									
Luverne	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Blanton	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LtF*:									
Luverne	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Blanton	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Cowarts	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LyA*:									
Lynchburg	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair
Ocilla	Fair	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair
MBA*:									
Mantachie	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair
Iuka	Poor	Fair	Fair	Good	Poor	Poor	Fair	Good	Poor
Bibb	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
MgB2, MgD2 Maytag	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Very poor.
MgE2 Maytag	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MkE2*:									
Maytag	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Very poor.
Oktibbeha	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MnA Minter	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
OcA Ocilla	Fair	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair
OkB2 Oktibbeha	Fair	Fair	Fair	Good	Poor	Very poor.	Fair	Good	Poor
OkD2, OkE2 Oktibbeha	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.
OrB2 Orangeburg	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt* Pits	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ScA---------------- Sucarnoochee	Poor	Fair	Poor	Good	Fair	Fair	Poor	Fair	Fair
URA*:									
Urbo---------------	Poor	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair
Riverview----------	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
VaA---------------- Vaiden	Fair	Fair	Fair	Good	Poor	Fair	Fair	Good	Poor

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AgB--------------- Alaga	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
BaE--------------- Blanton	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
BbB*:						
Blanton----------	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Moderate: droughty.
Bonifay----------	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Moderate: droughty.
CaB--------------- Compass	Moderate: too clayey, wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
CeB2, CeC2-------- Conecuh	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: droughty.
CeE--------------- Conecuh	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: droughty, slope.
CoB2-------------- Cowarts	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
CuD2*:						
Cowarts----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Luverne----------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
CuE*:						
Cowarts----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Luverne----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
EaB--------------- Eunola	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
GoA--------------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HoA--------------- Houlka	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: flooding, too clayey.
KpB2-------------- Kipling	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
LnB--------------- Luverne	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
LnE2-------------- Luverne	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoE*:						
Luverne----------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Blanton----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
LtF*:						
Luverne----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Blanton----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cowarts----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LyA*:						
Lynchburg--------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Ocilla-----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: wetness, flooding.	Moderate: wetness, droughty.
MBA*:						
Mantachie--------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Iuka-------------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Bibb-------------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MgB2, MgD2-------- Maytag	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Severe: too clayey.
MgE2-------------- Maytag	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.	Severe: too clayey.
MkE2*:						
Maytag-----------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Severe: too clayey.
Oktibbeha--------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
MnA--------------- Minter	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
OcA--------------- Ocilla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: wetness, flooding.	Moderate: wetness, droughty.
OkB2, OkD2-------- Oktibbeha	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
OkE2-------------- Oktibbeha	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
OrB2-------------- Orangeburg	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
Pt*--------------- Pits	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
ScA--------------- Sucarnoochee	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
URA*:						
Urbo-------------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding, too clayey.
Riverview--------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
VaA--------------- Vaiden	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Severe: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgB: Alaga	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BaE: Blanton	Moderate: wetness, slope.	Severe: seepage, slope.	Moderate: slope, too sandy.	Severe: seepage.	Fair: too sandy, slope.
BbB*:					
Blanton	Moderate: wetness.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Fair: too sandy.
Bonifay	Moderate: wetness, percs slowly.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Fair: too sandy.
CaB: Compass	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: wetness, thin layer.
CeB2, CeC2: Conecuh	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
CeE: Conecuh	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
CoB2: Cowarts	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
CuD2*:					
Cowarts	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Luverne	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
CuE*:					
Cowarts	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Luverne	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EaB: Eunola	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GoA----------------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness, too acid.	Severe: wetness.	Fair: wetness.
HoA----------------- Houlka	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
KpB2---------------- Kipling	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
LnB----------------- Luverne	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
LnE2---------------- Luverne	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
LoE*:					
Luverne------------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Blanton------------	Moderate: wetness, slope.	Severe: seepage, slope.	Moderate: slope, too sandy.	Severe: seepage.	Fair: too sandy, slope.
LtF*:					
Luverne------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Blanton------------	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
Cowarts------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
LyA*:					
Lynchburg----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ocilla-------------	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
MBA*:					
Mantachie----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Iuka---------------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MBA*:					
Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: small stones, wetness.
MgB2, MgD2 Maytag	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
MgE2 Maytag	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MkE2*:					
Maytag	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Oktibbeha	Severe: percs slowly.	Severe: slope.	Severe: too clayey, too acid.	Slight	Poor: too clayey, hard to pack.
MnA Minter	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
OcA Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
OkB2, OkD2 Oktibbeha	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, too acid.	Slight	Poor: too clayey, hard to pack.
OkE2 Oktibbeha	Severe: percs slowly.	Severe: slope.	Severe: too clayey, too acid.	Moderate: slope.	Poor: too clayey, hard to pack.
OrB2 Orangeburg	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
Pt* Pits	Variable	Variable	Variable	Variable	Variable.
ScA Sucarnoochee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
URA*:					
Urbo	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Riverview	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
VaA----------------- Vaiden	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgB------------------- Alaga	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
BaE------------------- Blanton	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: too sandy, slope.
BbB*:				
Blanton--------------	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: too sandy.
Bonifay--------------	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: too sandy.
CaB------------------- Compass	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CeB2, CeC2, CeE------- Conecuh	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CoB2------------------ Cowarts	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
CuD2*:				
Cowarts--------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Luverne--------------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CuE*:				
Cowarts--------------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Luverne--------------	Poor: slope, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
EaB------------------- Eunola	Fair: wetness.	Probable-------------	Improbable: too sandy.	Fair: too clayey, small stones, thin layer.
GoA------------------- Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too acid.
HoA------------------- Houlka	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
KpB2 Kipling	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LnB, LnE2 Luverne	Poor: slope, shrink-swell, too clayey.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LoE*: Luverne	Poor: shrink-swell, too clayey.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Blanton	Good	Probable	Improbable: too sandy.	Fair: too sandy, slope.
LtF*: Luverne	Poor: slope, shrink-swell, too clayey.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Blanton	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope.
Cowarts	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
LyA*: Lynchburg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
MBA*: Mantachie	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
MgB2, MgD2, MgE2 Maytag	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MkE2*: Maytag	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MkE2*:				
Oktibbeha	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MnA: Minter	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
OcA: Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
OkB2, OkD2, OkE2: Oktibbeha	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
OrB2: Orangeburg	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Pt*: Pits	Variable	Variable	Variable	Variable.
ScA: Sucarnoochee	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
URA*:				
Urbo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Riverview	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
VaA: Vaiden	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AgB: Alaga	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
BaE: Blanton	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
BbB*:						
Blanton	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
Bonifay	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
CaB: Compass	Severe: seepage.	Severe: piping.	Favorable	Droughty	Wetness, soil blowing.	Droughty, rooting depth.
CeB2, CeC2: Conecuh	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, droughty.	Percs slowly	Droughty.
CeE: Conecuh	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, droughty.	Slope, percs slowly.	Slope, droughty.
CoB2: Cowarts	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Soil blowing, percs slowly.	Droughty, rooting depth.
CuD2*, CuE*:						
Cowarts	Severe: slope.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Slope, percs slowly.	Slope, droughty, rooting depth.
Luverne	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
EaB: Eunola	Severe: seepage.	Severe: piping, wetness.	Favorable	Wetness, fast intake.	Wetness, soil blowing.	Favorable.
GoA: Goldsboro	Moderate: seepage.	Moderate: piping, wetness.	Too acid	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty, rooting depth.
HoA: Houlka	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
KpB2: Kipling	Slight	Severe: hard to pack.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
LnB------------- Luverne	Moderate: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
LnE2------------- Luverne	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
LoE*:						
Luverne----------	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Blanton----------	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
LtF*:						
Luverne----------	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Blanton----------	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy.	Slope, droughty.
Cowarts----------	Severe: slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, percs slowly.	Slope, droughty, rooting depth.
LyA*:						
Lynchburg--------	Moderate: seepage.	Severe: piping, wetness.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
Ocilla-----------	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty.
MBA*:						
Mantachie--------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
Iuka-------------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Erodes easily, wetness.	Erodes easily, wetness.
Bibb-------------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
MgB2------------- Maytag	Slight---------	Severe: hard to pack.	Deep to water	Slow intake, percs slowly.	Percs slowly---	Percs slowly.
MgD2------------- Maytag	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, slow intake, percs slowly.	Percs slowly---	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MgE2: Maytag	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, slow intake, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
MkE2*:						
Maytag	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, slow intake, percs slowly.	Percs slowly	Percs slowly.
Oktibbeha	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Percs slowly	Percs slowly.
MnA: Minter	Slight	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
OcA: Ocilla	Severe: seepage.	Severe: piping, wetness.	Favorable	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty.
OkB2: Oktibbeha	Slight	Severe: hard to pack.	Deep to water	Percs slowly	Percs slowly	Percs slowly.
OkD2: Oktibbeha	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Percs slowly	Percs slowly.
OkE2: Oktibbeha	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
OrB2: Orangeburg	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Fast intake, slope.	Soil blowing	Favorable.
Pt*: Pits	Variable	Variable	Variable	Variable	Variable	Variable.
ScA: Sucarnoochee	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
URA*:						
Urbo	Slight	Severe: wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Riverview	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Soil blowing	Favorable.
VaA: Vaiden	Slight	Severe: hard to pack.	Percs slowly	Wetness, slow intake.	Wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
AgB-------------- Alaga	0-7	Loamy sand-------	SM, SW-SM, SP-SM	A-2, A-1-b	100	100	40-80	10-35	<25	NP-4
	7-80	Loamy sand, sand.	SM, SW-SM, SP-SM	A-2	100	100	50-85	10-35	<25	NP-4
BaE-------------- Blanton	0-46	Loamy sand-------	SM	A-2-4	100	95-100	85-100	13-25	---	NP
	46-70	Sandy clay loam, sandy loam.	SC, SC-SM, SM	A-4, A-2-4, A-2-6, A-6	100	95-100	69-100	25-50	12-45	3-22
BbB*:										
Blanton---------	0-46	Loamy sand-------	SM	A-2-4	100	95-100	85-100	13-25	---	NP
	46-70	Sandy clay loam, sandy loam.	SC, SC-SM, SM	A-4, A-2-4, A-2-6, A-6	100	95-100	69-100	25-50	12-45	3-22
Bonifay---------	0-53	Loamy sand-------	SM	A-2-4	98-100	98-100	65-95	13-20	---	NP
	53-62	Sandy loam, sandy clay loam, fine sandy loam.	SC-SM, SC, SM	A-2-4, A-4, A-2-6, A-6	95-100	90-100	63-95	23-50	<30	NP-12
	62-70	Sandy clay loam	SC-SM, SC	A-2, A-4, A-6, A-7	95-100	90-100	60-95	30-50	25-45	5-22
CaB-------------- Compass	0-17	Loamy fine sand	SM	A-2-4	95-100	95-100	75-95	13-25	---	NP
	17-32	Sandy loam, fine sandy loam.	SM	A-2-4	95-100	95-100	75-95	20-30	<10	NP-3
	32-62	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC-SM, SC	A-2-4, A-2-6, A-4, A-6	100	100	90-100	20-50	<30	NP-15
CeB2------------- Conecuh	0-5	Sandy loam-------	SM, ML, CL-ML, SC-SM	A-4	95-100	95-100	70-100	40-70	<20	NP-5
	5-9	Clay loam, clay, silty clay loam.	ML, MH, CL, CH	A-7, A-6	95-100	95-100	85-100	70-95	35-65	10-32
	9-50	Clay, silty clay	ML, MH, CH	A-7	95-100	95-100	90-100	80-98	45-70	15-45
	50-63	Variable---------	---	---	---	---	---	---	---	---
CeC2------------- Conecuh	0-3	Sandy loam-------	SM, ML, CL-ML, SC-SM	A-4	95-100	95-100	70-100	40-70	<20	NP-5
	3-61	Clay, silty clay	ML, MH, CH	A-7	95-100	95-100	90-100	80-98	45-70	15-45
	61-72	Variable---------	---	---	---	---	---	---	---	---
CeE-------------- Conecuh	0-5	Sandy loam-------	SM, ML, CL-ML, SC-SM	A-4	95-100	95-100	70-100	40-70	<20	NP-5
	5-35	Clay, silty clay	ML, MH, CH	A-7	95-100	95-100	90-100	80-98	45-70	15-45
	35-72	Variable---------	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
CoB2------------- Cowarts	0-5	Loamy sand-------	SM	A-2	90-100	85-100	50-80	13-30	---	NP
	5-20	Fine sandy loam, sandy loam, sandy clay loam.	SC-SM, SC, SM	A-2, A-4, A-6	95-100	90-100	60-95	23-45	20-40	NP-15
	20-40	Sandy clay loam, sandy clay, clay loam.	SM, SC	A-6, A-7, A-2-6	95-100	90-100	60-95	25-50	20-54	5-25
	40-64	Sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6, A-7	85-100	80-100	60-95	25-58	25-53	5-20
CuD2*:										
Cowarts---------	0-4	Loamy sand-------	SM	A-2	90-100	85-100	50-80	13-30	---	NP
	4-36	Sandy clay loam, sandy clay, clay loam.	SM, SC	A-6, A-7, A-2-6	95-100	90-100	60-95	25-50	20-54	5-25
	36-60	Sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6, A-7	85-100	80-100	60-95	25-58	25-53	5-20
Luverne---------	0-6	Loamy sand-------	SM	A-2, A-4	85-100	80-95	60-90	19-45	---	NP
	6-23	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	23-40	Clay loam, sandy clay loam.	ML, MH, SM	A-4, A-5, A-7	95-100	85-100	85-100	36-76	32-56	2-14
	40-62	Stratified loamy sand to sandy clay loam.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-49	3-16
CuE*:										
Cowarts---------	0-6	Loamy sand-------	SM	A-2	90-100	85-100	50-80	13-30	---	NP
	6-12	Fine sandy loam, sandy loam, sandy clay loam.	SC-SM, SC, SM	A-2, A-4, A-6	95-100	90-100	60-95	23-45	20-40	NP-15
	12-36	Sandy clay loam, sandy clay, clay loam.	SM, SC	A-6, A-7, A-2-6	95-100	90-100	60-95	25-50	20-54	5-25
	36-65	Sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6, A-7	85-100	80-100	60-95	25-58	25-53	5-20
Luverne---------	0-10	Loamy sand-------	SM	A-2, A-4	85-100	80-95	60-90	19-45	---	NP
	10-32	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	32-49	Clay loam, sandy clay loam.	ML, MH, SM	A-4, A-5, A-7	95-100	85-100	85-100	36-76	32-56	2-14
	49-62	Stratified loamy sand to sandy clay loam.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-49	3-16
EaB-------------- Eunola	0-14	Loamy sand-------	SM, SP-SM	A-2, A-4, A-2-4	100	98-100	50-80	10-38	---	NP
	14-27	Sandy clay loam, clay loam, sandy loam.	SM, SC, SC-SM, CL	A-4, A-2, A-6	100	90-100	75-95	30-60	<36	NP-15
	27-42	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6, A-7	100	98-100	80-95	36-60	22-50	3-26
	42-64	Sandy loam, sandy clay loam.	SM, SC, SC-SM	A-2, A-4	100	98-100	60-70	30-40	<30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
GoA-------------- Goldsboro	0-9	Loamy fine sand	SM	A-2	95-100	95-100	50-95	13-30	10-20	NP
	9-22	Sandy clay loam, sandy loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	98-100	95-100	60-100	25-55	20-37	4-18
	22-60	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	95-100	90-100	65-95	36-70	25-55	6-32
HoA-------------- Houlka	0-5	Clay-------------	CH, CL	A-7	100	100	90-100	75-95	45-70	32-45
	5-62	Clay, silty clay, clay loam.	CH	A-7	100	100	95-100	80-97	52-75	30-50
KpB2------------- Kipling	0-5	Fine sandy loam	SC-SM, SM, ML, CL-ML	A-4	100	100	70-85	40-55	<25	NP-7
	5-55	Silty clay, clay, clay loam.	CH, CL	A-7, A-6	100	100	95-100	85-95	38-70	22-45
	55-65	Clay, silty clay	CH, CL	A-7	100	100	90-100	75-95	48-80	26-50
LnB-------------- Luverne	0-12	Loamy sand-------	SM	A-2, A-4	85-100	80-95	60-90	19-45	---	NP
	12-48	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	48-64	Stratified loamy sand to clay.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-49	3-16
LnE2------------- Luverne	0-6	Loamy sand-------	SM	A-2, A-4	85-100	80-95	60-90	19-45	---	NP
	6-20	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	20-35	Clay loam, sandy clay loam.	ML, MH, SM	A-4, A-5, A-7	95-100	85-100	85-100	36-76	32-56	2-14
	35-64	Stratified loamy sand to clay.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-49	3-16
LoE*:										
Luverne---------	0-6	Loamy sand-------	SM	A-2, A-4	85-100	80-95	60-90	19-45	---	NP
	6-43	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	43-62	Stratified loamy sand to clay.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-49	3-16
Blanton---------	0-58	Loamy sand-------	SM	A-2-4	100	95-100	85-100	13-25	---	NP
	58-65	Sandy clay loam, sandy loam, sandy clay.	SC, SC-SM, SM	A-4, A-2-4, A-2-6, A-6	100	95-100	69-100	25-50	12-45	3-22
LtF*:										
Luverne---------	0-9	Sandy loam-------	ML, SM	A-4, A-2	87-100	84-100	80-100	30-60	<20	NP
	9-33	Clay loam, sandy clay, clay.	ML, MH	A-5, A-7, A-4	95-100	90-100	85-100	50-95	38-70	8-30
	33-41	Clay loam, sandy clay loam.	ML, MH, SM	A-4, A-5, A-7	95-100	85-100	85-100	36-76	32-56	2-14
	41-62	Stratified loamy sand to clay.	SM, ML	A-4, A-6, A-2, A-7	90-100	85-100	70-100	25-65	28-70	3-30
Blanton---------	0-50	Loamy sand-------	SM	A-2-4	100	95-100	85-100	13-25	---	NP
	50-62	Sandy clay loam, sandy loam, sandy clay.	SC, SC-SM, SM	A-4, A-2-4, A-2-6, A-6	100	95-100	69-100	25-50	12-45	3-22

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
LtF*:										
Cowarts---------	0-7	Sandy loam-------	SM, SC-SM	A-2, A-4	95-100	90-100	75-90	20-40	<20	NP-5
	7-37	Sandy clay loam, sandy clay, clay loam.	SM, SC	A-6, A-7, A-2-6	95-100	90-100	60-95	25-50	20-54	5-25
	37-62	Sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6, A-7	85-100	80-100	60-95	25-58	25-53	5-20
LyA*:										
Lynchburg-------	0-15	Loamy sand, fine sandy loam.	SM, ML	A-2, A-4	92-100	90-100	75-100	25-65	<30	NP-7
	15-62	Sandy clay loam, sandy loam, clay loam.	SC-SM, SC, CL, CL-ML	A-2, A-4, A-6	92-100	90-100	70-100	25-67	18-40	4-18
	65-80	Sandy clay loam, sandy clay, clay.	SC-SM, SC, CL, CL-ML	---	95-100	92-100	70-100	25-73	15-40	4-20
Ocilla----------	0-36	Loamy fine sand	SM, SP-SM	A-2, A-3	100	95-100	75-100	8-35	---	NP
	36-75	Sandy loam, sandy clay loam, fine sandy loam.	SM, CL, SC, ML	A-2, A-4, A-6	100	95-100	80-100	20-55	20-40	NP-18
MBA*:										
Mantachie-------	0-3	Clay loam--------	CL-ML, CL	A-4, A-6	100	100	90-100	70-80	20-40	5-15
	3-62	Loam, clay loam, sandy clay loam.	CL, SC, SC-SM, CL-ML	A-4, A-6	95-100	90-100	80-95	45-80	20-40	5-15
Iuka------------	0-3	Loam------------	ML, CL-ML	A-4	95-100	95-100	80-95	50-80	<30	NP-7
	3-30	Fine sandy loam, loam, sandy loam.	SM, SC-SM, ML, CL-ML	A-4	95-100	85-100	65-100	36-75	<30	NP-7
	30-65	Sandy loam, fine sandy loam, loam.	SM, ML	A-2, A-4	95-100	90-100	70-100	25-60	<30	NP-7
Bibb------------	0-6	Sandy loam-------	SM, SC-SM, ML, CL-ML	A-2, A-4	95-100	90-100	60-90	30-60	<25	NP-7
	6-62	Sandy loam, loam, loamy sand.	SM, SC-SM, ML, CL-ML	A-2, A-4	60-100	50-100	40-100	30-90	<30	NP-7
MgB2------------- Maytag	0-7	Silty clay-------	CH, MH	A-7	98-100	95-100	90-100	85-98	50-70	20-35
	7-53	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	85-98	60-95	30-60
	53-65	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	75-98	60-95	30-60
MgD2------------- Maytag	0-6	Silty clay-------	CH, MH	A-7	98-100	95-100	90-100	85-98	50-70	20-35
	6-38	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	85-98	60-95	30-60
	38-72	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	75-98	60-95	30-60
MgE2------------- Maytag	0-4	Silty clay-------	CH, MH	A-7	98-100	95-100	90-100	85-98	50-70	20-35
	4-49	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	85-98	55-95	24-60
	49-62	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	75-98	60-95	30-60

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
MkE2*:										
Maytag----------	0-3	Silty clay-------	CH, MH	A-7	98-100	95-100	90-100	85-98	50-70	20-35
	3-34	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	85-98	60-95	30-60
	34-60	Silty clay, clay, silty clay loam.	CH, MH	A-7	98-100	95-100	90-100	75-98	60-95	30-60
Oktibbeha-------	0-3	Clay loam--------	CL	A-6, A-7	100	100	90-100	75-95	32-50	20-30
	3-50	Clay-------------	CH	A-7	100	100	95-100	95-100	55-75	35-50
	50-60	Clay, silty clay	CL	A-7	100	100	90-100	90-100	42-65	30-45
MnA-------------- Minter	0-13	Loam-------------	CL, ML, CL-ML	A-4, A-6	100	100	80-100	65-95	26-40	5-18
	13-65	Clay loam, silty clay, clay.	CL, CH	A-6, A-7	100	100	90-100	75-95	37-59	18-32
OcA-------------- Ocilla	0-36	Loamy fine sand	SM, SP-SM	A-2, A-3	100	95-100	75-100	8-35	---	NP
	36-75	Sandy loam, sandy clay loam, fine sandy loam.	SM, CL, SC, ML	A-2, A-4, A-6	100	95-100	80-100	20-55	20-40	NP-18
OkB2------------- Oktibbeha	0-3	Clay loam--------	CL	A-6, A-7	100	100	90-100	75-95	32-50	20-30
	3-45	Clay-------------	CH	A-7	100	100	95-100	95-100	55-75	35-50
	45-80	Clay, silty clay	CL	A-7	100	100	90-100	90-100	42-65	30-45
OkD2------------- Oktibbeha	0-4	Clay loam--------	CL	A-6, A-7	100	100	90-100	75-95	32-50	20-30
	4-48	Clay-------------	CH	A-7	100	100	95-100	95-100	55-75	35-50
	48-65	Clay, silty clay	CL	A-7	100	100	90-100	90-100	42-65	30-45
OkE2------------- Oktibbeha	0-2	Clay loam--------	CL	A-6, A-7	100	100	90-100	75-95	32-50	20-30
	2-48	Clay-------------	CH	A-7	100	100	95-100	95-100	55-75	35-50
	48-65	Clay, silty clay	CL	A-7	100	100	90-100	90-100	42-65	30-45
OrB2------------- Orangeburg	0-5	Loamy sand-------	SM	A-2	98-100	95-100	60-87	14-28	---	NP
	5-29	Sandy clay loam, sandy loam.	SC, CL, SM, SC-SM	A-6, A-4	98-100	95-100	71-96	38-58	22-40	3-19
	29-64	Sandy clay loam, sandy clay, sandy loam.	SC, CL	A-6, A-4, A-7	98-100	95-100	70-97	40-65	24-46	8-21
Pt*-------------- Pits	0-60	Variable---------	---	---	---	---	---	---	---	---
ScA-------------- Sucarnoochee	0-10	Silty clay-------	CL, CH, MH	A-7	98-100	95-100	90-100	85-95	40-65	15-35
	10-38	Silty clay, clay	MH, CH, CL	A-7	98-100	95-100	90-100	85-98	45-70	20-40
	38-64	Silty clay, clay	CH, MH	A-7	98-100	95-100	90-100	85-98	50-80	25-45
URA*:										
Urbo------------	0-15	Clay loam--------	CL, CH	A-7	100	100	95-100	80-98	44-62	20-36
	15-65	Silty clay, clay loam, silty clay loam.	CL, CH	A-7	100	100	95-100	80-98	44-62	20-36

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
URA*:										
Riverview-------	0-4	Sandy loam-------	ML, SM, CL-ML, SC-SM	A-2, A-4	95-100	90-100	85-95	30-60	<20	NP-7
	4-58	Sandy clay loam, silty clay loam, loam.	CL, ML, CL-ML	A-4, A-6	100	100	90-100	60-95	20-40	3-20
	58-70	Loamy fine sand, sandy loam, sand.	SM, SC-SM	A-2, A-4	100	100	50-95	15-45	<20	NP-7
VaA--------------	0-6	Silty clay-------	MH, CH	A-7	100	100	95-100	90-100	50-60	20-30
Vaiden	6-33	Clay-------------	CH, MH	A-7	100	100	95-100	85-100	50-90	30-50
	33-65	Clay, silty clay	CH	A-7	95-100	95-100	90-100	85-100	50-90	30-52

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AgB-------------- Alaga	0-7	2-12	1.60-1.75	6.0-20	0.05-0.09	3.6-6.0	Low----------	0.10	5	.5-3
	7-80	2-12	1.60-1.75	6.0-20	0.05-0.09	3.6-6.0	Low----------	0.10		
BaE-------------- Blanton	0-46	5-13	1.35-1.60	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10	5	.5-2
	46-59	10-18	1.50-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.15		
	59-70	12-35	1.60-1.70	0.2-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
BbB*:										
Blanton---------	0-46	5-13	1.35-1.60	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10	5	.5-2
	46-59	10-18	1.50-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.15		
	59-70	12-35	1.60-1.70	0.2-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
Bonifay---------	0-53	6-12	1.50-1.60	6.0-20	0.05-0.10	4.5-6.5	Low----------	0.10	5	.5-3
	53-62	15-35	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.5	Low----------	0.24		
	62-70	20-45	1.60-1.70	0.2-0.6	0.10-0.15	4.5-6.5	Low----------	0.24		
CaB-------------- Compass	0-17	6-12	1.45-1.65	6.0-20	0.05-0.10	4.5-5.5	Low----------	0.15	5	1-3
	17-32	10-18	1.40-1.60	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.20		
	32-62	15-35	1.55-1.75	0.2-0.6	0.10-0.15	4.5-5.5	Low----------	0.28		
CeB2------------- Conecuh	0-5	7-25	1.40-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low----------	0.28	5	.5-2
	5-9	35-50	1.35-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate-----	0.32		
	9-50	45-70	1.30-1.55	<0.06	0.08-0.19	3.6-5.5	High---------	0.32		
	50-63	---	---	<0.06	---	---	-------------	----		
CeC2------------- Conecuh	0-3	7-25	1.40-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low----------	0.28	5	.5-2
	3-61	45-70	1.30-1.55	<0.06	0.08-0.19	3.6-5.5	High---------	0.32		
	61-72	---	---	<0.06	---	---	-------------	----		
CeE-------------- Conecuh	0-5	7-25	1.40-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low----------	0.28	5	.5-2
	5-35	45-70	1.30-1.55	<0.06	0.08-0.19	3.6-5.5	High---------	0.32		
	35-72	---	---	<0.06	---	---	-------------	----		
CoB2------------- Cowarts	0-5	3-10	1.30-1.70	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.15	4	.5-2
	5-20	10-30	1.30-1.50	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	20-40	25-40	1.30-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	40-64	18-35	1.65-1.80	0.06-0.6	0.10-0.14	4.5-5.5	Low----------	0.24		
CuD2*:										
Cowarts---------	0-4	3-10	1.30-1.70	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.15	4	.5-2
	4-36	25-40	1.30-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	36-60	18-35	1.65-1.80	0.06-0.6	0.10-0.14	4.5-5.5	Low----------	0.24		
Luverne---------	0-6	2-12	1.40-1.70	2.0-6.0	0.06-0.12	3.6-5.5	Low----------	0.15	5	.5-1
	6-23	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	23-40	20-40	1.35-1.65	0.2-0.6	0.12-0.18	3.6-5.5	Low----------	0.28		
	40-62	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
CuE*:										
Cowarts---------	0-6	3-10	1.30-1.70	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.15	4	.5-2
	6-12	10-30	1.30-1.50	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	12-36	25-40	1.30-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	36-65	18-35	1.65-1.80	0.06-0.6	0.10-0.14	4.5-5.5	Low----------	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CuE*:										
Luverne---------	0-10	2-12	1.40-1.70	2.0-6.0	0.06-0.12	3.6-5.5	Low----------	0.15	5	.5-1
	10-32	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	32-49	20-40	1.35-1.65	0.2-0.6	0.12-0.18	3.6-5.5	Low----------	0.28		
	49-62	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
EaB-------------- Eunola	0-14	3-11	1.45-1.70	2.0-6.0	0.06-0.11	4.5-5.5	Low----------	0.15	5	.5-2
	14-27	18-35	1.35-1.65	0.6-2.0	0.12-0.17	4.5-5.5	Low----------	0.28		
	27-42	18-45	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32		
	42-64	8-25	1.35-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low----------	0.24		
GoA-------------- Goldsboro	0-9	2-8	1.55-1.75	6.0-20	0.06-0.11	3.5-5.5	Low----------	0.17	5	.5-2
	9-22	10-30	1.30-1.50	0.6-2.0	0.11-0.17	3.5-5.5	Low----------	0.24		
	22-60	20-40	1.30-1.40	0.6-2.0	0.11-0.20	3.5-5.5	Low----------	0.24		
HoA-------------- Houlka	0-5	40-55	1.45-1.65	0.6-2.0	0.18-0.22	4.5-5.5	High---------	0.32	5	.5-1
	5-62	35-55	1.40-1.60	<0.06	0.18-0.20	4.5-5.5	High---------	0.32		
KpB2------------- Kipling	0-5	12-18	1.50-1.55	0.06-2.0	0.12-0.18	3.6-6.0	Low----------	0.28	5	.5-2
	5-55	36-60	1.37-1.41	0.06-0.2	0.20-0.22	3.6-8.4	High---------	0.32		
	55-65	40-60	1.57-1.60	<0.06	0.18-0.20	4.5-8.4	Very high----	0.32		
LnB-------------- Luverne	0-12	2-12	1.40-1.70	2.0-6.0	0.06-0.12	3.6-5.5	Low----------	0.15	5	.5-1
	12-48	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	48-64	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
LnE2------------- Luverne	0-6	2-12	1.40-1.70	2.0-6.0	0.06-0.12	3.6-5.5	Low----------	0.15	5	.5-1
	6-20	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	20-35	20-40	1.35-1.65	0.2-0.6	0.12-0.18	3.6-5.5	Low----------	0.28		
	35-64	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
LoE*:										
Luverne---------	0-6	2-12	1.40-1.70	2.0-6.0	0.06-0.12	3.6-5.5	Low----------	0.15	5	.5-1
	6-43	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	43-62	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
Blanton---------	0-58	5-13	1.35-1.60	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10	5	.5-2
	58-65	12-40	1.60-1.70	0.2-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
LtF*:										
Luverne---------	0-9	7-20	1.35-1.65	2.0-6.0	0.11-0.15	3.6-5.5	Low----------	0.24	5	.5-1
	9-33	35-50	1.25-1.55	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	33-41	20-40	1.35-1.65	0.2-0.6	0.12-0.18	3.6-5.5	Low----------	0.28		
	41-62	10-35	1.35-1.65	0.2-0.6	0.05-0.10	3.6-5.5	Low----------	0.28		
Blanton---------	0-50	5-13	1.35-1.60	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10	5	.5-2
	50-62	12-40	1.60-1.70	0.2-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
Cowarts---------	0-7	5-20	1.30-1.65	2.0-6.0	0.08-0.13	4.5-5.5	Low----------	0.24	4	1-3
	7-37	25-40	1.30-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	37-62	18-35	1.65-1.80	0.06-0.6	0.10-0.14	4.5-5.5	Low----------	0.24		
LyA*:										
Lynchburg-------	0-15	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low----------	0.20	5	.5-5
	15-62	19-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.20		
	65-80	20-50	1.30-1.45	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.20		
Ocilla----------	0-36	4-10	1.45-1.65	2.0-20	0.05-0.08	4.5-5.5	Low----------	0.10	5	1-2
	36-75	15-35	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low----------	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
MBA*:										
Mantachie-------	0-3	28-32	1.50-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.28	5	1-3
	3-62	18-34	1.50-1.60	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.28		
Iuka------------	0-3	6-15	---	0.6-2.0	0.15-0.20	5.1-6.0	Low----------	0.37	5	.5-2
	3-30	8-18	---	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	30-65	5-15	---	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.20		
Bibb------------	0-6	2-18	1.50-1.70	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.20	5	1-3
	6-62	2-18	1.45-1.75	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.37		
MgB2------------- Maytag	0-7	40-60	1.15-1.55	0.06-0.2	0.14-0.18	6.1-8.4	High---------	0.32	5	2-5
	7-53	35-60	1.15-1.50	0.06-0.2	0.12-0.17	6.6-8.4	High---------	0.32		
	53-65	35-70	1.15-1.50	0.06-0.2	0.12-0.17	7.4-8.4	High---------	0.32		
MgD2------------- Maytag	0-6	40-60	1.15-1.55	0.06-0.2	0.14-0.18	6.1-8.4	High---------	0.32	5	2-5
	6-38	35-60	1.15-1.50	0.06-0.2	0.12-0.17	6.6-8.4	High---------	0.32		
	38-72	35-70	1.15-1.50	0.06-0.2	0.12-0.17	7.4-8.4	High---------	0.32		
MgE2------------- Maytag	0-4	40-60	1.15-1.55	0.06-0.2	0.14-0.18	6.1-8.4	High---------	0.32	5	2-5
	4-49	35-60	1.15-1.50	0.06-0.2	0.12-0.17	6.6-8.4	High---------	0.32		
	49-62	35-70	1.15-1.50	0.06-0.2	0.12-0.17	7.4-8.4	High---------	0.32		
MkE2*:										
Maytag----------	0-3	40-60	1.15-1.55	0.06-0.2	0.14-0.18	6.1-8.4	High---------	0.32	5	2-5
	3-34	35-60	1.15-1.50	0.06-0.2	0.12-0.17	6.6-8.4	High---------	0.32		
	34-60	35-70	1.15-1.50	0.06-0.2	0.12-0.17	7.4-8.4	High---------	0.32		
Oktibbeha-------	0-3	30-40	1.10-1.40	0.06-0.2	0.13-0.17	4.5-7.3	Moderate-----	0.32	5	2-7
	3-50	60-80	1.00-1.30	0.00-0.06	0.12-0.16	3.5-6.5	Very high----	0.32		
	50-60	50-70	1.10-1.40	0.00-0.06	0.05-0.10	6.6-8.4	Very high----	0.32		
MnA-------------- Minter	0-13	14-27	1.45-1.65	0.6-2.0	0.16-0.22	4.5-5.5	Low----------	0.37	5	1-3
	13-65	35-50	1.35-1.65	0.06-0.2	0.14-0.20	4.5-5.5	Moderate-----	0.32		
OcA-------------- Ocilla	0-36	4-10	1.45-1.65	2.0-20	0.05-0.08	4.5-5.5	Low----------	0.10	5	1-2
	36-75	15-35	1.55-1.70	0.6-2.0	0.09-0.12	4.5-5.5	Low----------	0.24		
OkB2------------- Oktibbeha	0-3	30-40	1.10-1.40	0.06-0.2	0.13-0.17	4.5-7.3	Moderate-----	0.32	5	2-7
	3-45	60-80	1.00-1.30	0.00-0.06	0.12-0.16	3.5-6.5	Very high----	0.32		
	45-80	50-70	1.10-1.40	0.00-0.06	0.05-0.10	6.6-8.4	Very high----	0.32		
OkD2------------- Oktibbeha	0-4	30-40	1.10-1.40	0.06-0.2	0.13-0.17	4.5-7.3	Moderate-----	0.32	5	2-7
	4-48	60-80	1.00-1.30	0.00-0.06	0.12-0.16	3.5-6.5	Very high----	0.32		
	48-65	50-70	1.10-1.40	0.00-0.06	0.05-0.10	6.6-8.4	Very high----	0.32		
OkE2------------- Oktibbeha	0-2	30-40	1.10-1.40	0.06-0.2	0.13-0.17	4.5-7.3	Moderate-----	0.32	5	2-7
	2-48	60-80	1.00-1.30	0.00-0.06	0.12-0.16	3.5-6.5	Very high----	0.32		
	48-65	50-70	1.10-1.40	0.00-0.06	0.05-0.10	6.6-8.4	Very high----	0.32		
OrB2------------- Orangeburg	0-5	4-10	1.35-1.55	2.0-6.0	0.06-0.09	4.5-6.0	Low----------	0.10	5	.5-1
	5-29	18-35	1.60-1.75	0.6-2.0	0.11-0.14	4.5-5.5	Low----------	0.24		
	29-64	20-45	1.60-1.75	0.6-2.0	0.11-0.14	4.5-5.5	Low----------	0.24		
Pt*-------------- Pits	0-60	---	---	---	---	---	-------------	----	---	---
ScA-------------- Sucarnoochee	0-10	30-60	1.20-1.50	0.06-0.2	0.14-0.20	6.6-8.4	High---------	0.32	5	2-7
	10-38	40-60	1.00-1.30	<0.06	0.14-0.18	6.6-8.4	High---------	0.32		
	38-64	45-70	1.00-1.30	<0.06	0.12-0.18	6.6-8.4	High---------	0.32		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
URA*:										
Urbo------------	0-15	28-40	1.45-1.55	0.06-0.2	0.18-0.20	4.5-5.5	Moderate-----	0.28	5	1-3
	15-65	35-55	1.45-1.55	<0.06	0.18-0.20	4.5-5.5	Moderate-----	0.28		
Riverview-------	0-4	4-18	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.5	Low----------	0.24	5	.5-2
	4-58	18-35	1.20-1.40	0.6-2.0	0.15-0.22	4.5-6.0	Low----------	0.24		
	58-70	4-18	1.20-1.50	2.0-6.0	0.07-0.11	4.5-6.0	Low----------	0.17		
VaA-------------- Vaiden	0-6	40-55	1.10-1.40	0.06-0.2	0.10-0.15	4.5-6.0	High---------	0.32	5	1-5
	6-33	60-75	1.00-1.30	<0.06	0.10-0.15	4.5-6.5	Very high----	0.32		
	33-65	40-75	1.10-1.40	<0.06	0.10-0.15	6.6-8.4	Very high----	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
AgB--------------- Alaga	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
BaE--------------- Blanton	A	None--------	---	---	4.0-6.0	Perched	Mar-Aug	>60	---	High-----	High.
BbB*:											
Blanton----------	A	None--------	---	---	4.0-6.0	Perched	Mar-Aug	>60	---	High-----	High.
Bonifay----------	A	None--------	---	---	4.0-5.0	Perched	Jan-Feb	>60	---	Low------	High.
CaB--------------- Compass	B	None--------	---	---	2.5-3.5	Perched	Jan-May	>60	---	Moderate	High.
CeB2, CeC2, CeE--- Conecuh	D	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
CoB2-------------- Cowarts	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CuD2*, CuE*:											
Cowarts----------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Luverne----------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
EaB--------------- Eunola	C	None--------	---	---	1.5-2.5	Apparent	Nov-Mar	>60	---	Low------	High.
GoA--------------- Goldsboro	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
HoA--------------- Houlka	D	Frequent----	Brief-----	Jan-Mar	1.0-2.0	Apparent	Jan-Mar	>60	---	High-----	High.
KpB2-------------- Kipling	D	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	High-----	High.
LnB, LnE2--------- Luverne	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
LoE*:											
Luverne----------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Blanton----------	A	None--------	---	---	4.0-6.0	Perched	Mar-Aug	>60	---	High-----	High.
LtF*:											
Luverne----------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Blanton----------	A	None--------	---	---	4.0-6.0	Perched	Mar-Aug	>60	---	High-----	High.
Cowarts----------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
LyA*:											
Lynchburg--------	C	Rare--------	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	High.
Ocilla-----------	C	Rare--------	---	---	1.0-2.5	Apparent	Dec-Apr	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
MBA*:											
Mantachie--------	C	Frequent----	Brief-----	Jan-Mar	1.0-1.5	Apparent	Dec-Mar	>60	---	High-----	High.
Iuka-------------	C	Frequent----	Brief-----	Dec-Apr	1.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
Bibb-------------	D	Frequent----	Brief-----	Dec-May	0.5-1.0	Apparent	Dec-Apr	>60	---	High-----	Moderate.
MgB2, MgD2, MgE2-- Maytag	D	None--------	---	---	>6.0	---	---	>60	---	High-----	Low.
MkE2*:											
Maytag-----------	D	None--------	---	---	>6.0	---	---	>60	---	High-----	Low.
Oktibbeha--------	D	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
MnA--------------- Minter	D	Occasional	Brief-----	Dec-Apr	0-1.0	Apparent	Nov-Jan	>60	---	High-----	High.
OcA--------------- Ocilla	C	Rare--------	---	---	1.0-2.5	Apparent	Dec-Apr	>60	---	High-----	Moderate.
OkB2, OkD2, OkE2-- Oktibbeha	D	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
OrB2-------------- Orangeburg	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Pt*--------------- Pits	-	None--------	---	---	>6.0	---	---	>60	---	---	---
ScA--------------- Sucarnoochee	D	Frequent----	Brief-----	Dec-Apr	0.5-1.5	Apparent	Nov-Feb	>60	---	High-----	Low.
URA*:											
Urbo-------------	D	Frequent----	Brief-----	Jan-Mar	1.0-2.0	Apparent	Jan-Mar	>60	---	High-----	High.
Riverview--------	B	Frequent----	Brief-----	Dec-Mar	3.0-5.0	Apparent	Dec-Mar	>60	---	Low------	Moderate.
VaA--------------- Vaiden	D	None--------	---	---	1.0-2.0	Perched	Dec-Mar	>60	---	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution (Percent less than 2.0 mm)		
			Sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In				
Conecuh [1]					
(S72AL-011-1)	0-5	A	53.1	31.7	15.2
	5-9	Bt1	35.9	27.1	37.0
	9-17	Bt2	22.3	28.4	49.3
	17-31	Bt3	9.6	31.2	59.2
	31-39	Bt4	20.3	30.3	49.4
	39-50	BC	20.3	28.7	51.0
	50-63	C	25.0	29.3	45.7
Conecuh [2]					
(S82AL-011-5)	0-3	A	71.3	21.6	7.1
	3-6	E	69.6	20.5	9.9
	5-12	Bt1	21.7	20.7	57.6
	12-27	Bt2	24.2	22.2	53.6
	27-44	Bt3	24.6	22.3	53.1
	44-61	BC	61.1	9.1	29.8
	61-72	C	66.2	7.5	26.3
Eunola [1]					
(S85AL-011-1)	0-8	Ap	83.8	11.5	4.7
	8-14	E	81.6	13.3	5.1
	14-20	Bt1	68.9	11.5	19.6
	20-27	Bt2	64.2	10.8	25.0
	27-42	Bt3	64.9	12.7	22.4
	42-58	BC	71.4	12.2	16.4
	58-64	C	67.6	10.7	21.7
Goldsboro [1]					
(S84AL-011-9)	0-9	Ap	78.2	18.0	3.8
	9-17	E	75.0	19.8	5.2
	17-22	Bt1	68.1	16.6	15.3
	22-42	Bt2	62.7	16.3	21.0
	42-60	Bt3	60.9	13.9	25.2
Houlka [1]					
(S85AL-011-9)	0-5	Ap	21.4	36.4	42.2
	5-8	Bw	25.8	34.0	40.2
	8-13	Bg1	41.8	29.2	29.0
	13-41	Bg2	35.6	28.8	35.6
	41-62	Bg3	35.9	27.3	36.8
Kipling [3]					
(S83AL-011-2)	0-3	A	54.4	31.5	14.1
	3-8	Bt1	27.5	31.8	40.7
	8-19	Bt2	22.0	26.7	51.3
	19-34	Bt3	22.1	24.9	53.0
	34-44	Bt4	26.5	29.7	43.8
	44-50	BC	26.6	25.3	48.1
	50-65	C1	27.4	22.1	50.5
	65-70	C2	23.8	27.1	49.1
Kipling [1]					
(S85AL-011-2)	0-2	A	57.6	35.4	7.0
	2-5	E	53.9	34.2	11.9
	5-10	Bt1	21.0	36.4	42.6
	10-17	Bt2	18.9	37.6	43.5
	17-47	Bt3	12.3	28.6	59.1
	47-55	Bt4	17.5	31.8	50.7
	55-65	C	14.5	32.2	53.3

See footnotes at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (Percent less than 2.0 mm)		
			Sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In				
Luverne [1]					
(S82AL-011-3)	0-8	Ap	84.8	11.6	3.6
	8-12	E	78.1	14.9	7.0
	12-21	Bt1	39.9	12.9	47.2
	21-32	Bt2	41.4	12.1	46.5
	32-39	Bt3	47.5	12.1	40.4
	39-48	Bt4	47.9	14.0	38.1
	48-64	C	55.2	13.2	31.6
Lynchburg [1]					
(S84AL-011-10)	0-5	A	75.1	19.7	5.2
	5-11	E1	76.1	19.1	4.8
	11-15	E2	76.9	17.7	5.4
	15-21	Bt	63.3	17.5	19.2
	21-47	Btg1	64.8	14.6	20.6
	47-62	Btg2	58.4	13.0	28.6
Maytag [1]					
(S84AL-011-3)	0-3	Ap	10.0	47.7	42.3
	3-7	AB	8.4	47.8	43.8
	7-17	Bkss1	4.0	43.3	52.7
	17-31	Bkss2	3.5	35.7	60.8
	31-53	Bkss3	3.4	34.9	61.7
	53-65	Bkss4	6.0	36.0	58.0
Maytag [4]					
(S85AL-011-4)	5-11	Bkss1	8.0	48.3	43.7
	11-30	Bkss2	6.8	41.5	51.7
	30-56	Bkss3	3.2	35.7	61.1
	56-65	Bkss4	3.6	34.2	62.2
Minter [1]					
(S84AL-011-4)	0-4	Ap	43.1	38.9	18.0
	4-9	A	43.4	39.1	17.5
	9-13	E	54.6	31.4	14.0
	13-17	Btg1	37.2	27.0	35.8
	17-30	Btg2	34.2	22.8	43.0
	30-53	Btg3	35.4	24.1	40.5
	53-65	Btg4	36.5	25.9	37.6
Ocilla [1]					
(S82AL-011-4)	0-8	Ap	83.7	14.2	2.1
	8-21	E1	82.2	14.6	3.2
	21-36	E2	80.4	17.8	1.8
	36-48	Bt1	68.3	14.5	17.2
	48-57	Bt2	69.6	12.9	17.5
	57-64	Bt3	69.1	12.0	18.9
	64-75	Bt4	66.8	12.6	20.6
Sucarnoochee [5]					
(S84AL-011-6)	0-6	Ap	9.7	47.5	42.8
	6-15	B2	18.2	21.5	60.3
	15-32	Bgss1	19.1	22.7	58.2
	32-50	Bgss2	19.2	23.7	57.1
	50-60	Bgss3	16.5	24.7	58.8
	60-70	Bgss4	34.1	26.4	39.5

1 See the section "Soil Series and Their Morphology" for the locations of sites sampled.
2 2,500 feet north and 700 feet west of the southeast corner of sec. 29, T. 19 N., R. 27 E.
3 2,700 feet north and 400 feet east of the southwest corner of sec. 23, T. 14 N., R. 21 E.
4 2,800 feet north and 2,000 feet west of the southeast corner of sec. 17, T. 14 N., R. 22 E.
5 500 feet south and 1,200 feet west of the northeast corner of sec. 21, T. 15 N., R. 21 E.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases			Base saturation	Reaction	Cation-exchange capacity
			Ca	Mg	K			
			Meq 100g			Pct	pH	
Conecuh [1] (S72AL-011-1)	0-5	A	1.94	1.97	0.05	38.2	4.8	10.35
	5-9	Bt1	2.40	3.42	0.04	30.1	4.7	19.45
	9-17	Bt2	0.76	1.80	0.06	8.3	4.6	31.58
	17-31	Bt3	0.12	1.32	0.06	4.5	4.5	33.50
	31-39	Bt4	0.12	1.29	0.06	4.4	4.4	33.39
	39-50	BC	0.09	1.02	0.06	3.5	4.3	33.89
	50-63	C	0.12	0.88	0.06	3.1	3.9	33.70
Conecuh [2] (S82AL-011-5)	0-3	A	1.73	0.50	0.08	38.0	4.7	6.06
	3-6	E	0.98	0.41	0.05	29.1	4.7	4.96
	6-12	Bt1	3.99	1.58	0.10	30.5	4.4	18.64
	12-27	Bt2	3.34	1.30	0.12	15.7	4.4	30.37
	27-44	Bt3	3.52	1.37	0.16	14.3	4.2	35.29
	44-61	BC	2.54	0.79	0.12	22.9	4.3	15.05
	61-72	C	2.70	0.67	0.11	24.0	4.1	14.50
Eunola [1] (S85AL-011-1)	0-8	Ap	1.70	0.30	0.06	60.3	---	3.43
	8-14	E	0.88	0.24	0.02	70.3	---	1.62
	14-20	Bt1	1.15	0.24	0.03	24.7	5.3	5.74
	20-27	Bt2	1.02	0.23	0.04	17.5	4.9	7.37
	27-42	Bt3	1.07	0.17	0.04	20.3	5.0	6.33
	42-58	BC	0.78	0.19	0.03	19.6	5.0	5.08
	58-64	C	1.25	0.32	0.05	25.3	5.0	6.42
Goldsboro [1] (S84AL-011-9)	0-9	Ap	1.15	0.26	0.04	39.4	5.8	3.70
	9-17	E	0.40	0.18	0.03	29.8	5.3	2.05
	17-22	Bt1	0.50	0.18	0.06	17.1	4.9	4.34
	22-42	Bt2	0.83	0.15	0.07	14.5	4.9	7.20
	42-60	Bt3	0.50	0.23	0.08	12.2	4.6	6.65
Houlka [1] (S85AL-011-9)	0-5	Ap	18.15	1.05	0.16	82.0	5.4	23.60
	5-8	Bt	15.45	0.79	0.14	82.3	5.3	19.90
	8-13	Bgss1	7.75	0.39	0.07	70.0	5.0	11.74
	13-41	Bgss2	6.85	0.47	0.09	54.0	4.6	13.73
	41-62	Bgss3	6.33	0.52	0.11	47.3	4.6	14.71
Kipling [3] (S83AL-011-2)	0-3	A	2.30	0.88	0.08	40.8	5.1	7.99
	3-8	Bt1	2.80	1.16	0.08	32.0	4.7	12.61
	8-19	Bt2	2.88	0.79	0.11	12.1	4.6	31.14
	19-34	Bt3	3.45	0.55	0.11	12.7	4.6	32.27
	34-44	Bt4	3.98	0.35	0.08	32.6	4.9	13.52
	44-50	Btss1	5.03	0.37	0.08	39.8	4.9	13.76
	50-65	Btss2	6.78	0.45	0.08	50.9	4.6	14.35
	65-70	Btss3	9.48	0.60	0.17	80.0	4.8	12.81
Kipling [1] (S85AL-011-2)	0-2	A	1.50	0.33	0.06	41.7	5.2	4.53
	2-5	E	1.95	0.37	0.03	52.1	5.3	4.51
	5-10	Bt1	4.83	0.85	0.05	51.3	5.0	11.16
	10-17	Bt2	5.75	0.69	0.07	53.8	5.1	12.11
	17-47	Bt3	8.80	0.51	0.10	58.6	4.6	16.04
	47-55	Bt4	7.10	0.37	0.09	50.7	4.7	14.92
	55-65	Btss	9.80	0.39	0.11	73.3	4.8	14.06

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases Ca	Mg	K	Base saturation	Reaction	Cation-exchange capacity
			Meq 100g			Pct	pH	
Luverne [1]								
(S82AL-011-3)	0-8	Ap	0.15	0.02	0.03	12.3	4.4	1.64
	8-12	E	0.13	0.02	0.04	10.2	4.4	1.78
	12-21	Bt1	0.77	0.36	0.15	18.6	4.4	6.88
	21-32	Bt2	0.91	0.72	0.12	19.7	4.5	8.87
	32-39	Bt3	1.00	0.85	0.13	24.8	4.5	7.98
	39-48	Bt4	0.51	0.62	0.15	14.2	4.5	9.04
	48-64	C	0.30	0.62	0.16	12.8	4.3	8.44
Lynchburg [1]								
(S84AL-011-10)	0-5	A	0.48	0.06	0.02	13.5	4.6	4.07
	5-11	E1	0.40	0.04	0.01	22.0	5.2	2.05
	11-15	E2	0.38	0.05	0.01	26.5	5.1	1.63
	15-21	Bt	0.63	0.10	0.03	13.0	4.9	5.80
	21-47	Btg1	0.43	0.08	0.04	7.9	4.8	6.87
	47-62	Btg2	0.93	0.06	0.06	10.4	4.9	10.09
Maytag [1]								
(S84AL-011-3)	0-3	Ap	45.03	0.43	0.20	97.1	7.6	47.02
	3-7	AB	41.38	0.30	0.07	96.8	7.9	43.10
	7-17	Bkss1	40.00	0.21	0.03	97.1	8.0	41.44
	17-31	Bkss2	43.83	0.26	0.09	97.0	7.9	45.53
	31-53	Bkss3	44.20	0.37	0.21	97.4	7.8	45.98
	53-65	Bkss4	60.23	0.58	0.34	97.7	7.9	62.58
Maytag [4]								
(S85AL-011-4)	5-11	Bkss1	45.52	0.12	0.06	97.4	7.6	46.91
	11-30	Bkss2	46.12	0.17	0.08	97.2	7.6	47.73
	30-56	Bkss3	44.77	0.30	0.14	97.3	7.6	46.49
	56-65	Bkss4	43.62	0.38	0.17	96.3	7.7	45.85
Minter [1]								
(S84AL-011-4)	0-4	Ap	8.43	2.18	0.25	86.0	6.4	12.61
	4-9	A	6.35	0.97	0.17	77.0	5.9	9.74
	9-13	E	3.30	0.58	0.06	74.3	5.9	5.30
	13-17	Btg1	4.73	0.71	0.07	54.7	4.8	10.07
	17-30	Btg2	4.55	0.50	0.09	43.6	4.6	11.77
	30-53	Btg3	4.18	0.36	0.10	44.3	4.7	10.48
	53-65	Btg4	4.75	0.23	0.08	52.1	---	9.69
Ocilla [1]								
(S82AL-011-4)	0-8	Ap	0.65	0.07	0.03	41.5	5.4	1.78
	8-21	E1	0.57	0.07	0.02	40.5	5.5	1.61
	21-36	E2	0.30	0.03	0.02	68.4	5.5	0.51
	36-48	Bt1	2.82	0.27	0.05	68.6	5.4	4.59
	48-57	Bt2	2.85	0.63	0.06	68.9	5.4	5.14
	57-64	Bt3	2.26	0.61	0.07	47.3	5.1	6.22
	64-75	Bt4	1.52	0.36	0.08	30.1	4.9	6.53
Sucarnoochee [5]								
(S84AL-011-6)	0-6	Ap	33.70	0.49	0.14	94.9	7.0	36.17
	6-15	B2	30.13	0.20	0.13	94.5	7.6	32.22
	15-32	Bgss1	24.48	0.20	0.12	92.8	7.6	26.71
	32-50	Bgss2	21.83	0.33	0.13	88.6	7.1	25.16
	50-60	Bgss3	21.20	0.33	0.12	91.5	7.4	23.65
	60-70	Bgss4	41.48	0.28	0.10	96.1	7.9	43.53

1 See the section "Soil Series and Their Morphology" for the locations of sites sampled.
2 2,500 feet north and 700 feet west of the southeast corner of sec. 29, T. 19 N., R. 27 E.
3 2,700 feet north and 400 feet east of the southwest corner of sec. 23, T. 14 N., R. 21 E.
4 2,800 feet north and 2,000 feet west of the southeast corner of sec. 17, T. 14 N., R. 22 E.
5 500 feet south and 1,200 feet west of the northeast corner of sec. 21, T. 15 N., R. 21 E.

TABLE 19.--ENGINEERING INDEX TEST DATA

(LL means liquid limit; PI, plasticity index; MD, maximum dry density; and OM, optimum moisture. Dashes indicate data were not available)

Soil name, report number, horizon, and depth in inches*	Classification		Grain-size distribution					LL	PI	Moisture density	
			Percentage passing sieve--				Percentage smaller than				
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	0.005 mm			MD	OM
								Pct		Lb/ cu ft	Pct
Conecuh [1]											
(S82AL-011-6)											
Bt1---- 5 to 13	A-7-5(20)	CH	100	100	98	70	63	61	31	86.9	25.5
Bt2---- 13 to 20	A-7-5(8)	MH	100	100	98	80	55	45	15	91.4	30.6
Bt3---- 20 to 35	A-7-6(9)	CH	100	100	99	80	52	46	19	91.8	24.9
BC----- 35 to 57	A-7-5(5)	ML	100	100	100	80	45	45	15	92.0	20.9
Maytag [2]											
(S84AL-011-3)											
Ap----- 0 to 3	A-7-6(25)	MH	100	100	99	96	73	51	22	89.6	24.0
AB----- 3 to 7	A-7-5(28)	MH	100	100	99	96	73	55	24	94.4	22.4
Bkss1-- 7 to 17	A-7-5(43)	CH	100	100	100	98	87	67	36	94.0	23.7
Bkss2-- 17 to 31	A-7-5(65)	CH	100	100	100	98	93	89	54	82.7	25.7
Bkss3-- 31 to 53	A-7-5(69)	CH	100	100	100	98	94	93	58	94.0	18.1
Bkss4-- 53 to 65	A-7-5(69)	CH	100	100	100	98	93	93	58	90.7	23.1
Maytag [3]											
(S85AL-011-4)											
Bkss1-- 5 to 11	A-7-6(37)	CH	100	100	99	91	42	62	35	94.5	17.3
Bkss2-- 11 to 30	A-7-6(35)	CH	100	100	98	96	83	61	32	92.0	24.5
Bkss3-- 30 to 56	A-7-5(51)	CH	100	100	100	98	94	77	43	90.3	23.4
Bkss4-- 56 to 65	A-7-5(53)	MH	100	100	100	98	93	81	42	88.2	23.5
Minter [2]											
Btg1---- 13 to 17	A-6(9)	CL	100	100	100	75	46	37	18	95.6	20.8
Btg2---- 17 to 30	A-6(11)	CL	100	100	100	75	50	37	18	101.5	18.7
Btg3---- 30 to 53	A-6(11)	CL	100	100	100	75	47	37	18	99.2	18.8
Btg4---- 53 to 65	A-6(12)	CL	100	100	100	75	45	37	18	100.8	20.6
Sucarnoochee [4]											
(S84AL-011-6)											
Ap----- 0 to 6	A-7-5(36)	MH	100	100	100	94	79	65	32	84.6	24.3
B2----- 6 to 15	A-7-5(33)	MH	100	100	100	90	72	65	30	87.4	24.2
Bgss1-- 15 to 32	A-7-5(33)	MH	100	100	100	89	70	64	31	88.7	24.6
Bgss2-- 32 to 50	A-7-5(31)	CH	100	100	100	89	80	61	31	89.4	23.7
Bgss3-- 50 to 60	A-7-6(27)	CH	100	100	100	87	74	56	28	92.4	25.0
Bgss4-- 60 to 70	A-7-6(18)	CH	100	100	97	85	52	50	25	101.4	17.6
Vaiden [2]											
(S85AL-011-3)											
Ap----- 0 to 6	A-7-5(30)	MH	100	100	99	90	76	56	26	90.8	20.7
Bt----- 6 to 18	A-7-6(37)	CH	100	100	100	95	83	61	32	87.3	27.2
Btss1-- 18 to 33	A-7-6(37)	CH	100	100	100	95	81	61	34	89.1	27.1
Btss2-- 33 to 49	A-7-6(43)	CH	100	100	100	95	83	65	38	94.5	21.8
Btss3-- 49 to 65	A-7-6(50)	CH	100	100	100	95	84	68	46	92.6	21.2

1 1,500 feet north and 600 feet west of the southeast corner of sec. 29, T. 13 N., R. 25 E.
2 See the section "Soil Series and Their Morphology" for the locations of sites sampled.
3 2,800 feet north and 2,000 feet west of the southeast corner of sec. 17, T. 14 N., R. 22 E.
4 500 feet south and 1,200 feet west of the northeast corner of sec. 21, T. 15 N., R. 21 E.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alaga	Thermic, coated Typic Quartzipsamments
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Bonifay	Loamy, siliceous, thermic Grossarenic Plinthic Paleudults
Compass	Coarse-loamy, siliceous, thermic Plinthic Paleudults
Conecuh	Clayey, montmorillonitic, thermic Aquic Hapludults
Cowarts	Fine-loamy, siliceous, thermic Typic Kanhapludults
Eunola	Fine-loamy, siliceous, thermic Aquic Hapludults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Houlka	Fine, montmorillonitic, acid, thermic Aeric Epiaquerts
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Kipling	Fine, montmorillonitic, thermic Vertic Paleudalfs
Luverne	Clayey, mixed, thermic Typic Hapludults
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Mantachie	Fine-loamy, siliceous, acid, thermic Aeric Fluvaquents
Maytag	Fine, montmorillonitic, thermic Oxyaquic Hapluderts
Minter	Fine, mixed, thermic Typic Endoaqualfs
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Oktibbeha	Very-fine, montmorillonitic, thermic Chromic Dystruderts
Orangeburg	Fine-loamy, siliceous, thermic Typic Kandiudults
Pits.	
Riverview	Fine-loamy, mixed, thermic Fluventic Dystrochrepts
Sucarnoochee	Fine, montmorillonitic, thermic Chromic Epiaquerts
Urbo	Fine, mixed, acid, thermic Vertic Epiaquepts
Vaiden	Very-fine, montmorillonitic, thermic Aquic Dystruderts

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