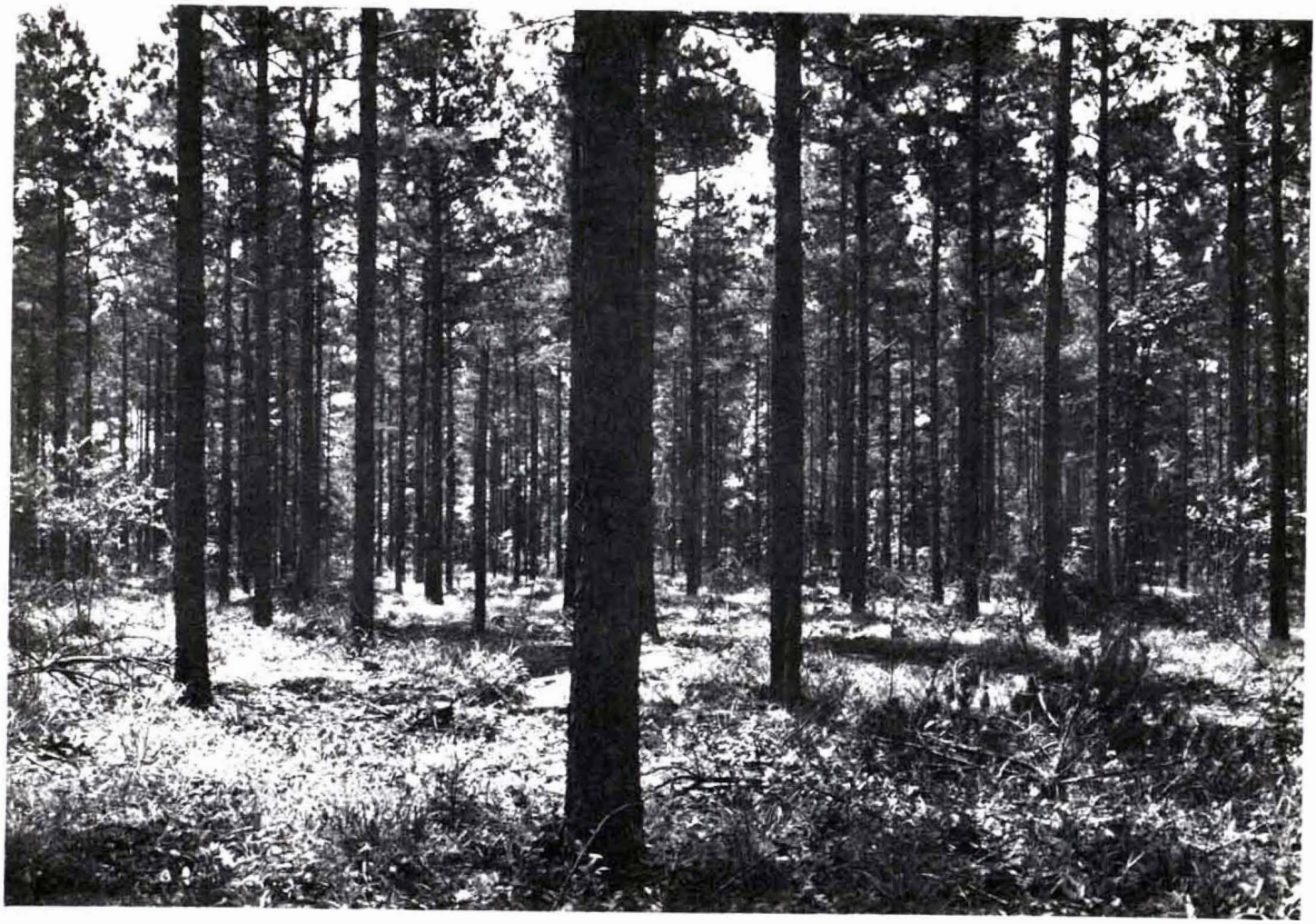
SOIL SURVEY OF

Drew County, Arkansas



Notice - Potential Update - Soils information in this manuscript is current as of the publication date. Some areas may have changed due to natural events such as flooding or erosion or because of updated mapping. The most current soil information is available on-line in the Electronic Field Office Technical Guide (e-FOTG) at the Arkansas Natural Resources Conservation Service (SRCS) website. The website is located at www.as.nrcs.usda.gov, click on Technical Resources, Arkansas e-FOTG, County of Interest, Section 9 Soils Information, County of Interest, and Soil Data Download or Soil Reports.

United States Department of Agriculture

Soil Conservation Service

In cooperation with

Arkansas Agricultural Experiment Station

Major fieldwork for this soil survey was done in the period 1965-71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Drew County Conservation District.

Copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

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

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

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol, gives the capability classification and woodland group of each soil, and shows the page where each soil is described.

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

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

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

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

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

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

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

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

Cover: Well-stocked stand of naturally seeded loblolly pine on Savannah fine sandy loam, 1 to 3 percent slopes.

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SOIL SURVEY OF DREW COUNTY, ARKANSAS

BY FRED C. LARANCE, HIRAM V. GILL, AND CHARLES L. FULTZ, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION

DREW COUNTY is in southeastern Arkansas (fig. 1). It is about 13 miles west of the Mississippi River, at the nearest point, and 27 miles north of Louisiana. Except for a small area in the southwestern part, the county is rectangular. It is about 30 miles wide in the northern part, about 32 miles wide in the southern part, and about 28 miles from north to south.

According to the U.S. Censuses, the approximate area of Drew County is 535,040 acres, or 836 square miles. In 1970 the population was 15,157. Monticello, the county seat and main trading center, had a population of 5,085. Wilmar, the next largest town, had a population of 653.

The main enterprises in the county are the production and processing of wood products, and general farming. Except for a few manufacturing plants, most of the businesses provide agricultural services.

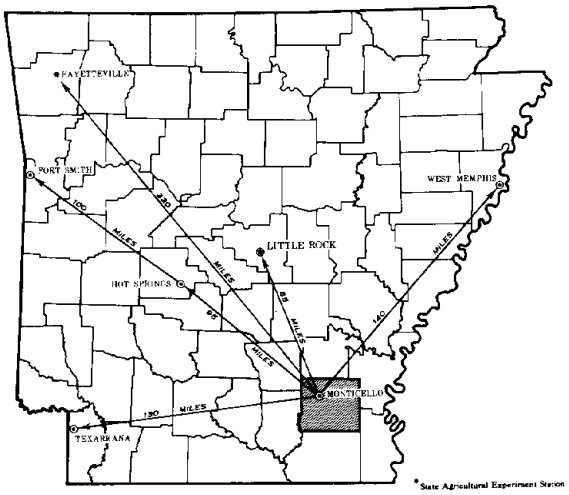

Figure 1.--Location of Drew County in Arkansas.

General Nature of the County

Information about farming, physiography and drainage, and climate in Drew County given in this section will be useful to readers not familiar with the County.

Along the eastern border of the county are bottom lands. Soils in this area formed in loamy and clayey sediment deposited mainly by the Arkansas River and its tributaries. These soils contain moderate to large amounts of plant nutrients. Except for small tracts dedicated to use as wildlife habitat, this entire area is cultivated. Excess water drains away slowly or ponds, and is a moderate to severe hazard over most of the area. Erosion is not significant in most areas.

Uplands and their associated local floodplains make up the rest of the county. Frequent flooding on the floodplains severely limits their use, and most are forested. In the eastern part of the uplands, the soils formed mainly in loamy, windblown sediment. In the western part, the soils formed mainly in older, loamy and clayey sediment laid down in a former shallow sea. Most of the upland area is in forest. Generally, the soils in the eastern part of the uplands contain moderate amounts of plant nutrients, and those in the western part contain small amounts. Most of the uplands is suitable for improved pasture and cultivated crops. Excess water is a moderate to very severe hazard on the level tracts. Erosion is a moderate to severe hazard in the more sloping areas.

Elevations on the north-south ridge that extends through the middle part of the county range from about 240 feet to 400 feet above mean sea level. Elevations are lower in the eastern and western parts of the county. The Bayou Bartholomew flood plain in the eastern part of the county is at elevations of about 125 to 155 feet. Areas along the Saline River in the southwestern part are at elevations of about 90 to 100 feet.

Farming

The first settlers arrived in Drew County in about 1840, and the first community was established in the vicinity of Monticello. The early settlers cleared small tracts on the high, well-drained ridges to grow corn and vegetables for home consumption and to grow cotton as a money crop. Farming gradually spread throughout the county, and large plantations were cleared on floodplains of Bayou Bartholomew and the Saline River to grow cotton and feed crops. The importance of farming grew steadily until the outbreak of World War II, and then declined. Lumbering has become most important enterprise in the county.

According to the 1969 Census of Agriculture, only about 31 percent of the county was farmed. The rest was extensive wooded tracts, towns, and sites for transportation and utility facilities. Farming has since become more general.

Important crops in the county are soybeans, cotton, cereal crops, livestock, and truck and special crops. Table 1 shows the acreage of principal crops and pasture in selected years. Table 2 gives the kind and number of livestock in the county.

Farms in Drew County are decreasing in number and increasing in size. Between 1964 and 1969, the number of farms decreased from 960 to 664, and the average size increased from 176 to 246 acres.

Farms of 260 acres or more increased from 141 in 1964 to 161 in 1969, while farms smaller than 260 acres decreased from 819 to 503. Farms smaller than 100 acres were 309 fewer in 1969 than in 1964. Of the farm operators in the county in 1969, 461 were full owners, 118 were part owners, and 85 were tenants. Of these operators, 385 held jobs off the farm; and 372 of these worked off the farm 100 days or more each year.

Most farms are small enough that a family can do most of the work, hiring outside labor during peak seasons. The larger farms are operated by laborers surpervised by the owner, manager, or tenant. Tenants pay either a fixed rent or a percentage of the crop for use of the land. Most farm operators have sufficient modern equipment to farm efficiently. They fertilize according to the needs of the crop, and many use chemicals for weed control.

Physiography and Drainage

The geological deposits at the surface of Drew County are made up of unconsolidated sediment deposited by water and wind. Generally, Southern Mississippi Valley Alluvium makes up the eastern part of the county, Southern Mississippi Valley Silty Uplands make up the east-central part, and the Southern Coastal Plain makes up the western part. The unconsolidated sediments are several hundred feet thick over bedrock.

The relief of the county can be divided into three main divisions: rolling upland, flatwoods upland, and stream flood plains.

The rolling upland belt forms the divide between the eastern and western drainage systems. This belt crosses the county in a general north-south direction through Monticello. Slopes are mainly from 3 to 12 percent, but range from about 1 to 20 percent.

The flatwoods are mainly east of the rolling upland, but a few small areas are to the west.

TABLE 1.--ACREAGE OF PRINCIPAL CROPS AND PASTURE

Crops and pasture	1964	1969
	Acres	Acres
Soybeans	28,209	40,966
Cotton	10,095	11,164
Corn	1,415	799
Grain sorghum	3	278
Wheat	633	790
Other small grains 1/	5,433	5,558
Hay	4,198	5,068
Pasture	17,145	23,736

1/ Includes rice.

TABLE 2.--NUMBER OF LIVESTOCK

[Absence of an entry means information was not available]

Livestock	1964		1969	
	On farms	Sold	On farms	Sold
Cattle and calves	16,759	6,840	14,965	6,948
Hogs and pigs	2,882	2,906	3,900	4,181
Broiler chickens	------	300,505	54,022	183,000
Other chickens 1/	29,172	6,742	14,788	-----

1/ 3 months old or older.

Slopes are predominantly less than 1 percent, but low ridges within the area have slopes as steep as 8 to 12 percent. In many places the flatwoods end abruptly at short escarpments that drop 5 to 20 feet to the stream flood plains.

The largest area of flood plains is along Bayou Bartholomew. Major floods are rare along this stream, but low areas have occasional local floods. Slopes in this area are generally less than 1 percent. A few small, undulating tracts have short slopes that are as much as 8 percent. Small areas of flood plains are also along the Saline River and along small tributary streams. Most of these areas have slopes of less than 1 percent and are subject to frequent flooding.

The small streams east of the divide flow in a southeasterly direction into Bayou Bartholomew. Those west of the divide flow southwestward into the Saline River.

The major tributary streams in the east are Ables Creek, Cut-Off Creek, Wolf Creek, and Bearhouse Creek. In the west they are Hudgins Creek, Tenmile Creek, Clear Creek, and Brown Creek. These major streams have numerous small tributaries that spread throughout the upland.

Climate 1/

The climate of Drew County is one of warm summers and mild winters. Abundant rainfall is well distributed throughout the year. The predominant air masses that affect the county are maritime tropical, due to the effects of the Gulf of Mexico, and modified continental polar. Occasional penetrations of continental arctic air during winter cause low temperature extremes, but the periods of very cold weather are of short duration. The relief of Drew County does little to affect seasonal weather patterns. Large hilly or mountainous areas are sufficiently distant to have no noticeable effect on the climate of the county.

The temperature and precipitation data from Monticello are given in table 3. They are representative of the county. July and August are the hottest months, having high temperatures that often exceed 100° F. The highest

1/ By ELDEN V. JETTON, climatologist for Arkansas, National Weather Service, Little Rock, U.S. Department of Commerce.

TABLE 3.--TEMPERATURE AND PRECIPITATION

[All data from Monticello; period of record 1941-70]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with--		Average monthly total	One year in 10 will have--	
			Maximum temperature equal to or higher than	Minimum temperature equal to or lower than		Less than--	More than--
	°F.	°F.	°F.	°F.	Inches	Inches	Inches
January------	54.1	32.8	77	7	4.35	1.53	9.81
February-----	57.7	35.8	78	14	4.97	2.34	8.50
March--------	62.7	42.1	86	21	5.83	2.73	9.54
April--------	75.5	52.2	88	32	5.50	2.44	9.48
May----------	82.7	59.7	93	41	4.74	1.46	9.15
June---------	89.6	67.0	99	50	3.30	.41	7.78
July---------	92.7	69.7	102	56	4.33	1.29	7.49
August-------	89.0	68.7	104	55	2.69	.66	4.86
September----	86.5	60.7	98	43	3.60	1.15	8.47
October------	75.0	52.0	91	30	2.59	.15	5.47
November-----	65.2	41.5	83	17	4.23	2.01	7.47
December-----	56.4	35.1	78	14	4.88	2.57	7.57
Year-------	73.9	51.4	--	--	51.01	----	----

recorded temperature was 108° F. January is the coldest month, commonly having temperatures as low as 12° F. The lowest recorded temperature was -4° F. Winters are relatively free of severe cold and snow, and outdoor work can be done during much of the winter season.

The average annual precipitation is about 51 inches. The wettest months are March and April, having a normal total of more than 11 inches of precipitation. Even during the driest period, August through October, the rainfall averages nearly 3 inches per month in a normal year. Winter and spring rains are frequent. They are normally associated with frontal systems. Summer and fall rains are mainly thundershowers from convective clouds. They are erratically distributed and sometimes produce very heavy rainfall over small areas.

Only about 2.5 inches of snow falls each year and snow is a negligible source of moisture. The greatest monthly total snowfall was 11 inches, recorded in January 1966. Normally snow falls on warm ground and melts within a few hours. Periods of several years may pass in which no snow or only traces of snow falls. Sleet and freezing rain are infrequent. They can cause serious damage to evergreen trees and shrubs, but otherwise do little more than disrupt transportation and utility service.

Short periods of drought occur frequently in summer and fall, but severe droughts are rare. Only 1 year in 8 has less than 80 percent of the normal rainfall. During the hottest part of summer, as much as one-third of an inch of soil moisture evaporates each day. Thus, extended periods of high temperatures and maximum sunshine can result in a large depletion of soil moisture. A summer rain of 1 inch can be dissipated in 2 or 3 days.

In winter and spring, the low evaporation and transpiration rates and the high rainfall cause soil wetness and local flooding. In low-lying areas crop planting, tree harvesting, and similar kinds of work may be delayed several weeks during wet periods. The normally drier weather late in summer and in fall is favorable for harvesting. However it often reduces the growth of pasture plants and is a concern in establishing stands of fall-seeded crops.

The growing season is long, normally a period of 229 days beginning late in March. The shortest recorded growing season was 181 days. The average date of the last freezing temperature in spring is March 23; and the first in fall is November 7. The latest recorded temperature of 32° F. was on April 19; and the earliest was on October 17. The average date of the last temperature of 28° F. in spring is March 7; and the first in fall is November 18. The latest recorded temperature of 28° F. was on April 14; and the earliest was on October 22.

Thunderstorms occur on about 50 days each year. Occasionally they are accompanied by hail and damaging wind. Tornadoes are infrequent, only 7 having been recorded in the county.

How this Survey Was Made

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

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Amy and Grenada, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Grenada silt loam, 1 to 3 percent slopes, is one of several phases within the Grenada series.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent,

because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Drew County: soil associations and undifferentiated groups.

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

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. If there are two or more dominant series represented in the group, the name of the group ordinarily consists of the names of the dominant soils, joined by "and." Tichnor and Arkabutla soils, frequently flooded, is an example.

Two of the mapping units in this survey include soils unlike any known series. These soils are named using nomenclature from a higher level of the soil classification system. They are the Udorthents and the Udults.

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

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

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

General Soil Map

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

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

The soil associations in this survey have been grouped into three general kinds of landscapes for broad interpretative purposes. Each of the broad groups, and soil associations in them, are described in the following pages. The terms for texture used in the title for several of the associations apply to the texture of the surface layer. For example, in the title of association 9, the terms clayey and loamy refer to the texture of the surface layer in the major soils of this association.

Soils Formed on Uplands in Sediment Deposited in an Old Coastal Embayment or in Local Sediment Washed from these Uplands

Soils in associations 1, 2, 3, and 4 formed either in stratified sediment deposited on the bottom of the shallow coastal embayment that covered all of Drew County thousands of years ago, or in recent alluvium washed from this sediment. These four soil associations make up about 46 percent of the county. They are on the Southern Coastal Plain in the western part. The soils are well drained to poorly drained and are loamy and gravelly.

These soil associations are used mainly for wood crops. Scattered throughout the area are general farms that produce beef cattle, field crops, and truck crops.

1. Amy-Ouachita Association

Poorly drained and well-drained, level, loamy soils on flood plains of local streams

The soils of this association are on flats and low natural levees on the flood plains along the Saline River and its tributaries. They are in the western part of the county.

This association makes up about 8 percent of the county. About 60 percent of the association is Amy soils; about 30 percent is Ouachita soils; and 10 percent is Leaf and Pheba soils and areas of water. The Amy soils are on flats, and the Ouachita soils are on low natural levees near the streams.

Amy soils are poorly drained. The surface and subsurface layers are gray silt loam. The subsoil is gray, mottled silty clay loam.

Ouachita soils are well drained. The surface layer is dark-brown and yellowish-brown silt loam. The uppermost part of the subsoil is yellowish-brown silt loam; the middle part is brown, mottled loam; and the lowermost part is gray, mottled loam containing lenses of silt loam and silty clay loam.

Frequent flooding makes these soils poorly suited to farming. The floods generally occur between January and June. Nearly all of this association is wooded. The few cleared areas are used for pasture and for warm-season crops that require a short growing season. Farms average about 120 acres in size. Most of this acreage is owned in large tracts by commercial timber companies.

This association, because of the frequent flooding is poorly suited to use for septic tank absorption fields, dwellings, and other buildings, and highways.

2. Amy-Pheba-Savannah Association

Poorly drained to moderately well drained, level to gently sloping, loamy soils on uplands and stream terraces

This association is in the western part of the county. It is made up of broad stream terraces and upland flats, broken by ridges that rise 1 to 10 feet above the flats. The natural drainageways are mainly slow-flowing, intermittent streams.

This association makes up about 9 percent of the county. About 64 percent of the association is Amy soils; 16 percent is Pheba soils; 8 percent is Savannah soils; and 12 percent is Cahaba, Lafe, and Ouachita soils. The Amy soils are on broad flats, the Pheba soils are on the flats and lower parts of low ridges, and the Savannah soils are on the ridges.

Amy soils are poorly drained. The surface and subsurface layers are gray silt loam. The subsoil is gray, mottled silty clay loam.

Pheba soils are somewhat poorly drained. The surface layer is dark-brown, mottled silt loam, and the subsurface layer is pale-brown, mottled silt loam. The upper part of the subsoil is brown, mottled silt loam, and the lower part is a mottled, firm and brittle, silt-loam fragipan. The underlying material is mottled silt loam.

Savannah soils are moderately well drained. The surface layer is dark-brown fine sandy loam. The upper part of the subsoil is strong-brown loam. The lower part is a mottled, firm and brittle, loam and clay loam fragipan. The underlying material is red, mottled sandy clay loam.

The soils of this association are suited to farming, but most areas are wooded. Farms range from 40 to 200 acres in size. About 90 percent of the farms are operated by owners, and the rest by renters. The main crops are soybeans, winter small grains, corn, cotton, and tomatoes. Most farms also have some beef cattle.

The wetness, seasonal high water table, and low bearing strength, make most of this association poorly suited to use for highways or for dwellings and other buildings. The Savannah soils on the ridges, however, are fairly well suited to these uses. The slow percolation rate and seasonal high water table make the soils in this association poorly suited to use for septic tank absorption fields.

3. Tippah-Sacul-Amy Association

Moderately well drained and poorly drained, level to moderately sloping, loamy soils on uplands

This association is in the western part of the county. It is made up of small flats and of broken ridges that rise 10 to 30 feet above the flats. The natural drainageways are slow-flowing, intermittent streams.

This association makes up about 25 percent of the county. About 34 percent of the association is Tippah soils; 17 percent is Sacul soils; 16 percent is Amy soils; and 33 percent is mainly Ouachita, Pheba, and Savannah soils. The Amy soils are on the flats and the Tippah and Sacul soils are on the ridges.

Tippah soils are moderately well drained. The surface layer is brown silt loam. The upper part of the subsoil is strong-brown silty clay loam and the lower part is mottled clay. The underlying material is gray silty clay loam that contains thin bands of brownish-yellow silt.

Sacul soils are moderately well drained. The surface layer is yellowish-brown loam. The uppermost part of the subsoil is yellowish-red loam; the middle part is yellowish-red and red, mottled clay; and the lowermost part is gray, mottled clay. The underlying material is strong-brown, gray, and red siltstone and shale.

Amy soils are poorly drained. The surface and subsurface layers are gray silt loam. The subsoil is gray, mottled silty clay loam.

The soils of this association are suited to farming, but most of the acreage is wooded. Erosion is a moderate to very severe hazard in the sloping areas, and excess water is a severe hazard in the level areas. Most of the cleared areas are used for pasture. A few are used for growing soybeans, cotton, and winter small grains. Most farms range from 40 to 260 acres in size and are operated by the owners.

Low bearing strength, seasonal high water table, and slow percolation rate make this association poorly suited to use for septic tank absorption fields, dwellings and other buildings and highways.

4. Cahaba-Savannah-Saffell Association

Well drained and moderately well drained, nearly level to moderately steep, loamy and gravelly soils on uplands

This association is in the western part of the county. It is made up of the higher ridges in the area, known locally as "Monticello Ridge."

This association makes up about 4 percent of the county. About 51 percent of the association is Cahaba soils; 33 percent is Savannah soils; 11 percent is Saffell soils; and 5 percent is Leaf and Pheba soils, small areas of deeply gullied Udorthents and Udults, and small areas that have been mined for gravel.

Cahaba soils are well drained. The surface layer is brown fine sandy loam. The subsurface layer is yellowish-brown fine sandy loam. The upper part of the subsoil is red sandy clay loam, and the lower part is yellowish-red sandy loam. The underlying material is yellowish-red and red, stratified loamy and sandy material.

Savannah soils are moderately well drained. The surface layer is dark-brown fine sandy loam. The upper part of the subsoil is strong-brown loam. The lower part is a mottled, firm, and brittle fragipan of loam and clay loam texture. The underlying material is red, mottled sandy clay loam.

Saffell soils are well drained. The surface layer is light yellowish-brown gravelly fine sandy loam. The subsurface layer is pale-brown gravelly fine sandy loam. The subsoil is red and yellowish-red gravelly sandy clay loam. The underlying material is reddish-brown gravelly fine sandy loam.

The soils of this association are suited to farming, but careful management is needed to control erosion. The steeper areas are best suited to pasture or woodland. Most farms range from about 40 to 260 acres in size and are operated by owners. The main crops are corn, tomatoes, and other truck crops. Nearly all of the farms produce some beef cattle.

Most of this association is suited to use for septic tank absorption fields, dwellings and other buildings, and highways. Areas where slopes are excessive are not suited. Because of the slow percolation rate, Savannah soils are poorly suited to use for septic tank absorption fields.

Soils Formed Predominantly in Wind-laid Sediment

Soils in associations 5 and 6 formed cheifly in material that was blown from ancient flood plains and deposited in thick to thin layers over older loamy and clayey sediment. These soil associations make up about 36 percent of the county. They are on the Southern Mississippi Valley Silty Uplands in the central part of the county. These soils are moderately well drained to poorly drained and are loamy.

Large areas of these associations are used as woodland. Many other areas are in general farms that produce beef cattle and field crops.

5. Grenada-Calloway-Henry Association

Moderately well drained to poorly drained, level to moderately steep, loamy soils on uplands

This association is in the central part of the county. It is made up of broad flats broken by low ridges that rise 1 to 10 feet above the flats. The natural drainageways are mainly slow-flowing intermittent streams.

This association makes up about 35 percent of the county. About 37 percent is Grenada soils; 29 percent is Calloway soils; 19 percent is Henry soils; and 15 percent is Ariel, Arkabutla, and Tichnor soils and small areas of deeply gullied Udorthents. The Henry soils are on the lower parts of the flats; the Calloway soils are on the flats and low ridges; and the Grenada soils are on the higher parts of the ridges.

Grenada soils are moderately well drained. The surface layer is yellowish-brown silt loam. The upper part of the subsoil is yellowish-brown and brownish-yellow silty clay loam that is mottled in the lower few inches. The lower part of the subsoil is a firm, brittle, mottled, silt loam fragipan.

Calloway soils are somewhat poorly drained. The surface layer is grayish-brown silt loam. The upper part of the subsoil is light yellowish-brown, mottled silt loam. The lower part is a firm, brittle fragipan of mottled silt loam and silty clay loam.

Henry soils are poorly drained. The surface layer is dark-gray silt loam. The subsurface layer is light gray and gray, mottled silt loam. The upper part of the subsoil is a firm, brittle fragipan of light brownish-gray, mottled silty clay loam. The lower part is gray, mottled silt loam.

The soils of this association are suited to farming, but most are in large wooded tracts. Surface drainage is needed on most of this association. Farms range from about 40 to 320 acres in size. Most of them are operated by the owners, but a few are rented. The main crops are soybeans, cotton, rice, and winter small grains. Most farms produce some beef cattle.

The wetness, seasonal high water table, and low bearing strength make most of this association poorly suited as a site for highways or dwellings and other buildings. The Grenada soils, on ridges, are fairly well suited to these uses. The slow percolation rate and seasonal high water table make the soils in this association poorly suited to use for septic tank absorption fields.

6. Calhoun-Crowley Association

Poorly drained, level, loamy soils on uplands

This association is in the central part of the county. It is made up of small tracts that were originally prairies scattered on broad flats through the central part of the county.

This association makes up about 1 percent of the county. About 60 percent is Calhoun soils; about 33 percent is Crowley soils; and 7 percent is Calloway and Henry soils.

Calhoun soils are poorly drained. The surface layer is brown silt loam. The subsurface layer is light brownish-gray, mottled silt loam. The upper part of the subsoil is light brownish-gray, mottled silt loam into which tongues of gray silt loam extend from the layer above. The lower part of the subsoil is gray, mottled silty clay loam.

Crowley soils are poorly drained. The surface layer is dark grayish-brown silt loam. The subsurface layer is gray, mottled silt loam. The upper part of the subsoil is light brownish-gray, mottled clay. The lower part is yellowish-brown, mottled silty clay loam.

Soils in this association are suited to farming, and most of the acreage is cultivated. Surface drainage is needed on most of the association. Farms are highly mechanized. They range from about 40 to 320 acres in size. Most are operated by owners. The main crops are soybeans, cotton, and rice.

The wetness, seasonal high water table, slow percolation rate, and low bearing strength make the soils of this association poorly suited as sites for septic tank absorption fields, dwellings and other buildings, and highways.

Soils Formed in Alluvial Sediment Deposited by Large Rivers

Soil associations 7, 8, and 9 make up about 18 percent of the county. They are well-drained to poorly drained loamy and clayey soils in the eastern part of the county. These soils formed on natural levees and in back swamps, chiefly in sediment deposited by the Arkansas River and its tributaries.

These soils are used mainly for cultivated crops. The hardwood forests in Seven Devils Swamp and in the Cut-Off-Creek Game Management Area are among the few large wooded tracts that remain in these associations.

7. Perry-Portland Association

Poorly drained and somewhat poorly drained, level, predominantly clayey soils on slack-water flats

This association is in the eastern part of the county on slack-water flats drained by sluggish bayous and sloughs. It includes Seven Devils Swamp and the Cut-Off-Creek Game Management Area.

This association makes up about 9 percent of the county. About 45 percent is Perry soils; 44 percent is Portland soils; and 11 percent is Hebert and Rilla soils and areas of water.

Perry soils are poorly drained. The surface layer is dark grayish-brown, mottled clay. The upper part of the subsoil is gray, mottled clay. The lower part of the subsoil and the underlying material are reddish-brown clay.

Portland soils are somewhat poorly drained. The surface layer is dark-brown clay or silt loam. The upper part of the subsoil is brown, mottled clay. The lower part is reddish-brown clay.

The soils of this association are productive and are suited to farming. About 90 percent of the acreage in farms is cultivated. Most farms are highly mechanized. They range from 200 to 1,000 acres in size. About 50 percent of the farms are operated by owners, and the rest are rented. The main crops are cotton, soybeans, rice, winter small grains, and pasture.

These soils shrink and crack when dry. When wet, they expand and the cracks seal. The wetness, slow percolation rate, instability, and low bearing strength make these soils poorly suited as sites for septic tank absorption fields, dwellings and other buildings, and highways.

8. Rilla-Hebert Association

Well drained and somewhat poorly drained, level and undulating, loamy soils on natural levees

This association is in the eastern part of the county. It is made up of level and undulating natural levees along Bayou Bartholomew.

This association makes up about 7 percent of the county. About 67 percent is Rilla soils; 20 percent is Hebert soils; and 13 percent is Perry and Portland soils and areas of water. The Rilla soils are on the higher parts of the natural levees and on small areas near stream channels where swales alternate with low ridges that rise 1 to 8 feet above the swales. Hebert soils are on the lower parts of the natural levees.

Rilla soils are well drained. The surface layer is dark grayish-brown silt loam. The subsurface layer is brown silt loam. The upper part of the subsoil is yellowish-red silty clay loam. The lower part is brown silt loam. Below the subsoil is brown to red silt loam and silty clay loam that contains pockets and lenses of very fine sandy loam.

Hebert soils are somewhat poorly drained. The surface layer is brown silt loam. The uppermost part of the subsoil is reddish-brown, mottled silty clay loam; the middle part is yellowish-red, mottled silty clay loam; and the lowermost part of the subsoil and the underlying material are brown, mottled fine sandy loam.

Soils in this association are productive and are well suited to farming. Except for a few small areas of hardwood trees along drainageways, nearly all of the acreage is cultivated. Surface drainage is needed on the Hebert soils. Erosion is a moderate hazard on some areas of the Rilla soils. Farms range from about 100 to 1,000 acres in size and are highly mechanized. About 50 percent of the farms are operated by owners, and the rest are rented. The main crops are cotton, soybeans, grain sorghums, and winter small grains. A few small areas are in pasture.

The Rilla soils are slightly to moderately limited, and the Hebert soils moderately to severely limited as sites for dwellings and other buildings and for highways. The slow percolation rate and seasonal high water table severely limit Hebert soils for use as septic tank absorption fields.

9. Portland-Perry-Hebert Association

Somewhat poorly drained and poorly drained, level, clayey and loamy soils on slack-water flats and natural levees

The association is in small areas along the east edge of the county. It is transitional between associations 7 and 8. The natural drainageways are sluggish bayous and sloughs.

This association makes up about 2 percent of the county. About 39 percent is Portland soils; 22 percent is Perry soils; 21 percent is Hebert soils; and 18 percent is Rilla soils and areas of water.

The Portland soils are on the slack-water flats. These soils are somewhat poorly drained. The surface layer is dark-brown clay or silt loam. The upper part of the subsoil is brown, mottled clay. The lower part is reddish-brown clay.

Perry soils are on the lower parts of natural levees. These soils are poorly drained. The surface layer is dark grayish-brown, mottled clay. The upper part of the subsoil is gray, mottled clay. The lower part of the subsoil and the underlying material are reddish-brown clay.

Hebert soils are somewhat poorly drained. The surface layer is brown silt loam. The uppermost part of the subsoil is reddish-brown, mottled silty clay loam, and the middle part is yellowish-red, mottled silty clay loam. The lowermost part of the subsoil and the underlying material are brown, mottled fine sandy loam.

Soils of this association are productive and are suited to farming. About 90 percent of the acreage is cultivated. A few small areas along streambanks support a growth of hardwood trees. Most farms range from 200 to 1,000 acres in size and are highly mechanized. About 50 percent of the farms are operated by owners. The rest are rented. The main crops are cotton, soybeans, winter small grains, and rice.

The clayey soils in this association shrink and crack when dry. When wet they expand and seal the cracks. The wetness, instability, and low bearing strength make these soils poorly suited to use for dwellings and other buildings and for highways. The slow percolation rate and seasonal high water table severely limit these soils for use as septic tank filter fields.

Descriptions of the Soils

In this section the soils of Drew County are described in detail and their use and management are discussed. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils.

The profile described in the series is representative of mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Udorthents and Udults for example, do not belong to soil series, but nevertheless, are listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. The page for the description of each capability unit can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 4. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*9*)*2*/.

Amy Series

The Amy series consists of poorly drained, level soils on broad upland flats on stream terraces, and on flood plains of local streams. These soils formed in loamy coastal plain sediment. The native vegetation is mixed pines and hardwoods on the upland flats and hardwoods on the flood plains.

In a representative profile the surface layer is gray silt loam about 4 inches thick. The subsurface layer is about 9 inches of gray, mottled silt loam. The subsoil is gray, mottled silty clay loam that extends to a depth of 65 inches or more.

Amy soils are low in natural fertility. Permeability is slow, and available water capacity is high.

Adequately drained areas of these soils that are not subject to flooding are suited to pasture and adapted clean-tilled crops. Most areas of these soils are wooded.

Representative profile of Amy silt loam in a moist wooded area in the SW¼SW¼NW¼ sec. 6, T. 13 S., R. 8 W.:

A1--0 to 4 inches, gray (10YR 5/1) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A2g--4 to 13 inches, gray (10YR 6/1) silt loam; common, fine, distinct, yellowish-brown mottles; weak, medium, subangular blocky structure; friable; many fine roots; common, fine, dark concretions; very strongly acid; clear, wavy boundary.

B21tg--13 to 25 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; interfingers and pockets of gray silt loam; moderate, medium, subangular blocky structure; firm; thin patchy clay films on faces of peds; many fine roots; common

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2/ Italic numbers in parentheses refer to Literature Cited, p. 81.

TABLE 4.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Soil	Area	Extent
	Acres	Percent
Amy silt loam	48,934	9.1
Amy silt loam, frequently flooded	27,888	5.2
Ariel silt loam, frequently flooded	5,250	1.0
Arkabutla silt loam, frequently flooded	782	.1
Cahaba fine sandy loam, 1 to 3 percent slopes	5,434	1.0
Cahaba fine sandy loam, 3 to 8 percent slopes	4,944	.9
Cahaba fine sandy loam, 8 to 12 percent slopes	1,766	.3
Calhoun silt loam	3,487	.7
Calloway silt loam, 0 to 1 percent slopes	30,961	5.8
Calloway silt loam, 1 to 3 percent slopes	7,599	1.4
Crowley silt loam	1,917	.4
Grenada silt loam, 0 to 1 percent slopes	786	.1
Grenada silt loam, 1 to 3 percent slopes	14,828	2.8
Grenada silt loam, 3 to 8 percent slopes	17,372	3.2
Grenada silt loam, 8 to 12 percent slopes	4,975	.9
Grenada association, undulating	28,852	5.4
Hebert silt loam	11,091	2.1
Henry silt loam	13,882	2.6
Henry-Calloway association	35,622	6.6
Lafe silt loam	452	.1
Leaf silt loam	3,211	.6
Ouachita silt loam	22,005	4.1
Perry clay	25,776	4.8
Pheba silt loam	28,693	5.3
Portland silt loam	2,992	.5
Portland clay	22,885	4.3
Rilla silt loam, 0 to 1 percent slopes	20,280	3.8
Rilla silt loam, undulating	7,917	1.5
Sacul loam, 8 to 12 percent slopes	1,896	.4
Sacul soils, 1 to 3 percent slopes, eroded	7,760	1.4
Sacul soils, 3 to 8 percent slopes, eroded	12,409	2.3
Saffell gravelly fine sandy loam, 3 to 8 percent slopes	913	.2
Saffell gravelly fine sandy loam, 8 to 20 percent slopes	1,321	.3
Savannah fine sandy loam, 1 to 3 percent slopes	21,757	4.1
Savannah fine sandy loam, 3 to 8 percent slopes	6,537	1.2
Tichnor and Arkabutla soils, frequently flooded	21,143	4.0
Tippah silt loam, 1 to 3 percent slopes	29,201	5.5
Tippah silt loam, 3 to 8 percent slopes	18,328	3.4
Udorthents and Grenada soils, 8 to 20 percent slopes, severely eroded	1,360	.3
Udults and Udorthents, 8 to 20 percent slopes, severely eroded	293	.1
Water	11,541	2.2
Total	535,040	100.0

fine pores; common, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B22tg--25 to 38 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm, thin patchy clay films on faces of peds; few fine roots; common fine pores; common, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B23tg--38 to 50 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, medium, prominent, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; common clay films on faces of peds; few fine roots; few fine pores; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B24tg--50 to 65 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; common clay films on faces of peds; few fine pores; few, fine, dark concretions; very strongly acid.

The A1 horizon ranges from gray to dark brown. The A2 horizon is mottled brown or yellowish brown. The B horizon is silt loam or silty clay loam. Some profiles have a IIC horizon of sandy clay loam or fine sandy loam. Reaction is medium acid to very strongly acid in the A horizon and is strongly acid or very strongly acid below the A horizon.

Amy soils are associated with Lafe, Leaf, Ouachita, and Pheba soils. They are not so fine textured in the B horizon as the Leaf soils. They are not so brown or so well drained as the Ouachita soils and they have a clay B horizon that the Ouachita soils lack. Amy soils are grayer throughout the B horizon and are more poorly drained than Pheba soils. They also lack the fragipan of the Pheba soils. Unlike Lafe soils, Amy soils lack a high concentration of sodium and magnesium in the B horizon.

Amy silt loam (Ae).--This level soil is on broad upland flats. Slopes are less than 1 percent. Individual areas range from about 20 to 300 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few small areas of Leaf, Ouachita, and Pheba soils.

This soil is suited to cultivated crops, but runoff is very slow and excess water is a severe hazard. Farming is delayed several days after a rain unless surface drains are installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year.

Most of this soil is wooded (pl. I, top). Most cleared areas are pasture. Suitable tilled crops are soybeans and grain sorghum. Winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, dallisgrass, annual lespedeza, white clover, and sericea lespedeza. Capability unit IIIw-1; woodland group 2w9.

Amy silt loam, frequently flooded (Af).--This level soil is on flood plains of local drainageways. Slopes are less than 1 percent. Individual areas range from about 40 to 400 acres in size. Included in mapping are a few small areas of Leaf and Ouachita soils.

The severe hazard of flooding makes this soil unsuitable for cultivation. This soil is used mainly as woodland. Capability unit Vw-1; woodland group 2w9.

Ariel Series

The Ariel series consists of well-drained, level soils on flood plains. These soils formed in loamy sediment washed from uplands made up predominantly of windblown silt. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is about 10 inches of dark yellowish-brown silt loam. The subsoil is about 11 inches of dark yellowish-brown silt loam underlain by a buried soil. The upper 16 inches of the buried soil is brown silt loam. The next 17 inches is brown, mottled silt loam. Below this layer, and extending to a depth of 72 inches, is gray, mottled silt loam.

Natural fertility of Ariel soils is moderate to high. Permeability is moderately slow, and available water capacity is high. These soils are easy to till, but frequent flooding during the growing season prevents using them regularly for crops. Most areas of these soils are forested.

Representative profile of Ariel silt loam, frequently flooded, in a moist wooded area in the SF¼SE¼SW¼ sec. 6, T. 13 S., R. 5 W.:

A1--0 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine and medium, granular structure; very friable; many fine roots; many fine pores; strongly acid; clear, smooth boundary.

B2--10 to 21 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; common worm tunnels; very strongly acid; gradual, wavy boundary.

A2b--21 to 37 inches, brown (10YR 5/3) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; few worm tunnels; very strongly acid; gradual, wavy boundary.

B2b--37 to 54 inches, brown (7.5YR 5/4) silt loam; few, fine and medium, distinct, pale-brown (10YR 6/3) and gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; friable; few fine roots; few

worm tunnels; very strongly acid; gradual, wavy boundary.

B3gb--54 to 72 inches, gray (10YR 6/1) silt loam; common, fine and medium, distinct, brown (10YR 5/3) and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few fine roots; common, fine, dark concretions; very strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown. The B horizon, above the buried solum, is pale brown to dark yellowish brown or strong brown. Depth to the buried solum is 20 to 36 inches. The soil is strongly acid or very strongly acid throughout.

Ariel soils are associated with Arkabutla and Tichnor soils, but they have better internal drainage and are not so gray as those soils. Ariel soils have a buried soil in their profile that Arkabutla and Tichnor soils lack.

Ariel silt loam, frequently flooded (Ar).--This level soil is on floodplains of local streams. Slopes are less than 1 percent. Individual areas range from about 20 to 100 acres in size. Included in the mapping are small areas of Arkabutla and Tichnor soils and small areas of Ariel soils that are only occasionally flooded.

Because flooding is a severe hazard, this soil is generally unsuitable for tilled crops, but it is suitable for pasture. The small included areas that are only occasionally flooded are suitable for tilled crops.

Most of this soil is in woodland. The small occasionally flooded areas are suitable for corn, winter small grains, grain sorghum, and soybeans. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, dallisgrass, white clover, and annual lespedeza. Capability unit Vw-1; woodland group 1w8.

Arkabutla Series

The Arkabutla series consists of somewhat poorly drained, level soils on flood plains of local streams. These soils formed in loamy sediment washed from uplands made up predominantly of windblown silt. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is dark-brown silt loam about 9 inches thick. The upper 10 inches of the subsoil is yellowish-brown, mottled silt loam. The lower 41 inches of the subsoil is gray, mottled silty clay loam. The underlying material is silty clay loam that is mottled gray, pale brown, and yellowish brown. Thin lenses of silt are common.

Natural fertility of Arkabutla soils is moderate. Permeability is moderate, and available water capacity is high. These soils respond well to fertilization, and they are easy to till.

These soils are subject to frequent flooding in winter and spring. Most areas are wooded but are suited to warm-season crops. The few cleared areas are used for row crops and pasture.

Representative profile of Arkabutla silt loam, frequently flooded, in a moist cultivated area in the SW¼NE¼NW¼ sec. 16, T. 12 S., R. 6 W.:

Ap--0 to 9 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; many, fine, dark concretions; slightly acid; abrupt, smooth boundary.

B21--9 to 19 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, grayish-brown mottles; weak, medium, subangular blocky structure; friable; many fine roots; common, fine, dark concretions; strongly acid; clear, wavy boundary.

B22g--19 to 60 inches, gray (10YR 6/1) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; gray silt coatings on some peds; many fine roots; few fine pores; common, fine and medium, dark concretions; very strongly acid; diffuse boundary.

C--60 to 75 inches, mottled gray (10YR 6/1), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/6) silty clay loam; pockets and thin lenses of gray silt loam; massive; few dark concretions; strongly acid.

The A horizon ranges from dark gray to pale brown. The B and C horizons are silt loam or silty clay loam. The B21 horizon is mottled gray or grayish brown. The B22 horizon is gray or grayish brown and is mottled brown or yellowish brown. The A horizon is slightly acid to strongly acid. The B and C horizons are strongly acid or very strongly acid.

Arkabutla soils are associated with Ariel and Tichnor soils. They are not so well drained as Ariel soils, and their B horizon is grayer. Arkbutla soils are better drained and browner than Tichnor soils.

Arkabutla silt loam, frequently flooded (At).--This level soil is on the flood plains of small streams. Slopes are less than 1 percent. Individual areas are long and narrow and range from 20 to 100 acres in size. Included in mapping are small areas of Ariel and Tichnor soils.

This soil is suited to farming. Most areas are flooded in winter and spring. Warm-season annual crops that require a short growing season can be grown safely. Under good management, clean-tilled crops that leave large amounts of residue can be grown year after year.

The main crops are soybeans and grain sorghums. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, and white clover. Capability unit IVw-1; woodland group 1w9.

Cahaba Series

The Cahaba series consists of well-drained, nearly level to moderately sloping soils on rolling uplands. These soils formed in loamy coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is brown fine sandy loam about 6 inches thick. The subsurface layer is about 5 inches of yellowish-brown fine sandy loam. The upper part of the subsoil is red sandy clay loam about 24 inches thick. The lower part is yellowish-red sandy loam that extends to a depth of about 49 inches. The underlying material extending to a depth of 72 inches, is red to yellowish-red stratified sandy clay loam and fine sandy loam. It contains lenses of loamy sand.

Natural fertility of Cahaba soils is moderate to low. Permeability is moderate, and available water capacity is medium. These soils warm early in spring, and crops can be planted early. Response to fertilization is good, and the soils are easy to till. If erosion is controlled, these soils are suitable for cultivation. Most areas have been cleared, but many have reverted to woodland through planting or natural reseeding.

Representative profile of Cahaba fine sandy loam, 3 to 8 percent slopes, in a moist, idle area in the SW¼NW¼NW¼ sec. 13, T. 13 S., R. 7 W.:

Ap--0 to 6 inches, brown (10YR 5/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary.

A2--6 to 11 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary.

B21t--11 to 25 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; patchy clay films on faces of peds; common fine roots; strongly acid; gradual, smooth boundary.

B22t--25 to 35 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; firm; sand grains coated and bridged with clay; few small pebbles; few fine roots; strongly acid; gradual, smooth boundary.

B3--35 to 49 inches, yellowish-red (5YR 4/8) sandy loam; weak, medium, subangular blocky structure; very friable; few small pebbles; strongly acid; abrupt, wavy boundary.

C1--49 to 61 inches, yellowish-red (5YR 4/6) fine sandy loam; weak, fine, subangular blocky structure; very friable; few small pebbles; strongly acid; abrupt, wavy boundary.

C2--61 to 72 inches, red (2.5YR 4/8) sandy clay loam; many lenses and pockets of yellowish-red (5YR 4/8) loamy sand; mixed texture is fine sandy loam; massive; very friable; few small pebbles; strongly acid.

The A1 horizon is brown to dark grayish brown. The Ap horizon is reddish brown to dark grayish brown. The A2 horizon is grayish brown to yellowish brown. The B horizon is red or yellowish red. The B3 horizon, beginning 28 to 42 inches below the surface, is fine sandy loam or sandy loam. The C horizon is yellowish red, red, or strong brown. The C1 horizon is loamy sand to fine sandy loam. The C2 horizon is sandy loam to sandy clay loam. The sandy clay loam C2 horizon is stratified with loamy sand or sandy loam and has a mixed texture of fine sandy loam. In places a gravelly B3 or C horizon begins at a depth of 35 to 60 inches. The content of coarse fragments in these horizons ranges from 25 to 50 percent, by volume. Reaction is medium acid or strongly acid in the A horizon and is strongly acid or very strongly acid below the A horizon.

Cahaba soils are associated with Sacul, Savannah, and Saffell soils. The Cahaba soils are better drained and have coarser textured B horizons than the Sacul soils. They do not have the fragipan that the Savannah soils have. Cahaba soils do not have the high gravel content throughout that Saffell soils have.

Cahaba fine sandy loam, 1 to 3 percent slopes (CaB).--This nearly level soil is on coastal plain uplands. Individual areas range from 20 to 100 acres in size. Included in mapping are small areas of Sacul and Savannah soils, a few areas having gravelly layers below a depth of 35 to 60 inches (pl. I, bottom), and a few small areas that have a gravelly surface layer.

This soil is well suited to farming, but erosion is a moderate hazard. Under good management that includes contour cultivation, and terracing on long slopes, clean-tilled crops that leave large amounts of residue can be safely grown year after year. Sown crops may be grown without attention to row direction.

This soil is used mainly for such truck crops as tomatoes (pl. II, top), potatoes, green beans, watermelons, and peas. Soybeans, grain sorghum, corn, and winter small grains are also suited. Suitable pasture plants are bahiagrass, bermudagrass, dallisgrass, white clover, sericea lespedeza, and annual lespedeza. Capability unit IIe-1; woodland group 2o7.

Cahaba fine sandy loam, 3 to 8 percent slopes (CaC).--This gently sloping soil is on coastal plain uplands. Its profile is the one described as representative of the series.

Individual areas range from about 20 to 100 acres in size. Included with this soil in mapping are a few small areas of Sacul and Saffell soils, a few areas having gravelly layers below a depth of 35 to 60 inches, and a few small areas having a gravelly surface layer.

This soil is suitable for cultivation, but runoff is medium and the hazard of erosion is severe. Under good management that includes contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be safely grown year after year in the less sloping areas. Conservation treatment needs to be intensified as slope length and gradient increase.

This soil is used mainly for such truck crops as tomatoes, watermelons, and green beans. Other suitable crops are corn, soybeans, winter small grains, and grain sorghum. Suitable pasture plants are bahiagrass, bermudagrass, dallisgrass, white clover, annual lespedeza and sericea lespedeza. Many tracts are woodland. Capability unit IIIe-1; woodland group 2o7.

Cahaba fine sandy loam, 8 to 12 percent slopes (CaD).--This moderately sloping soil is on the steeper parts of the coastal plain uplands. Individual areas range from about 20 to 40 acres in size. Included with this soil in mapping are small areas of Sacul and Saffell soils, small areas of a soil that has gravelly layers below a depth of 35 to 50 inches, and small areas of a soil that has a gravelly surface layer.

This soil is poorly suited to clean-tilled crops. Runoff is rapid and the hazard of erosion is very severe. Sown crops can be safely grown occasionally in a cropping system that keeps close-growing cover plants on the soil most of the time. This soil is best suited to pasture and woodland. Suitable pasture plants are bermudagrass, bahiagrass, annual lespedeza, and sericea lespedeza. Most areas of this soil are woodland. Capability unit IVe-1; woodland group 2o7.

Calhoun Series

The Calhoun series consists of poorly drained soils on upland flats. These soils formed in thick deposits of windblown silt. The native vegetation was scattered hardwood and pine trees and an understory of tall native grasses.

In a representative profile the surface layer is about 5 inches of brown silt loam. The subsurface layer is light brownish-gray, mottled silt loam about 18 inches thick. The upper part of the subsoil is about 8 inches of light brownish-gray, mottled silt loam that has tongues of gray silt loam extending from the layer above. The lower part, extending to a depth of 57 inches, is gray, mottled silty clay loam.

Natural fertility of Calhoun soils is moderate. Permeability is slow, and available water capacity is high. These soils respond well to fertilization. Tilth is easy to maintain.

If adequate surface drainage is used, these soils are suited to most crops and pasture plants commonly grown in the county. Nearly all areas are used for crops and pasture.

Representative profile of Calhoun silt loam in a moist cultivated area in the SW¼SW¼NE¼ sec. 15, T. 12 S., R. 6 W.:

Ap--0 to 5 inches, brown silt loam (10YR 5/3); few, fine, faint, gray and brown mottles; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A2g--5 to 23 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, faint, gray and strong-brown mottles; weak, medium, subangular blocky structure; friable; common fine roots; many, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B21tg & A2g--23 to 31 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, distinct, dark-gray (10YR 4/1) and yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; few fine roots; many fine pores; patchy clay films in pores and on faces of peds; common tongues of gray (10YR 6/1) silt loam extending through the horizon; gray silt coatings on faces of peds; common dark concretions; strongly acid; gradual, wavy boundary.

B22tg--31 to 57 inches, gray (10YR 5/1) silty clay loam; many, coarse, distinct, yellowish-brown (10YR 5/8) and light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; friable; patchy clay films on faces of peds; many dark concretions; common tongues of gray (10YR 6/1) silt loam, ¼ to 3 inches in diameter, that terminate in cups of dark grayish-brown (10YR 4/2) silty clay; strongly acid.

The A horizon ranges from 14 to 28 inches in thickness. The Ap horizon is dark grayish brown, brown, or grayish brown. The A2g horizon is light brownish gray or gray. The B horizon is light brownish-gray or gray silt loam or silty clay loam. The A horizon is medium acid to very strongly acid. The soil below the A horizon is strongly acid or very strongly acid.

Calhoun soils are associated with Calloway, Henry, and Crowley soils. They are more poorly drained than Calloway soils and they lack the fragipan horizon of the Calloway and Henry soils. Unlike Crowley soils, the upper part of the B horizon in Calhoun soils is not clayey.

Calhoun silt loam (Ch).--This level soil is on broad flats. Slopes are less than 1 percent. Individual areas range from 40 to 800 acres in size. Included with this soil in mapping are small areas of Calloway, Henry, and Crowley soils.

This soil is suited to farming, but the hazard of excessive wetness is severe. Farming is delayed several days after a rain in areas where surface drains have not been installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

The main crops are soybeans (pl. II, bottom) and rice (pl. III, top). Winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, dallisgrass, tall fescue, and white clover. Capability unit IIIw-2; woodland group 3w9.

Calloway Series

The Calloway series consists of somewhat poorly drained soils on level and nearly level uplands. These soils formed in thick deposits of windblown silt. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is grayish-brown silt loam about 6 inches thick. The upper part of the subsoil is light yellowish-brown, mottled silt loam about 15 inches thick. The lower part is a firm brittle fragipan. In sequence from the top, 7 inches of the fragipan is gray, mottled silt loam; 12 inches is grayish-brown mottled silty clay loam; and the lowest part is mottled light brownish-gray, gray, and yellowish-brown silt loam that extends to a depth of 72 inches or more.

Natural fertility of Calloway soils is moderate. Permeability is slow, and available water capacity is medium. These soils respond well to fertilization. Tilth is easy to maintain.

These soils are suited to most crops and pasture plants commonly grown in the county. Nearly all of this acreage is wooded.

Representative profile of Calloway silt loam, 0 to 1 percent slopes, in a moist idle area in the NW¼SE¼SE¼ sec. 7, T. 12 S., R. 4 W.:

Ap--0 to 6 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; many fine roots; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B2--6 to 21 inches, light yellowish-brown (10YR 6/4) silt loam; common, fine, faint, gray and grayish-brown mottles; moderate, medium, subangular blocky structure; friable; few, fine, dark concretions; few fine roots; few fine pores; very strongly acid; gradual, irregular boundary.

A'2--21 to 28 inches, gray (10YR 6/1) silt loam; common, fine, distinct, brown and yellowish-brown mottles; moderate, medium, subangular blocky structure; firm; slightly brittle; few, fine, dark concretions; many fine pores; strongly acid; gradual, irregular boundary.

B'x1--28 to 40 inches, grayish-brown (10YR 5/2) silty clay loam; common, fine, distinct, brown and yellowish-brown mottles; moderate, medium, subangular blocky structure; firm; brittle; clay films on faces of peds and in pores; gray silt coatings on faces of peds and in seams between coarse polygons; common, fine, dark concretions; common fine pores; very strongly acid; gradual, wavy boundary.

B'x2--40 to 72 inches, mottled light brownish-gray (10YR 6/2), gray (10YR 6/1) and yellowish-brown (10YR 5/4) silt loam; strong, medium, subangular blocky structure; very firm; compact and brittle; patchy clay films on faces of peds; common, fine, dark concretions; few fine pores; very strongly acid.

The A1 horizon is 1 to 2 inches thick and ranges from very dark grayish brown to grayish brown. The A2 horizon, 2 to 4 inches thick, is grayish brown to pale brown. The Ap horizon is dark grayish brown to brown. The B2 horizon is light yellowish brown to grayish brown. The A'2 horizon ranges from light gray or gray to light brownish gray. The B'x horizon is gray, light brownish-gray, or grayish-brown silty clay loam or silt loam. The soil is strongly acid or very strongly acid throughout the profile.

Calloway soils are associated with Grenada, Calhoun, Crowley, and Henry soils. Unlike Grenada soils, Browley soils have mottles in the upper part of the B horizon. The Calloway soils are not so gray as Calhoun and Henry soils, and they have a fragipan that the Calhoun soils lack. They have a thinner A2 horizon than the Henry soils. They lack the clayey upper part of the B horizon that Crowley soils have.

Calloway silt loam, 0 to 1 percent slopes (CoA).--This level soil in on uplands. Individual areas range from 20 to 200 acres in size. The profile of this soil is the one described as representative of the series. Included with this soil in mapping are small areas of Grenada, Calhoun, and Henry soils.

This soil is suited to farming, but the hazard of excessive wetness is moderate. Farming is delayed several days after a rain in areas where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

The main crops are soybeans and rice. Grain sorghum is a suitable crop, and winter small grains can be grown where surface drainage is

adequate. Suitable pasture plants are bermudagrass, dallisgrass, tall fescue, and white clover. Capability unit IIw-1; woodland group 3w8.

Calloway silt loam, 1 to 3 percent slopes (CoB).--This nearly level soil is on uplands. Individual areas range from 20 to 100 acres in size. The profile of this soil is similar to the one described as representative of the series, but erosion has removed some of the original surface layer in cultivated areas. Included in mapping are small areas of Grenada, Calhoun, and Henry soils.

This soil is suited to farming. Runoff is slow to medium; however, the hazard of erosion is moderate on long slopes. The hazard of excessive wetness is moderate in the less sloping areas. Under good management that includes contour cultivation and terracing on long slopes and surface drainage in less sloping areas, clean-tilled crops that leave large amounts of residue can be grown year after year. Sown crops can be grown without attention to row direction.

The main crops are soybeans, cotton, and rice. Other suitable crops are corn, grain sorghum, and winter small grains. Suitable pasture plants are bermudagrass, dallisgrass, tall fescue, and white clover. Capability unit IIe-2; woodland group 3w8.

Crowley Series

The Crowley series consists of poorly drained soils on upland flats. These soils formed in thin deposits of windblown silt and in the underlying clayey and loamy sediment. The native vegetation was scattered pine and hardwood trees and an understory of tall native grasses.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsurface layer is gray, mottled silt loam about 10 inches thick. The upper part of the subsoil is about 8 inches of mottled light brownish-gray, red, and brown, clay. The lower part is yellowish-brown, mottled silty clay loam that extends to a depth of 60 inches or more.

Natural fertility of Crowley soils is moderate. Permeability is very slow, and available water capacity is high. These soils respond well to fertilization. Tilth is easy to maintain.

If surface drainage is adequate, these soils are suited to most crops and pasture plants commonly grown in the county. Nearly all areas are used for crops and pasture.

Representative profile of Crowley silt loam, in a moist cultivated area in the NE¼SW¼SE¼ sec. 31, T. 14 S., R. 6 W.:

Ap--0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine granular structure; very friable; many fine roots; common, fine, dark concretions; very strongly acid; gradual, smooth boundary.

A2g--10 to 20 inches, gray (10YR 6/1) silt loam; common, fine and medium, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; few fine roots; common, medium, red concretions having black interiors; medium acid; abrupt, wavy boundary.

B21t--20 to 28 inches, mottled light brownish-gray (10YR 6/2), red (2.5YR 5/6), and brown (10YR 5/3) clay; moderate, medium, subangular blocky structure; very plastic; continuous clay films on faces of peds and in pores; few fine roots; many fine pores; medium acid; clear, irregular boundary.

B22t--28 to 60 inches, yellowish-brown (10YR 5/6) silty clay loam; many, medium, distinct, gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm; very plastic; patchy clay films on faces of peds and in root channels; few fine roots; common, medium, red concretions having black interiors; few small pebbles; medium acid.

The Ap horizon ranges from dark grayish brown to brown. The A2 horizon is gray to light brownish gray. The A horizon is 12 to 25 inches thick. The B21t horizon is silty clay or clay, and the B22t horizon is silty clay loam or silty clay. The soil is medium acid to very strongly acid throughout the profile.

Crowley soils are associated with Calhoun, Calloway, and Henry soils. The Crowley soils have a finer textured upper B horizon than the associated soils. They lack the fragipan of Calloway and Henry soils.

Crowley silt loam (Cr).--This level soil is on broad flats. Slopes are less than 1 percent. This soil is in a single tract of nearly 2,000 acres. Included in mapping are small areas of Calloway, Calhoun, and Henry soils.

This soil is suited to farming, but excessive wetness is a severe hazard. Farming is delayed several days after a rain where surface drains have not been installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Soybeans are the main crop. Other suitable crops are grain sorghum, cotton, and rice. Winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, and white clover. Capability unit IIIw-2; woodland group 3w9.

Grenada Series

The Grenada series consists of moderately well drained soils on level to moderately steep uplands. These soils formed in thick deposits

of windblown silt. The native vegetation was mixed pine and hardwood trees.

In a representative profile the surface layer is yellowish-brown silt loam about 4 inches thick. The upper part of the subsoil is yellowish-brown silty clay loam about 13 inches thick; the middle part is 9 inches of brownish-yellow, mottled silty clay loam; and the lower part is a firm, brittle, mottled fragipan that extends to a depth of 72 inches. In sequence from the top, the upper 3 inches is fragipan of gray silt loam; the next 15 inches is yellowish-brown silt loam; and the lower 28 inches is brownish-yellow silt loam.

Natural fertility of Grenada soils is moderate. Permeability is slow, and available water capacity is medium. These soils respond well to fertilization. Tilth is easy to maintain. These soils warm early in spring, and crops can be planted early. Grenada soils are suited to the crops and pasture plants commonly grown in the county, but most areas are wooded.

Representative profile of Grenada silt loam, 3 to 8 percent slopes, in a moist cultivated area in the SW¼NE¼SW¼ sec. 20, T. 12 S., R. 4 W.:

Ap--0 to 4 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, granular structure; friable; many fine roots; many fine pores; few, fine, dark concretions; very strongly acid; clear, smooth boundary.

B21t--4 to 17 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; few patchy clay films on faces of peds; many fine roots; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B22t--17 to 26 inches, brownish-yellow (10YR 6/6) silty clay loam; common, fine to medium, distinct, gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; friable; few patchy clay films on faces of peds; few, fine, dark concretions; very strongly acid; clear, irregular boundary.

A'2--26 to 29 inches, gray (10YR 6/1) silt loam; common, fine to medium, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; moderate, fine to medium, subangular blocky structure; firm; slightly brittle; many fine pores; few, fine, dark concretions; very strongly acid; clear, irregular boundary.

B'x1--29 to 44 inches, yellowish-brown (10YR 5/6) silt loam; common, fine to medium, distinct, gray (10YR 6/1) and brown (10YR 5/3) mottles; strong, medium, subangular blocky structure; firm; very compact and brittle; tongues of gray silt loam as much as 3 inches in diameter extending from horizon above; gray silt coatings on faces of peds; few fine pores; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B'x2--44 to 72 inches, brownish-yellow (10YR 6/6) silt loam; common, fine to medium, distinct, gray (10YR 6/1) and brown (10YR 5/3) mottles; strong, medium, subangular blocky structure; firm; very compact and brittle; few fine pores; few, fine, dark concretions; strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown. The B21t horizon is dark yellowish-brown to light yellowish-brown silt loam or silty clay loam. The B22t horizon is brownish-yellow or yellowish-brown silt loam or silty clay loam. The A'2 horizon is light brownish gray, gray, or light gray. The B'x horizon is yellowish-brown or brownish-yellow silt loam or silty clay loam. The A, B2t, and A'2 horizons are strongly acid or very strongly acid, and the B'x horizon is very strongly acid to medium acid.

Grenada soils are associated with Calloway and Henry soils. The Grenada soils lack the mottling in the upper 10 inches of the Bt horizon that Calloway and Henry soils have, and they are browner and better drained than Calloway and Henry soils.

Grenada silt loam, 0 to 1 percent slopes (GaA).--This level soil is on uplands. Individual areas range from about 20 to 60 acres in size. The profile of this soil is similar to the one described as representative of the series. Included in mapping are small areas of Calloway and Henry soils.

This soil is suited to farming, but excessive surface wetness is a moderate hazard. Farming is delayed a few days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year.

The main crops are cotton and soybeans (pl. III, bottom). Grain sorghum, rice, and corn are other suitable crops. Winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, tall fescue, and white clover. Capability unit IIw-1; woodland group 3o7.

Grenada silt loam, 1 to 3 percent slopes (GaB).--This nearly level soil is on uplands. Individual areas range from 20 to 60 acres in size. The profile of this soil is similar to the one described as representative of the series. Included in mapping are small areas of Calloway and Henry soils.

This soil is suited to farming, but runoff is medium and erosion is a moderate hazard. Under good management that includes contour cultivation and terracing on long slopes, clean-tilled crops that leave large amounts of residue can be grown year after year. Sown crops may be grown without attention to row direction.

The main crops are cotton, corn, and soybeans. Other suitable crops are grain sorghum, tomatoes, and winter small grains. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, and white clover. Capability unit IIe-2; woodland group 3o7.

Grenada silt loam, 3 to 8 percent slopes (GaC).--This gently sloping soil is on uplands. Individual areas range from about 20 to 50 acres in size. This soil has the profile described as representative of the series. Included with it in mapping are a few small areas of Calloway soils and a few small areas of Grenada soils having slopes greater than 8 percent.

This soil is suited to farming. Runoff is medium to rapid, however, the hazard of erosion is severe. Under good management that includes contour cultivation and terracing, clean-tilled crops that leave large amounts of residue can be safely grown year after year in the less sloping areas. The greater the length and gradient of slope, the more intensive is the management needed to control erosion.

The main crops are cotton, corn, and soybeans. Other suitable crops are grain sorghum, tomatoes, and winter small grains. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, and white clover. Capability unit IIIe-2; woodland group 3o7.

Grenada silt loam, 8 to 12 percent slopes (GaD).--This moderately sloping soil is on uplands. Individual areas range from 20 to 100 acres in size. Included in mapping are small areas of Udorthents and small, severely eroded areas that have many rills and few to common gullies.

Runoff is rapid, and the hazard of erosion is very severe. This soil is poorly suited to cultivated crops. Sown crops can be safely grown occasionally if the soil has a close-growing cover most of the time. This soil is best suited to pasture, woodland, or wildlife habitat. Most areas of this soil are wooded. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, and white clover. Capability unit IVe-1; woodland group 3o7.

Grenada association, undulating (GSC).--This soil association is in the steeper parts of the heavily wooded tracts in the south-central part of the county. It is about 70 percent Grenada soils, 15 percent soils similar to the Grenada but lacking a gray layer above the fragipan, and 15 percent small areas of Ariel, Arkabutla, Calhoun, Henry, and Tichnor soils.

Soils of this association were mapped together because of poor accessibility and low intensity of use. They occur in a regular pattern and in about the same proportion from one area to the next. Areas range from 100 to more than 1,000 acres in size. Slopes are less than 8 percent. The Grenada soils and the soils similar to them are mainly sloping. The Calloway soils are on small flats.

This soil association is suitable for cultivation, but nearly all of it is in mixed hardwood and pine forest. The hazard of erosion is moderate to severe in cleared tracts. The few small cleared areas are in pasture. Clean-tilled crops that leave large amounts of residue can be grown safely year after year if contour farming, terracing of long slopes, and other good management is practiced. The greater the length and gradient of slope, the greater the need for careful management for control of erosion.

Suitable crops on this soil association are soybeans, grain sorghum, and winter small grains. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza. Capability unit IIIe-2; woodland group 3o7.

Hebert Series

The Hebert series consists of somewhat poorly drained, level soils on the lower parts of old natural levees along bayous and abandoned meanders of the Arkansas River. These soils formed in stratified, loamy sediment. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is brown silt loam about 8 inches thick. The upper part of the subsoil is reddish-brown, mottled silty clay loam about 17 inches thick; the middle part is yellowish-red, mottled silty clay loam about 15 inches thick; and the lower part of the subsoil, about 15 inches thick, and the underlying material, extending to a depth of 72 inches, are brown, mottled fine sandy loam.

Natural fertility of Hebert soils is moderate to high. Permeability is moderately slow, and available water capacity is high. In places, a plowpan has formed beneath plow depth. This plowpan restricts penetration of roots and movement of water through the soil.

If they are well managed and adequately drained, these soils are suited to most crops and pasture plants grown in the county. Nearly all of the acreage is cultivated.

Representative profile of Hebert silt loam, in a moist cultivated area in the NW¼NW¼NE¼ sec. 33, T. 13 S., R. 4 W.:

Ap--0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary.

B21t--8 to 16 inches, reddish-brown (5YR 5/4) silty clay loam; common, fine and medium, gray (10YR 6/1) and strong-brown (7.5YR 5/8) mottles; peds coated with gray silt; moderate, medium, subangular blocky structure; firm; many patchy clay films on faces of peds; many fine roots; common

fine pores; medium acid; gradual, wavy boundary.

B22t--16 to 25 inches, reddish-brown (5YR 5/4) silty clay loam; common, fine, faint, strong-brown and pale-brown mottles; peds coated with gray silt; moderate, medium, subangular blocky structure; firm; many patchy clay films on faces of peds and in root channels; many fine roots; many fine pores; strongly acid; clear, wavy boundary.

B23t--25 to 40 inches, yellowish-red (5YR 5/6) silty clay loam; common, fine, faint, reddish-brown and strong-brown mottles; splotches, or pockets, of brown (10YR 5/3); peds coated with gray silt; moderate, medium, subangular blocky structure; firm; patchy clay films on faces of peds; many fine roots; many pores; few, fine, dark concretions; strongly acid; clear, wavy boundary.

IIB3--40 to 55 inches, brown (7.5YR 5/4) fine sandy loam; few, fine, faint, strong-brown and grayish-brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; few, fine, dark concretions; many fine pores; medium acid; gradual, wavy boundary.

IIC--55 to 72 inches, brown (7.5YR 5/4) fine sandy loam; few, coarse, faint, strong-brown (7.5YR 5/8) and brown (7.5YR 5/2) mottles; massive; slightly acid.

The Ap horizon ranges from dark grayish brown to brown. The B2 horizon is reddish-brown, yellowish-red, or brown silty clay loam or silt loam. In places, one or more subhorizons of the B2 horizon are grayish brown. The IIB3 and IIC horizons are grayish-brown to reddish-brown fine sandy loam to silty clay loam. The IIC horizon is stratified and, in places, contains few to common bedding planes. The A horizon is strongly acid to slightly acid. The B2 horizon is medium acid or strongly acid. The IIB3 and IIC horizons are medium acid to mildly alkaline.

Hebert soils are associated with Rilla, Perry, and Portland soils. Hebert soils are mottled throughout the B horizon and they are not so well drained as the Rilla soils. They have a loamy B horizon and, in contrast, the Perry and Portland soils have a clayey B horizon.

Hebert silt loam (Ha).--This level soil is in slightly depressed areas on bottom lands. Slopes are less than 1 percent. Individual areas range from about 40 to 300 acres in size. Included with this soil in mapping are small areas of Portland and Rilla soils.

This soil is suited to farming. Excessive wetness is a moderate hazard, and farming may be delayed a few days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

The main crops are soybeans, cotton, and rice. Grain sorghum and corn are also suitable crops, and winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bahiagrass, bermudagrass, dallisgrass, johnsongrass, tall fescue, and white clover. Capability unit IIw-2; woodland group 2w5.

Henry Series

The Henry series consists of poorly drained soils on broad upland flats and depressions. These soils formed in thick deposits of wind-blown silt. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is dark-gray, decayed forest debris and silt loam about 1 inch thick. The subsurface layer is light-gray and gray, mottled silt loam about 28 inches thick. The upper part of the subsoil is a firm, brittle fragipan of light brownish-gray, mottled silty clay loam about 25 inches thick. The lower part of the subsoil extending to a depth of 72 inches, is gray, mottled silt loam.

Natural fertility of Henry soils is moderate. Permeability is slow, and available water capacity is medium. These soils respond to fertilization. Tilth is easy to maintain.

If adequately drained these soils are suited to most crops and pasture plants commonly grown in the county, but most of the acreage is woodland.

Representative profile of Henry silt loam in a moist wooded area in the NE¼SE¼SE¼ sec. 34, T. 12 S., R. 6 W.:

A1--0 to 1 inch, dark-gray (10YR 4/1) decayed forest debris and silt loam; moderate, medium, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary.

A21g--1 to 7 inches, light-gray (10YR 7/1) silt loam; common, fine, distinct, brown and yellowish-brown mottles; weak, fine, granular structure; very friable; few, fine, dark concretions; many fine roots; very strongly acid; diffuse boundary.

A22g--7 to 14 inches, gray (10YR 6/1) silt loam; common, fine, distinct, brown and yellowish-brown mottles; weak, fine, granular structure; very friable; many fine roots; many, fine, dark concretions; very strongly acid; diffuse boundary.

A23g--14 to 29 inches, gray (10YR 6/1) silt loam; common, fine, distinct, brown and yellowish-brown mottles; weak, fine, subangular blocky structure; friable; many, fine, dark concretions; very strongly acid; abrupt, wavy boundary.

Bx--29 to 54 inches, light brownish-gray (10YR 6/2) silty clay loam; common, fine, distinct, yellowish-brown mottles; coarse prismatic structure parting to strong,

medium, angular blocky; firm; brittle; thick clay films on faces of prisms; tongues of gray silt between prisms in upper part of horizon; common dark concretions; very strongly acid; gradual, wavy boundary.

B3g--54 to 72 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/4) silt loam; few thin lenses of grayish-brown (10YR 5/2) silty clay loam; moderate, medium, subangular blocky structure; firm; few, fine, dark concretions; strongly acid.

The A1 horizon ranges from dark gray to dark grayish brown. The Ap horizon is dark gray to grayish brown. The A2g horizon is gray or light gray. The Bx and B3g horizons are light brownish-gray to gray silt loam or silty clay loam. The Ap or A1 horizon is slightly acid to very strongly acid. The soil beneath the A horizon is strongly acid or very strongly acid.

Henry soils are associated with Calhoun, Calloway, Crowley, and Grenada soils. The Henry soils have a fragipan that the Calhoun and Crowley soils lack. They are grayer and more poorly drained than the Calloway and Grenada soils. Henry soils are not so clayey in the upper part of the B horizon as the Crowley soils.

Henry silt loam (Hb).--This level soil is on broad upland flats and in depressions. Individual areas range from 40 to 400 acres in size. Slopes are less than 1 percent. This soil has the profile described as representative of the series. Included in mapping are small areas of Calhoun, Calloway, Tichnor, and Arkabutla soils.

This soil is suited to farming. The hazard of excessive wetness is severe. Farming is delayed several days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

The main crops are soybeans and rice. Grain sorghum, cotton, and winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, tall fescue, and white clover. Capability unit IIIw-2; woodland group 3w9.

Henry-Calloway association (HC).--This association consists of soils mapped together because they are poorly accessible and not intensively used. They are level and nearly level soils on heavily wooded broad flats and low ridges in the uplands. Slopes are less than 3 percent. The association is about 40 to 60 percent Henry silt loam, 25 to 35 percent Calloway silt loam, and 5 to 20 percent small areas of Grenada, Tichnor, and Arkabutla soils. The Henry soils are in broad level areas. To some extent, Calloway soils are also in these broad level areas, but to greater extent they are in nearly level areas.

This soil association is suited to cultivated crops and pasture, but most of it is in mixed pines and hardwoods. On the broad flats the hazard of excessive wetness is moderate to severe. Farming is delayed several days after a rain unless surface drains are installed. In the nearly level soils, runoff is slow and the hazard of erosion is moderate on the long slopes.

Clean-tilled crops that leave large amounts of residue can be grown year after year if adequate drainage is installed in the level areas and contour cultivation is practiced on the long slopes. Sown crops can be grown without attention to the direction in which the rows are run.

In the few small areas that have been cleared, the main crops are soybeans, and rice. Other suitable crops are corn, cotton, grain sorghum, and winter small grains. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, tall fescue, and white clover. Henry part, capability unit IIIw-2 and woodland group 3w9; Calloway part, in level areas, capability unit IIw-1 and IIe-2 in nearly level areas, and in woodland group 3w8.

Lafe Series

The Lafe series consists of somewhat poorly drained, level soils on broad upland flats. These soils formed in loamy sediment. The native vegetation is native grasses and a few stunted pines and post oaks on the occasional low mounds.

In a representative profile the surface layer is pale-brown silt loam about 5 inches thick. The subsoil is a layer of yellowish-brown, mottled silty clay loam about 49 inches thick. The underlying material, extending to a depth of 72 inches, is gray, mottled fine sand.

Natural fertility of Lafe soils is low. Runoff is slow, and permeability is very slow. The available water capacity is low.

These soils do not respond to fertilization. Because they contain sodium and magnesium in amounts toxic to most crops, they are unsuitable for cultivation. They are best used for pasture or for wildlife food and cover.

Representative profile of Lafe silt loam in a moist idle area in the NW¼SW¼SW¼ sec. 18, T. 13 S., R. 8 W.:

A1--0 to 5 inches, pale-brown (10YR 6/3) silt loam; weak, fine, granular structure; friable; few fine roots; few, fine, dark concretions; neutral; clear, smooth boundary.

B21t--5 to 25 inches, yellowish-brown (10YR 5/4) silty clay loam; many, fine and medium, distinct, gray (10YR 6/1) and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure arranged in moderate, coarse prisms; tongues of gray silt between prisms; very firm;

patchy clay films on faces of peds; few, fine calcium carbonate concretions; mildly alkaline; gradual, irregular boundary.

B22t--25 to 54 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct, gray (10YR 6/1) mottles; strong, medium, prismatic structure; very firm; few pockets of gray (10YR 6/1) fine sandy loam; patchy clay films on faces of peds; mildly alkaline; abrupt, irregular boundary.

IIC--54 to 72 inches, gray (10YR 6/1) fine sand; few, medium, distinct, strong-brown (7.5YR 5/8) mottles; single grained; loose; mildly alkaline.

The A horizon ranges from pale brown to grayish brown. The B horizon is pale-brown or yellowish-brown silt loam or silty clay loam. The IIC horizon ranges from fine sandy loam to fine sand. In places the IIC horizon is lacking and the B horizon extends to a depth of 72 inches or more. Calcium carbonate concretions in the profile range from few to common. The A horizon is medium acid to neutral. The soil below the A horizon is mildly alkaline or strongly alkaline.

Lafe soils are associated with Amy soils. They have a thinner A horizon than the Amy soils and have a high concentration of sodium and magnesium that the Amy soils lack.

Lafe silt loam (La).--This level soil is on broad upland flats. Slopes are less than 1 percent. Individual areas range from about 20 to 50 acres in size. Included in mapping are a few small areas of Amy soils, and small areas that have low, rounded mounds 1 to 2 feet high and 50 to 100 feet in diameter.

This soil is best suited to pasture and wildlife habitat. It is unsuitable for cultivation because of droughtiness and the high concentration of sodium and magnesium throughout the subsoil. Most crops on this soil are stunted, and they usually die before they mature. Capability unit VIs-1; woodland group 5t0.

Leaf Series

The Leaf series consists of poorly drained, level soils on broad upland flats. These soils formed in loamy and clayey coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is about 7 inches of gray, mottled silt loam. The upper part of the subsoil is gray, mottled clay about 38 inches thick. The lower part is about 14 inches of gray, mottled silty clay loam. The underlying material, extending to a depth of 72 inches, is gray, mottled clay.

Natural fertility of Leaf soils is low. Runoff is slow to ponded, and permeability is very slow. The available water capacity is high.

Most areas of these soils are wooded.

Representative profile of Leaf silt loam in a moist pasture in the SE¼SW¼SW¼ sec. 12, T. 14 S., R. 9 W.:

Ap--0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, yellowish-brown mottles; weak, fine, granular structure; friable; many fine roots; common, fine, dark concretions; very strongly acid; clear, smooth boundary.

A2g--6 to 13 inches, gray (10YR 6/1) silt loam; many, fine, distinct, brown and yellowish-brown mottles; weak, fine, granular structure; friable; many fine roots; many pores; common, fine, dark concretions; very strongly acid; abrupt, wavy boundary.

B21tg--13 to 35 inches, gray (10YR 6/1) clay; many, fine and medium, prominent, yellowish-red (5YR 5/8) and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; few fine roots; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B22tg--35 to 51 inches, gray (10YR 6/1) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; very strongly acid; gradual, smooth boundary.

B23tg--51 to 65 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; very strongly acid; gradual, smooth boundary.

Cg--65 to 72 inches, gray (10YR 6/1) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; thin lenses of gray (10YR 6/1) silt loam; massive; firm; plastic; strongly acid.

The A1 or Ap horizon is very dark grayish brown or dark grayish brown. The A2 horizon is gray or grayish brown. Texture of the B21tg and B22tg horizons is silty clay or clay. Texture of the B23tg and Cg horizons is silty clay loam to clay.

In some profiles, thin lenses of silt loam are lacking in the Cg horizon. The soil is strongly acid or very strongly acid throughout.

Leaf soils are associated with Amy soils. They have a finer textured B horizon than Amy soils.

Leaf silt loam (Le).--This level soil is on broad upland flats. Slopes are less than 1 percent. Individual areas range from about 20 to 300 acres in size. Included in mapping are a few small areas of Amy soils.

This soil is poorly suited to farming. Many areas are ponded during winter and spring, and

the hazard of excessive wetness is very severe. Warm-season annual crops that require a short growing season can be safely grown. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown year after year.

Most of the acreage is used for mixed pines and hardwoods. Most cleared areas are pasture. Suitable crops are soybeans and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, bahiagrass, tall fescue, and white clover. Capability unit IVw-2; woodland group 2w9.

Ouachita Series

The Ouachita series consists of well-drained, level soils on the flood plains of local streams. These soils formed in loamy sediment washed mainly from coastal plain uplands. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark-brown silt loam, about 7 inches thick, underlain by yellowish-brown silt loam about 16 inches thick. The upper most part of the subsoil is about 23 inches of yellowish-brown silt loam. The middle part is about 16 inches of brown, mottled loam. The lowermost part, extending to a depth of 75 inches or more, is gray, mottled loam that contains thin lenses of silt loam and silty clay loam.

Natural fertility of Ouachita soils is moderate. Permeability is moderately slow, and available water capacity is high. These soils respond well to fertilization and are easy to till.

These soils are subject to frequent flooding in winter and spring. Most of the acreage is wooded. The few cleared areas are used for pasture and for summer crops that require a short growing season.

Representative profile of Ouachita silt loam in a moist wooded area in the SE¼SW¼NW¼ sec. 7, T. 13 S., R. 8 W.:

A11--0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; many pores; very strongly acid; clear, smooth boundary.

A12--7 to 23 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; many fine roots; many pores; few, fine, dark concretions; very strongly acid; gradual, wavy boundary.

B21--23 to 46 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; firm; few fine roots; common pores; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B22--46 to 62 inches, brown (10YR 5/3) loam; few, fine, faint, dark grayish-brown and gray mottles; moderate, medium, subangular blocky structure; firm; few fine roots; common pores; few, fine, dark concretions; very strongly acid; gradual, wavy boundary.

B3g--62 to 75 inches, gray (10YR 6/1) loam; thin lenses of silt loam and silty clay loam; common, fine, distinct, brown mottles; weak, medium, subangular blocky structure; firm; few, fine and medium, dark concretions; very strongly acid.

The A11 or Ap horizon is very dark grayish brown to brown. The A12 horizon is brown or yellowish-brown silt loam or loam. The B2 horizon is brown or yellowish-brown silt loam or loam. The B3 horizon is gray to brown silt loam or loam. Mottling begins at a depth of 30 to 50 inches. The soil is strongly acid or very strongly acid throughout.

Ouachita soils are associated with Amy soils. They are browner and better drained than Amy soils.

Ouachita silt loam (Oa).--This level soil is on flood plains. Slopes are less than 1 percent. Individual areas are long and narrow and range from 40 to 200 acres in size. Included in mapping are a few small areas of Amy and Leaf soils, small areas having a surface layer of fine sandy loam, and small areas that are only occasionally flooded.

This soil is suited to farming, but most areas are subject to frequent flooding in winter and early in spring. Floods recede by June in most years. In areas not subject to scouring by rapidly flowing floodwater, warm-season crops that require a short growing season can be safely grown. The small included areas that are only occasionally flooded are suited to all row crops and pasture plants commonly grown in the county. Under good management, clean-tilled crops that leave large amounts of residue can be grown year after year.

This soil is well suited to forest, and most areas are used for hardwoods and loblolly pine. The main crops are soybeans and grain sorghum. Suitable pasture plants are bermudagrass, carpetgrass, dallisgrass, bahiagrass, and white clover. Capability unit IVw-1; woodland group 1w8.

Perry Series

The Perry series consists of poorly drained, level soils on bottom lands. These soils formed in thick beds of clayey slack-water deposits laid down by the Arkansas River. The native vegetation was mixed hardwoods.

In a representative profile the surface layer is dark grayish-brown, mottled clay about 6 inches thick. The upper part of the subsoil is about 27 inches of gray, mottled clay. The lower part of the subsoil is about 14 inches thick, and the underlying material, extending to a depth of 72 inches, is reddish-brown clay.

Natural fertility of Perry soils is moderate to high. Permeability is very slow, and available water capacity is high. When these soils

dry, they shrink and crack; and when they are wet they expand and the seal cracks.

If these soils are adequately drained, they are suited to most crops and pasture plants commonly grown in the county. Most areas are used for crops.

Representative profile of Perry clay in a moist cultivated area in the NE¼NE¼SE¼ sec. 32, T. 13 S., R. 4 W.:

Ap--0 to 6 inches, dark grayish-brown (10YR 4/2) clay; few, fine, faint, brown and gray mottles; moderate, medium, blocky structure; firm; plastic; many fine roots; few, fine, dark concretions; strongly acid; abrupt, smooth boundary.

B21g--6 to 20 inches, gray (10YR 5/1) clay; many, fine, distinct, strong-brown mottles; moderate, medium, blocky structure; very firm; plastic; many fine roots; common, fine, dark concretions; few slickensides; very strongly acid; gradual, smooth boundary.

B22g--20 to 33 inches, gray (10YR 5/1) clay; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, medium, blocky structure; very firm; plastic; many fine roots; many, fine, dark concretions; common slickensides; very strongly acid; gradual, smooth boundary.

IIB3--33 to 47 inches, reddish-brown (5YR 4/4) clay; moderate, medium, blocky structure; very firm; plastic; few, fine, dark concretions; few calcium carbonate nodules; few fine roots; moderately alkaline; diffuse boundary.

IIC--47 to 72 inches, reddish-brown (5YR 4/3) clay; few, fine, faint, red mottles; moderate, medium, blocky structure; very firm; plastic; common nodules of calcium carbonate; moderately alkaline; calcareous.

The A horizon ranges from gray to dark grayish brown. The B2g horizon is gray or dark gray. The depth to the IIB3 horizon ranges from 20 to 36 inches. The A and B2g horizons are medium acid to very strongly acid. The IIB3 and IIC horizons are neutral to moderately alkaline.

Perry soils are associated with Hebert and Portland soils. Perry soils are more poorly drained than either associated soil. They are finer textured throughout than the Hebert soils, and they are grayer in the upper part of the B horizon than the Portland soils.

Perry clay (Pe).--This is a level soil on low, depressional areas on bottom lands. Slopes are less than 1 percent. Individual areas range from about 40 to 400 acres in size. Included in mapping are a few small areas of Hebert and Portland soils.

This soil is suited to cultivated crops, but runoff is very slow and excessive wetness is a severe hazard. Because of its high content of clay, this soil can be cultivated only within a narrow range of moisture content. It is difficult to prepare a seedbed and to maintain good tilth. Farming is delayed several days after a rain where surface drains are not provided. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year.

Most of this acreage is cultivated. A few small areas are pasture and woodland. Suitable crops are soybeans, rice, winter small grains, cotton, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, tall fescue, white clover, and vetch. Capability unit IIIw-3; woodland group 2w6.

Pheba Series

The Pheba series consists of somewhat poorly drained, level to nearly level soils on broad upland flats. These soils formed in loamy coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is dark-brown, mottled silt loam about 5 inches thick. The subsurface layer is about 5 inches of pale-brown, mottled silt loam. The upper part of the subsoil is brown, mottled silt loam about 13 inches thick. The lower part is a firm, brittle fragipan. A buried soil is at a depth of 23 inches. In sequence from the top, the uppermost 7 inches of the buried soil is grayish-brown, mottled silt loam; the next 14 inches is yellowish-brown, mottled silt loam; and the lowermost 6 inches is brownish-yellow, mottled silt loam. The underlying material, extending to a depth of 72 inches, is mottled gray, reddish yellow, and yellowish brown silt loam.

Natural fertility of Pheba soils is moderate to low. Permeability is moderately slow, and available water capacity is medium. These soils respond well to fertilization. Tilth is easy to maintain.

These soils are suited to most crops and pasture plants commonly grown in the county, but nearly all of this acreage is wooded (pl. IV, top).

Representative profile of Pheba silt loam in a moist, idle area in the SE¼NE¼NW¼ sec. 6, T. 15 S., R. 7 W.:

Ap--0 to 5 inches, dark-brown (10YR 4/3) silt loam; few, fine, faint, gray and yellowish-brown mottles; weak, fine, granular structure; friable; many roots; few, fine, dark concretions; strongly acid; abrupt, smooth boundary.

A2--5 to 10 inches, pale-brown (10YR 6/3) silt loam; common, fine, distinct, gray and yellowish-brown mottles; weak, fine, granular structure; friable; many roots; few, fine, dark concretions; very strongly acid; gradual, smooth boundary.

B--10 to 23 inches, brown (10YR 5/3) silt loam; many, fine, faint, yellowish-brown, and

grayish-brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; few, fine, dark concretions; very strongly acid; clear, wavy boundary.

A'2--23 to 30 inches, grayish-brown (10YR 5/2) silt loam; few, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structrue; friable; brittle; many, fine, dark concretions; few fine pores; very strongly acid; abrupt, irregular boundary.

B'x1--30 to 44 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, gray (10YR 5/1) and brownish-yellow (10YR 6/8) mottles; moderate, medium, subangular blocky structure; firm; brittle; few patchy clay films and gray silt coats on faces of peds; few dark concretions and fine pores; very strongly acid; gradual, wavy boundary.

B'x2--44 to 60 inches, brownish-yellow (10YR 6/6) silt loam; few, medium, distinct, gray (10YR 6/1) and yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm; brittle; thin patchy clay films on faces of peds; many fine pores; few, fine, dark concretions; very strongly acid; gradual, wavy boundary.

C--60 to 72 inches, mottled gray (10YR 6/1), reddish-yellow (7.5YR 6/8) and yellowish-brown (10YR 5/8) silt loam; lenses of gray silty clay loam; massive; friable; very strongly acid.

The A1 horizon ranges from very dark grayish brown to grayish brown, and the A2 horizon is pale brown to yellowish brown. The Ap horizon is dark brown to pale brown. The B horizon is silt loam or loam and ranges from brown to yellowish brown. The A'2 horizon is light gray to grayish brown. The B'x horizon is yellowish brown to light brownish gray and ranges from silt loam to silty clay loam. Depth to the Bx horizon ranges from 18 to 32 inches. The soil is very strongly acid or strongly acid throughout.

Pheba soils are associated with Amy and Savannah soils. Pheba soils are better drained and have a browner B horizon than the Amy soils. They are not so well drained as Savannah soils and have mottling in the upper part of the B horizon that the Savannah soils lack.

Pheba silt loam (Ph).--This soil is on level to nearly level uplands. Slopes are less than 2 percent. Individual areas range from 20 to 60 acres in size. Included in mapping are small areas of Amy and Savannah soils.

This soil is suited to farming, but excessive wetness is a severe hazard. Farming is delayed several days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year.

Most areas of this soil are wooded. Suitable crops are soybeans and grain sorghum. Winter small grains can be grown where surface drainage is adequate. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, bahiagrass (pl. IV, bottom), tall fescue, annual lespedeza, and white clover. Capability unit IIIw-1; woodland group 2w8.

Portland Series

The Portland series consists of somewhat poorly drained, level soils on bottom land. These soils formed in thick beds of clayey slack-water deposits from the Arkansas River. In places the soil is covered by a thin overwash of loamy sediment. The native vegetation was mixed hardwoods.

In a representative profile the surface layer is about 6 inches of dark-brown clay. The upper part of the subsoil is about 8 inches of brown, mottled clay. The lower part is reddish-brown clay that extends to a depth of 72 inches or more.

Natural fertility of Portland soils is moderate to high. Permeability is very slow, and available water capacity is high. When these soils are dry they shrink and crack, and when they are wet they expand and seal the cracks.

Where these soils are adequately drained, they are suited to most crops and pasture plants commonly grown in the county. Most areas are used for crops.

Representative profile of Portland clay in a moist cultivated area in the NE¼SE¼NW¼ sec. 32, T. 13 S., R. 4 W.:

Ap--0 to 6 inches, dark-brown (10YR 4/3) clay; moderate, medium, blocky structure; firm; plastic; many fine roots; slightly acid; abrupt, smooth boundary.

B21--6 to 14 inches, brown (7.5YR 5/4) clay; many, medium, distinct, strong-brown (7.5YR 5/8) and grayish-brown (10YR 5/2) mottles; moderate, medium, blocky structure; firm; plastic; few slickensides; many fine roots; few, fine, dark concretions; strongly acid; gradual, smooth boundary.

B22--14 to 27 inches, reddish-brown (5YR 4/3) clay; moderate, medium, blocky structure; very firm; plastic; few slickensides; few fine roots; many, fine, dark concretions; medium acid; diffuse boundary.

B23--27 to 45 inches, reddish-brown (5YR 4/4) clay; few, fine, faint, brown mottles; moderate, medium, blocky structure; very firm; plastic; common slickensides; few, fine, dark concretions; mildly alkaline; diffuse boundary.

B24--45 to 72 inches, reddish-brown (5YR 4/4) clay; few, fine, faint, brown mottles; moderate, medium, blocky structure; very firm; plastic; few slickensides; few, fine, dark concretions; few calcium

carbonate nodules; moderately alkaline; calcareous.

The A1 or Ap horizon ranges from grayish-brown to dark-brown silt loam or clay. The B horizon is brown to reddish brown and has few to many gray, red, and brown mottles in the upper part. In places the profile has a C horizon of silt loam, of clay, or thin stratified layers of silt loam and clay. The C horizon is yellowish red, reddish brown, or brown. The A horizon is slightly acid to strongly acid. The upper part of the B horizon is very strongly acid to medium acid, and the lower part is slightly acid to moderately alkaline and calcareous.

Portland soils are associated with Hebert, Rilla, and Perry soils. Portland soils have a finer textured B horizon than the Hebert and Rilla soils. They are redder in the upper part of the B horizon than the Perry soils.

Portland silt loam (Po).--This level soil is on broad flats on bottom land. Slopes are less than 1 percent. Individual areas range from about 20 to 200 acres in size. The profile of this soil is similar to the one described as representative of the series, but the surface layer is silt loam. Included in mapping are a few small areas of Portland clay and Hebert and Perry soils.

This soil is suited to cultivated crops, but runoff is slow and excessive wetness is a severe hazard. Farming is delayed several days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year. Tilth is easy to maintain.

Most areas of this soil are cultivated. Suitable crops are soybeans, cotton, rice, corn, winter small grains, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, tall fescue, white clover, and alfalfa. Capability unit IIIw-3; woodland group 2w6.

Portland clay (Pr).--This level soil is on broad flats on bottom lands. Slopes are less than 1 percent. Individual areas range from about 40 to 400 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few small areas having a silt loam surface layer and small areas of Perry and Hebert soils.

This soil is suited to cultivated crops, but runoff is slow and excessive wetness is a severe hazard. Farming is delayed several days after a rain where surface drains are not installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be grown safely year after year. It is difficult to prepare a seedbed and to maintain good tilth on this soil.

Suitable crops are soybeans, cotton, rice, winter small grains, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, bahiagrass, tall fescue, alfalfa, and white clover. Capability unit IIIw-3; woodland group 2w6.

Rilla Series

The Rilla series consists of well-drained, level and undulating soils on natural levees. These soils formed in mixed alluvium deposited by the Arkansas River. They occur as long, narrow strips, chiefly along large bayous and abandoned channels of bayous. The native vegetation was mixed hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is about 7 inches thick of brown silt loam. The upper part of the subsoil is yellowish-red silty clay loam about 20 inches thick. The lower part is brown silt loam that extends to a depth of about 47 inches. The underlying material, extending to a depth of 72 inches, is brown to yellowish-red silt loam and silty clay loam. It contains pockets and lenses of very fine sandy loam.

Natural fertility of Rilla soils is moderate to high. Permeability is moderate, and available water capacity is high. These soils respond well to fertilization, and tilth is easy to maintain.

These soils are well suited to most cultivated crops and pasture plants commonly grown in the county, and nearly all areas are cleared.

Representative profile of Rilla silt loam, 0 to 1 percent slopes, in a moist cultivated area in the NE¼NW¼SE¼ sec. 34, T. 13 S., R. 4 W.:

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary.

A2--8 to 15 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary.

B21t--15 to 25 inches, yellowish-red (5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; pale-brown silt coatings and common patchy clay films on faces of peds; few dark concretions; common fine roots; common pores; very strongly acid; gradual, smooth boundary.

B22t--25 to 35 inches, yellowish-red (5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; pale-brown silt coatings and common patchy clay films on faces of peds; few dark concretions; few fine roots; common pores;

very strongly acid; gradual, smooth boundary.

B3--35 to 47 inches, brown (7.5YR 5/4) silt loam; few lenses of pale-brown (10YR 6/3) very fine sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; few dark concretions; common pores; very strongly acid; gradual, smooth boundary.

C1--47 to 60 inches, brown (7.5YR 5/4) silt loam; massive; very friable; few dark concretions; many pores; strongly acid; abrupt, wavy boundary.

C2--60 to 72 inches, yellowish-red (5YR 4/8) silty clay loam; pockets and lenses of pale-brown (10YR 6/3) very fine sandy loam; massive; friable; few dark concretions; medium acid.

The A horizon ranges from brown to dark grayish brown. The B2t horizon is yellowish-red or reddish-brown silt loam or silty clay loam. The B3 horizon is brown to yellowish-red silt loam or loam. The C horizon is brown to red fine sandy loam, silt loam, sandy clay loam, or silty clay loam. The A horizon is slightly acid to strongly acid. The B and C horizons are medium acid to very strongly acid.

Rilla soils are associated with Hebert and Portland soils. Rilla soils are better drained than Hebert and Portland soils and they lack the mottling of those soils. Rilla soils have less clay in the B horizon than Portland soils.

Rilla silt loam, 0 to 1 percent slopes (RaA).--This level soil is in long narrow strips, chiefly along larger bayous and abandoned channels. Individual areas range from 50 to 300 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few small areas of Hebert and Portland soils.

This soil is well suited to farming. In warms early in spring, and early planting is possible. This soil can be cultivated through a wide range of moisture content. Under good management, clean-tilled crops that leave large amounts of residue can be grown year after year.

The main crops are soybeans, cotton (pl. V, top), corn, winter small grains, grain sorghum, and such truck crops as tomatoes and green beans. Adapted pasture plants are bahiagrass, bermudagrass, dallisgrass, johnsongrass, tall fescue, lespedeza, crimson clover, and white clover. Capability unit I-1; woodland group 2o4.

Rilla silt loam, undulating (RbB).--This soil is along large bayous and abandoned channels. Individual areas range from 20 to 100 acres in size. Slopes range from 1 to 8 percent. The soil is undulating and has long narrow depressions between short slopes. Included in mapping are small areas of the Hebert and Portland soils.

This soil is well suited to farming, but the hazard of erosion is moderate on the narrow ridges. Under good management that includes cross-slope cultivation, clean-tilled crops that leave large amounts of residue can be grown safely year after year (pl. V, bottom). Sown crops may be grown without attention to row direction.

The main crops are cotton, soybeans, corn, winter small grains, grain sorghum, and such truck crops as tomatoes and green beans. Suitable pasture plants are bermudagrass, dallisgrass, johnsongrass, tall fescue, lespedeza, crimson clover, and white clover. Capability unit IIe-3; woodland group 2o4.

Sacul Series

The Sacul series consists of moderately well drained, nearly level to moderately sloping soils on rolling uplands. These soils formed in loamy and clayey coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is yellowish-brown loam about 6 inches thick. The uppermost part of the subsoil is about 6 inches of yellowish-red loam. The middle part is about 19 inches of yellowish-red and red, mottled clay. The lowermost part is about 24 inches of gray, mottled clay. The underlying material, extending to a depth of 72 inches, is strong-brown, gray, and red siltstone and shale.

Natural fertility of Sacul soils is low. Permeability is slow, and available water capacity is high. Response to fertilization is fair. In areas where erosion has removed much of the surface layer, these soils are somewhat difficult to till.

These soils are suited to most crops and pasture plants commonly grown in the county. Most areas of these soils are wooded.

Representative profile of Sacul loam in an area of Sacul soils, 3 to 8 percent slopes, eroded, in a moist pasture in the SE¼NE¼SE¼ sec. 22, T. 12 S., R. 7 W.:

Ap--0 to 6 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B1--6 to 12 inches, yellowish-red (5YR 5/6) loam; weak, medium, subangular blocky structure; friable; many fine roots; very strongly acid; clear, smooth boundary.

B21t--12 to 21 inches, yellowish-red (5YR 4/6) clay; few, fine, prominent, light olive-brown mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; many fine roots; very strongly acid; gradual, wavy boundary.

B22t--21 to 31 inches, red (2.5YR 4/6) clay; many, medium, prominent, gray (10YR 6/1)

and yellowish-brown (10YR 5/4) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; common fine roots; very strongly acid; gradual, smooth boundary.

B23t--31 to 44 inches, gray (10YR 6/1) clay; common, medium, prominent, red (2.5YR 4/6) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; few fine roots; very strongly acid; diffuse boundary.

B24t--44 to 55 inches, gray (10YR 6/1) clay; few, medium, prominent, red (2.5YR 4/6) mottles; moderate, medium, subangular blocky structure; firm; plastic; continuous clay films on faces of peds; few fine roots; extremely acid; gradual, smooth boundary.

C--55 to 72 inches, strong-brown (7.5YR 5/8), gray (10YR 6/1), and red (2.5YR 4/8) siltstone; thin bands of fissile shale 1/16 to 1/8 inch thick; massive; firm; extremely acid.

The A1 or Ap horizon ranges from dark grayish-brown to yellowish-brown loam in uneroded areas. In eroded areas, the Ap horizon is brown to reddish-brown loam or clay loam. The B1 horizon is red or yellowish-red loam or clay loam. The B21t horizon is red or yellowish-red clay or silty clay. The B22t horizon is red or yellowish-red clay or silty clay containing few to many mottles. The B23t and B24t horizons are gray or light brownish-gray clay to silty clay loam. The C horizon is siltstone and fissile shale or is stratified silt loam, silty clay loam, clay loam, or sandy clay loam. The A through the B23t horizons are acid or very strongly acid. The soil is strongly acid to extremely acid below the B23t horizon.

Sacul soils are associated with Cahaba, Saffell, Savannah, and Tippah soils. Sacul soils are not so well drained as the Cahaba soils, which lack mottling in their B horizons. They are finer textured in the B horizon than Cahaba and Savannah soils, and they lack the fragipan of Savannah soils. Sacul soils are redder in the upper part of the B horizon and have a lower content of bases than Tippah soils. They lack the high content of gravel of the Saffell soils and are more clayey in the B horizon.

Sacul loam, 8 to 12 percent slopes (SaD).--This moderately sloping soil is on uplands. Individual areas range from 20 to 100 acres in size. The profile of this soil is similar to the one described as representative of the series, but the surface layer is not so severely eroded. Included in mapping are small areas of Cahaba, Saffell, and eroded Sacul soils and a few small areas where the surface layer is gravelly.

Runoff is rapid and the hazard of erosion is severe. This soil is not suited to cultivation. It is best used as woodland or pasture, and most areas are in woodland. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, and sericea lespedeza. Capability unit VIe-1; woodland group 3c2.

Sacul soils, 1 to 3 percent slopes, eroded (ScB2).--This nearly level soil is on uplands. Individual areas range from 20 to 50 acres in size. The profile of this soil is similar to the one described as representative of the series, but texture of the surface layer ranges from loam to clay. Included in mapping are small areas of Cahaba, Savannah, and Tippah soils and a few small areas where the surface layer is gravelly.

This soil is suited to farming, but runoff is medium and the hazard of erosion is severe. Clean-tilled crops that leave large amounts of residue can be grown safely year after year under good management that includes use of contour cultivation, winter cover crops in the cropping system, and terraces on long slopes.

The main crops are soybeans, corn, winter small grains, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, white clover, and sericea lespedeza. Capability unit IIIe-3; woodland group 3c2.

Sacul soils, 3 to 8 percent slopes, eroded (ScC2).--These gently sloping soils are on uplands. Individual areas range from about 20 to 40 acres in size. The profile of these soils is similar to the one described as representative of the series, but texture of the surface layer ranges from loam to clay. Included in mapping are a few small areas of Cahaba, Saffell, Savannah, and Tippah soils and a few small areas where the surface layer is gravelly.

These soils are poorly suited to tilled crops. Runoff is rapid, and the hazard of erosion is very severe. Sown crops can be safely grown occasionally in a cropping system that keeps the soils under close-growing cover most of the time.

These soils are best suited to pasture and woodland. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, sericea lespedeza, and white clover. Capability unit IVe-2; woodland group 3c2.

Saffell Series

The Saffell series consists of well-drained, gently sloping to moderately steep soils on hilly uplands. These soils formed in gravelly, loamy coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is light yellowish-brown gravelly fine sandy loam about 6 inches thick. The subsurface layer is about 6 inches of pale-brown gravelly fine sandy loam. The subsoil is about 30 inches of red and yellowish-red gravelly sandy clay loam. The underlying material, extending to a

depth of 72 inches, is reddish-brown gravelly fine sandy loam.

Natural fertility of Saffell soils is low. Permeability is moderate, and available water capacity is low. Response to fertilization is fair. These soils are somewhat droughty and are difficult to till because of the content of gravel.

These soils are fairly to poorly suited to farming. Most crops and pasture plants are suitable. Most of these areas are wooded. Many areas have been mined for gravel.

Representative profile of Saffell gravelly fine sandy loam, 3 to 8 percent slopes, in a moist wooded area in the SE¼NE¼NE¼ sec. 28, T. 11 S., R. 7 W.:

A1--0 to 6 inches, light yellowish-brown (10YR 6/4) gravelly fine sandy loam; weak, fine, granular structure; very friable; many fine roots; about 20 percent, by volume, pebbles as much as 2 inches in diameter; medium acid; clear, smooth boundary.

A2--6 to 12 inches, pale-brown (10YR 6/3) gravelly fine sandy loam; weak, fine, granular structure; very friable; few fine roots; about 20 percent, by volume, pebbles as large as 2 inches in diameter; strongly acid; abrupt, smooth boundary.

B21t--12 to 27 inches, red (2.5YR 4/6) gravelly sandy clay loam; weak, fine, subangular blocky structure; friable; patchy clay films; about 65 percent, by volume, pebbles as large as 2 inches in diameter; strongly acid; gradual, smooth boundary.

B22t--27 to 42 inches, yellowish-red (5YR 4/6) gravelly sandy clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on faces of peds; about 50 percent, by volume, pebbles as large as 2 inches in diameter; very strongly acid; gradual, wavy boundary.

C--42 to 72 inches, reddish-brown (2.5YR 5/4) gravelly fine sandy loam; streaks and pockets of strong-brown (7.5YR 5/6) sand; massive; very friable; about 20 percent, by volume, pebbles as large as 2 inches in diameter; strongly acid.

The A1 or Ap horizon ranges from light yellowish brown to reddish brown. The A2 horizon is pale brown or yellowish brown to reddish yellow. It is lacking in places. The content of gravel in the A horizon ranges from 20 to 50 percent, by volume. The Bt horizon is brown to red gravelly fine sandy loam or gravelly sandy clay loam. The content of gravel ranges from 35 to 70 percent, by volume. The C horizon is red to brown gravelly loamy sand to gravelly fine sandy loam. The content of gravel ranges from about 20 to 80 percent, by volume. The soil is medium acid to very strongly acid throughout.

Saffell soils are associated with Cahaba and Sacul soils. They are gravelly throughout, whereas Cahaba and Sacul soils have little or no gravel in the B horizon. Saffell soils have less clay in the B horizon than Sacul soils.

Saffell gravelly fine sandy loam, 3 to 8 percent slopes (SfC).--This gently sloping soil is on uplands. Individual areas range from 20 to 50 acres in size. The profile of this soil is the one described as representative of the series. Included with this soil in mapping are a few small areas of Cahaba and Sacul soils and of gravel pits (pl. VI, top).

This soil is suited to farming, but it is somewhat droughty, and the gravel interfers with tillage. The hazard of erosion is severe. Under good management that includes contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be grown safely year after year on the less sloping areas. As length and gradient of slope increase, need increases for intensive management that controls erosion.

The main crops are winter small grains, grain sorghum, and truck crops, chiefly tomatoes. Suitable pasture plants are bermudagrass, bahiagrass, dallisgrass, and sericea lespedeza. Capability unit IIIe-4; woodland group 4f2.

Saffell gravelly fine sandy loam, 8 to 20 percent slopes (SfE).--This moderately sloping to moderately steep soil is on uplands. The profile of this soil is similar to the one described as representative of the series. Individual areas range from 20 to 100 acres in size. Included in mapping are a few small areas of Cahaba and Sacul soils and of gravel pits.

This soil is unsuitable for cultivation. It is best used as woodland and pasture. Suitable pasture plants are bermudagrass, dallisgrass, and sericea lespedeza. Capability unit VIe-2; woodland group 4f2.

Savannah Series

The Savannah series consists of moderately well drained, nearly level and gently sloping soils on rolling uplands. These soils formed in loamy coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is dark-brown fine sandy loam about 9 inches thick. The upper part of the subsoil is strong brown loam about 15 inches thick. The lower part is a firm, brittle fragipan. The upper 13 inches of the fragipan is strong-brown loam. The lower 28 inches is mottled yellowish-red, red, strong-brown, gray, and grayish-brown loam and clay loam. The underlying material is red sandy clay loam that contains few thin bands of light-gray fine sand.

Natural fertility of Savannah soils is low. Permeability is moderately slow and available water capacity is medium. Savannah soils respond well to fertilization and are easy to till. Where erosion is controlled, these soils

are suitable for cultivation. They are suited to most pasture plants commonly grown in the county. Many tracts have been cleared, and some are cultivated or are in pasture. Other areas have reverted to woodland through planting or natural reseeding.

Representative profile of Savannah fine sandy loam, 1 to 3 percent slopes, in a moist wooded area in the NE¼NW¼NW¼ sec. 21, T. 12 S., R. 8 W.:

A1--0 to 9 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine and medium roots; few, fine, dark concretions; medium acid; clear, smooth boundary.

B21t--9 to 24 inches, strong-brown (7.5YR 5/6) loam; moderate, medium, subangular blocky structure; friable; patchy clay films on faces of peds; many fine and medium roots; many fine pores; few, fine, dark concretions; medium acid; clear, wavy boundary.

Bx1--24 to 37 inches, strong-brown (7.5YR 5/6) loam; few pockets of brownish-yellow (10YR 6/6) loam; moderate, medium, subangular blocky structure; firm; brittle; gray silt coatings on faces of peds; many fine pores; many, fine, dark concretions; strongly acid; clear, wavy boundary.

Bx2--37 to 53 inches, mottled yellowish-red (5YR 5/6), gray (10YR 6/1), and strong-brown (7.5YR 5/6) loam; moderate, medium, subangular blocky structure; very firm; brittle; few root channels filled with gray silt; many fine pores; few, fine, dark concretions; strongly acid; gradual, wavy boundary.

Bx3--53 to 65 inches, mottled yellowish-brown (10YR 5/6), red (2.5YR 4/8), gray (10YR 6/1), and grayish-brown (10YR 5/2) clay loam; moderate, medium, subangular blocky structure; firm; brittle; many fine pores; few, fine, dark concretions; strongly acid; gradual, wavy boundary.

C--65 to 72 inches, red (2.5YR 4/8) sandy clay loam; few streaks of yellowish-brown (10YR 5/6) sandy clay loam and few thin bands of light-gray (10YR 7/1) fine sand; massive; firm; strongly acid.

The A1 or Ap horizon is dark brown to yellowish brown. The Bt horizon is strong-brown to yellowish-brown loam, clay loam, or sandy clay loam. The Bx horizon is sandy clay loam, clay loam, or loam. It is strong brown to yellowish brown, mottled with brown, yellow, and gray, or it lacks a dominant color and is mottled with, red, brown, yellow, and gray. The C horizon is red to brown fine sandy loam to sandy clay loam. In places it is mottled brown, yellow, and gray. Depth to the fragipan ranges from 18 to 36 inches. The A and Bt horizons are medium acid to strongly acid. The soil beneath the Bt horizon is strongly acid or very strongly acid.

Savannah soils are associated with Amy, Cahaba, Pheba, Sacul, and Tippah soils. The Savannah soils have a fragipan that the associated soils lack. They are browner and better drained than the Pheba and Amy soils and are not so clayey in the B horizon as Sacul and Tippah soils. Savannah soils are not so well drained as Cahaba soils, and they have mottling in the lower part of the B horizon that Cahaba soils lack.

Savannah fine sandy loam, 1 to 3 percent slopes (SvB).--This nearly level soil is on coastal plain uplands. Individual areas range from 20 to 100 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are small areas of Amy, Cahaba, and Tippah soils.

This soil is well suited to farming, but the hazard of erosion is moderate. Under good management that includes contour cultivation and terracing on long slopes, clean-tilled crops that leave large amounts of residue can be safely grown year after year. Sown crops may be grown without attention to row direction.

The main crops are soybeans, corn, winter small grains, grain sorghum, tomatoes, and potatoes. Suitable pasture plants are bahiagrass, bermudagrass, dallisgrass, white clover, annual lespedeza, and sericea lespedeza. Capability unit IIe-1; woodland group 3o7.

Savannah fine sandy loam, 3 to 8 percent slopes (SvC).--This gently sloping soil is on coastal plain uplands. Individual areas range from about 20 to 80 acres in size. Included in mapping are a few small areas of Cahaba, Sacul, and Tippah soils.

This soil is suitable for farming, but runoff is medium and the hazard of erosion is severe. Under good management that includes contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be safely grown year after year in the less sloping areas. Management that controls erosion needs to be intensified as length and gradient of slope increase.

The main crops are soybeans, tomatoes, corn, winter small grains, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, white clover, and tall fescue. Capability unit IIIe-1; woodland group 3o7.

Tichnor Series

The Tichnor series consists of poorly drained, level soils on flood plains of local streams. These soils formed in sediment washed from uplands made up predominantly of windblown silt. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is pale-brown, mottled silt loam about 7 inches thick. The subsurface layer is light-gray, mottled silt loam about 16 inches thick.

The subsoil is gray, mottled silty clay loam that extends to a depth of 72 inches.

Natural fertility of Tichnor soils is moderate. Permeability is slow, and available water capacity is high. These soils are easy to till, but frequent flooding during the growing season prevents their regular use for crops.

A few small areas are used for summer pasture, but most areas are forested.

Representative profile of Tichnor silt loam in an area of Tichnor and Arkabutla soils, frequently flooded, in a moist wooded area in the SW¼SW¼SE¼ sec. 14, T. 14 S., R. 5 W.:

A1--0 to 7 inches, pale-brown (10YR 6/3) silt loam; many, fine, distinct, yellowish-brown mottles; weak, fine, granular structure; very friable; many fine roots; few fine pores; medium acid; clear, smooth boundary.

A2g--7 to 23 inches, light-gray (10YR 7/1) silt loam; many, fine and medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, granular structure; very friable; many fine roots; many fine pores; few, fine, dark concretions; very strongly acid; abrupt, wavy boundary.

B21tg--23 to 40 inches, gray (10YR 5/1) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; common, thin, patchy clay films on faces of peds; few gray silt coatings on faces of peds and in root channels; many fine roots; few fine pores; very strongly acid; gradual, smooth boundary.

B22tg--40 to 56 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films on faces of peds; many, fine, dark concretions; very strongly acid; gradual smooth boundary.

B3--56 to 72 inches, mottled gray (10YR 6/1) brown (10YR 5/3), and yellowish-brown (10YR 5/6) silty clay loam; weak, medium, subangular blocky structure; friable; many, fine, dark concretions; very strongly acid.

The A1 or Ap horizon is dark grayish brown to pale brown. The A2 horizon is light gray or gray. The B horizon is gray to light brownish-gray silt loam or silty clay loam. The A1 horizon is medium acid or strongly acid. The A2 and B horizons are strongly acid or very strongly acid.

Tichnor soils are associated with Arkabutla and Ariel soils. The Tichnor soils are grayer throughout their profiles than the associated soils, and they have B horizons of accumulated clay that the associated soils lack. They do not have buried soils in their profiles, as do the Ariel soils.

Tichnor and Arkabutla soils, frequently flooded (TA).--This undifferentiated group of level soils is on broad flood plains along local streams. It extends onto narrow flood plains along smaller drainageways. Slopes are less than 1 percent. Individual areas range from about 40 to 300 acres in size. Tichnor soils make up about 70 to 80 percent of the broader flood plains, and Arkabutla and Ariel soils make up the rest. The narrower flood plains are made up of about equal parts of Tichnor and Arkabutla soils and similar soils that are too young to have formed a subsoil. Included in the mapping on the narrower flood plains are small areas of Ariel soils.

Because the hazard of frequent flooding is severe, this soil is unsuitable for tilled crops. Most of the area supports native stands of mixed hardwoods. A few small areas are pasture. Suitable pasture plants are bermudagrass, bahiagrass, dallisgrass, and annual lespedeza. Capability unit Vw-1; woodland group 1w6.

Tippah Series

The Tippah series consists of moderately well drained, nearly level to gently sloping soils on uplands. These soils formed in a thin layer of windblown silt and the underlying clayey coastal plain sediment. The native vegetation was mixed pines and hardwoods.

In a representative profile the surface layer is about 7 inches of brown silt loam. The upper part of the subsoil is about 21 inches of strong-brown silty clay loam. The middle part is about 27 inches of mottled red and gray clay. The lower part is about 11 inches of yellowish-brown, mottled clay. The underlying material, extending to a depth of 72 inches, is gray silty clay loam. It contains many thin bands of brownish-yellow silt.

Natural fertility of Tippah soils is moderate. Permeability is slow, and available water capacity is high. These soils respond to fertilization, and tilth is easy to maintain.

Tippah soils are suited to most crops and pasture plants commonly grown in the county. Most areas are wooded.

Representative profile of Tippah silt loam, 1 to 3 percent slopes, in a moist wooded area in the SW¼NW¼SW¼ sec. 25, T. 12 S., R. 8 W.:

A1--0 to 7 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B21t--7 to 28 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; patchy clay films on faces of peds; common fine roots; few dark concretions; very strongly acid; abrupt, wavy boundary.

IIB22t--28 to 40 inches, mottled red (2.5YR 4/6) and gray (10YR 6/1) clay; moderate,

medium, angular blocky structure; firm; plastic; continuous clay films on faces of peds; gray silt coatings on faces of some peds; very strongly acid; gradual, smooth boundary.

IIB23t--40 to 55 inches, mottled red (2.5YR 4/6) and gray (10YR 6/1) clay; moderate, medium, angular blocky structure; firm; plastic; continuous clay films on faces of peds; very strongly acid; gradual, smooth boundary.

IIB3--55 to 66 inches, yellowish-brown (10YR 5/6) clay; few, fine, faint, red mottles and common, fine, distinct, gray mottles; weak, medium, angular blocky structure; firm; plastic; very strongly acid; gradual, smooth boundary.

IIC--66 to 72 inches, gray (10YR 6/1) silty clay loam; many thin bands of brownish-yellow (10YR 6/8) silt 1/16 to 1/8 inch thick; platy rock structure; firm; very strongly acid.

The A1 or Ap horizon is dark grayish brown to yellowish brown. The B21t horizon is strong-brown or brown silt loam or silty clay loam. The IIB horizon ranges from clay to silty clay loam. The IIC horizon is red to gray, or is mottled red, brown, and gray. It ranges from silty clay loam to clay. Depth to the IIBt horizon is 26 to 36 inches. The soil is strongly acid or very strongly acid throughout.

Tippah soils are associated with Sacul and Savannah soils. Tippah soils have a higher content of bases than the associated soils. They are not so red in the upper part of the B horizon as the Sacul soils. They are more clayey in the lower part of the B horizon than Savannah soils, and they lack the fragipan of the Savannah soils.

Tippah silt loam, 1 to 3 percent slopes (TpB).--This nearly level soil is on uplands. Individual areas range from 20 to 200 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are small areas of Sacul and Savannah soils, small areas of eroded Tippah soils, and small areas of soils that are less than 26 inches deep over the clayey part of the subsoil.

This soil is suited to farming, but the hazard of erosion is moderate. Under good management that includes contour cultivation and terracing on long slopes, clean-tilled crops that leave large amounts of residue can be grown safely year after year. Sown crops can be grown without attention to the direction in which rows are run.

The main crops are soybeans, cotton, corn, winter small grains, and grain sorghum. Suitable pasture plants are bahiagrass, bermudagrass, dallisgrass, white clover, and annual lespedeza. Capability unit IIe-2; woodland group 3o7.

Tippah silt loam, 3 to 8 percent slopes (TpC).--This gently sloping soil is on uplands. Individual areas range from about 20 to 80 acres in size. Included in mapping are a few small areas of Sacul and Savannah soils, small areas of eroded Tippah soils, and small areas of soils that are less than 26 inches deep over the clayey part of the subsoil.

This soil is suitable for farming, but runoff is medium and the hazard of erosion is severe. Under good management that includes contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be grown safely year after year on the less sloping areas. Management that controls erosion needs to be intensified with increase in length and gradient of slope.

The main crops are soybeans, cotton, corn, winter small grains, and grain sorghum. Suitable pasture plants are bermudagrass, dallisgrass, bahiagrass, annual lespedeza, and white clover. Capability unit IIIe-2; woodland group 3o7.

Udorthents

The Udorthents mapped in this survey are very young soils on recently eroded surfaces in gullied areas where the former soil has been completely removed. These soils formed in thick windblown silt and loamy coastal plain sediment. They are chiefly on the bottoms of gullies and on the lower parts of the side-slopes of gullies, and in places between gullies where sheet erosion has removed most of the former soil. The gullies have eroded through the former soil and into the old underlying material. The material has been exposed so recently that in most places it lacks the characteristics of soil formation. In some areas a thin surface layer has formed.

These young soils vary greatly, but they are generally well drained or moderately well drained loamy soils. Textures range from silty clay loam to sandy loam. The surface layer and the underlying material range from grayish brown through yellowish brown or pale brown to red. Reaction ranges from very strongly acid to neutral.

Most areas of Udorthents are in woodland. Other areas are reverting to woodland. These soils are mapped only in undifferentiated groups with other soils.

Udorthents and Grenada soils, 8 to 20 percent slopes, severely eroded (UgE3).--This undifferentiated group is made up of deeply gullied areas that were formerly Grenada soils. The long, narrow areas on moderately sloping to moderately steep escarpments are 10 to 40 acres in size. Loamy Udorthents make up 50 to 85 percent of these areas; Grenada soils, 15 to 50 percent; and other soils, less than 15 percent.

The Udorthents are mainly in the gullies (pl. VI, bottom), but in places they are in the severely eroded areas between gullies. They are loamy, dispersed soils that have a high content of silt. Their surface layer and underlying material are silt loam or silty clay loam. The Grenada soils are between the gullies. They have a profile similar to the one described as representative of the series, but some or all of the original surface layer, and in places part of the subsoil, has been eroded. Included in mapping are small areas of red, clayey Udorthents in the bottoms of some gullies.

Natural fertility is moderate to high, but runoff is rapid and the hazard of further erosion is very severe. These soils are unsuitable for cultivated crops. They are suited to pasture if the gullies are shaped and smoothed, but they are best suited to woodland and wildlife habitat. Most areas are wooded or are reverting to woodland. Suitable pasture plants are bermudagrass, bahiagrass, and sericea lespedeza. Capability unit VIIe-1; woodland group 3o7.

Udults

The Udults mapped in this survey are on recently eroded surfaces in gullied areas of the coastal plain uplands. They are on the severely eroded ridges between gullies, and on the upper parts of the side slopes of gullies. They formed in severely eroded and deeply gullied areas of Cahaba soils.

These soils vary greatly, but they are generally well-drained, loamy soils. Textures range from clay loam to sandy loam. The present surface layer is a remnant of the subsoil of the former soils. The soils range from reddish brown to yellowish red or red. Reaction is strongly acid or very strongly acid.

Most areas of Udults are in woodland. Others are reverting to woodland.

Udults and Udorthents, 8 to 20 percent slopes, severely eroded (UoE3).--This undifferentiated group consists of deeply gullied areas that were formerly Cahaba soils. The soils are on moderately sloping to moderately steep coastal plain uplands. Individual areas are about 10 to 30 acres in size. Udults make up about 40 to 60 percent of the areas; loamy Udorthents, 25 to 40 percent, and other soils, 15 to 25 percent.

The Udults in this unit are on ridges between gullies and on the upper parts of the side slopes of gullies. The Udorthents are loamy soils that have high content of sand. They are in the bottoms and on the lower side slopes of gullies. The surface layer and underlying material ranges from sandy loam to loam. Included in mapping are areas of similar soils that have a high content of bases; small sandy and gravelly areas; and small areas of Cahaba, Sacul, and Saffell soils.

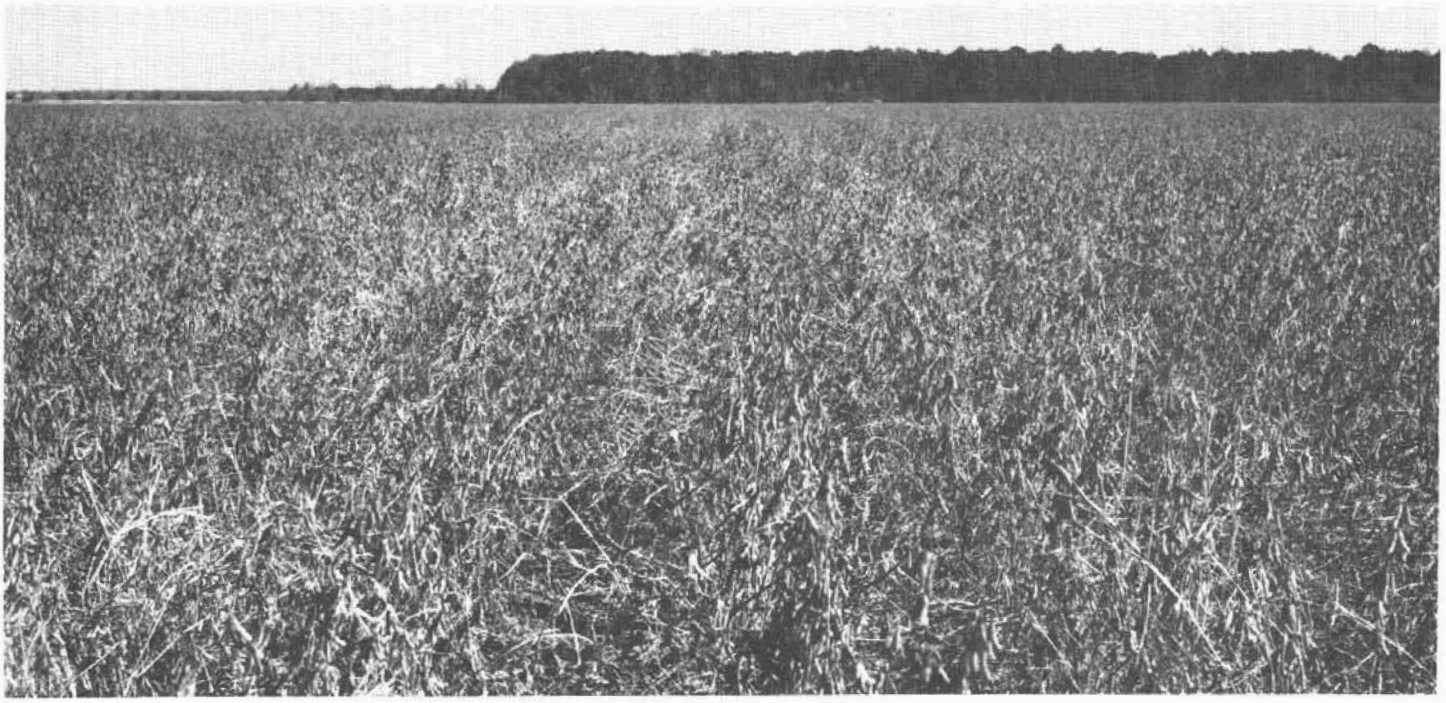
Natural fertility is low. Runoff is rapid, and the hazard of further erosion is very severe. These areas are not suited to cultivated crops. They are suitable for pasture if the gullies are shaped and smoothed, but they are best suited to woodland and wildlife habitat. Most areas are wooded or are reverting to woodland. Suitable pasture plants are bermudagrass, bahiagrass, and sericea lespedeza. Capability unit VIIe-1; woodland group 3o7.

PLATE I

I, top--Remnant virgin stand of pine-hardwood forest on Amy silt loam.

I, bottom--Bed of gravel suitable for road metal at a depth of about 5 feet in Cahaba fine sandy loam, 1 to 3 percent slopes.

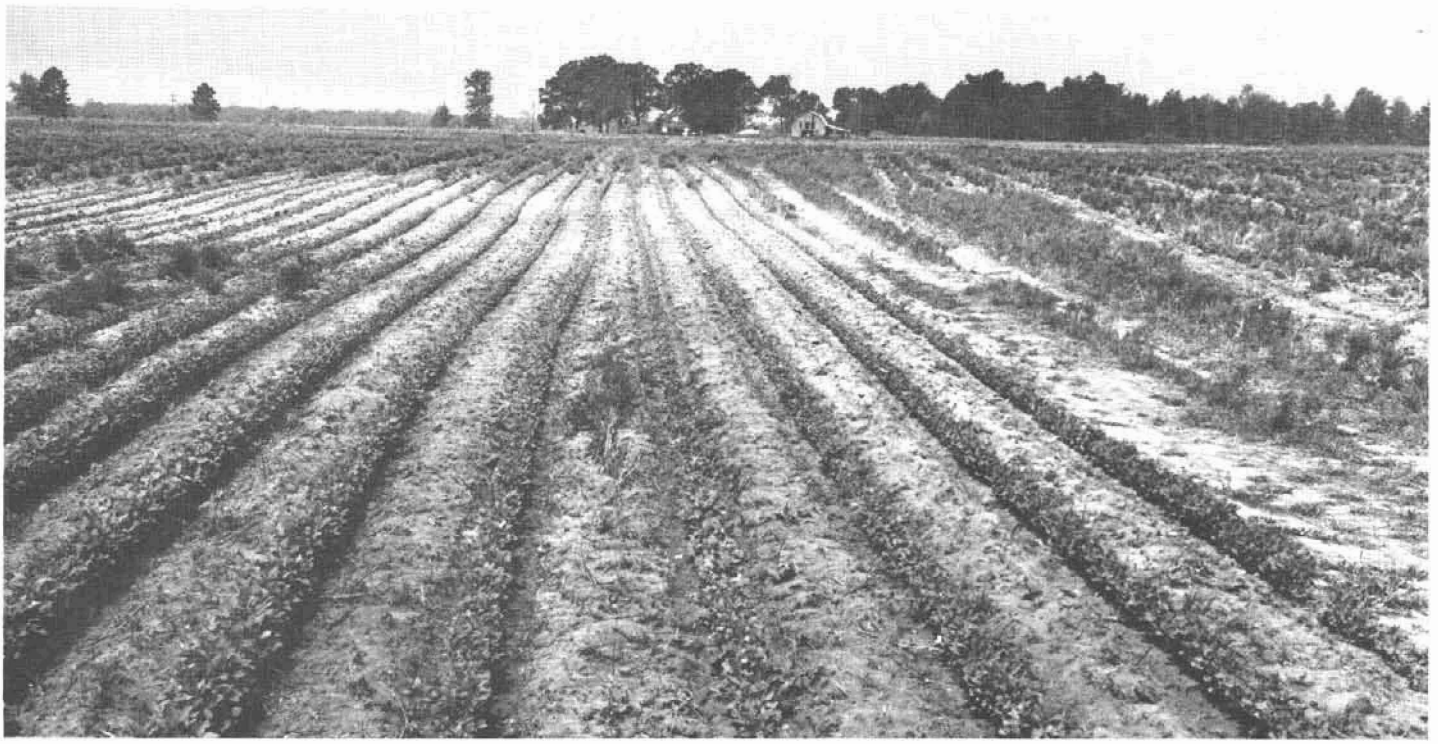
II, top--Sprinkler irrigation of a tomato crop on Cahaba fine sandy loam, 1 to 3 percent slopes.



II, bottom--Well-managed field of soybeans on Calhoun silt loam.

PLATE III

III, top--Field of rice on Calhoun silt loam.



III, bottom--Soybeans planted after wheat was harvested from Grenada silt loam, 0 to 1 percent slopes. Under good management, double cropping such as this is successful in most years because the growing season is long.

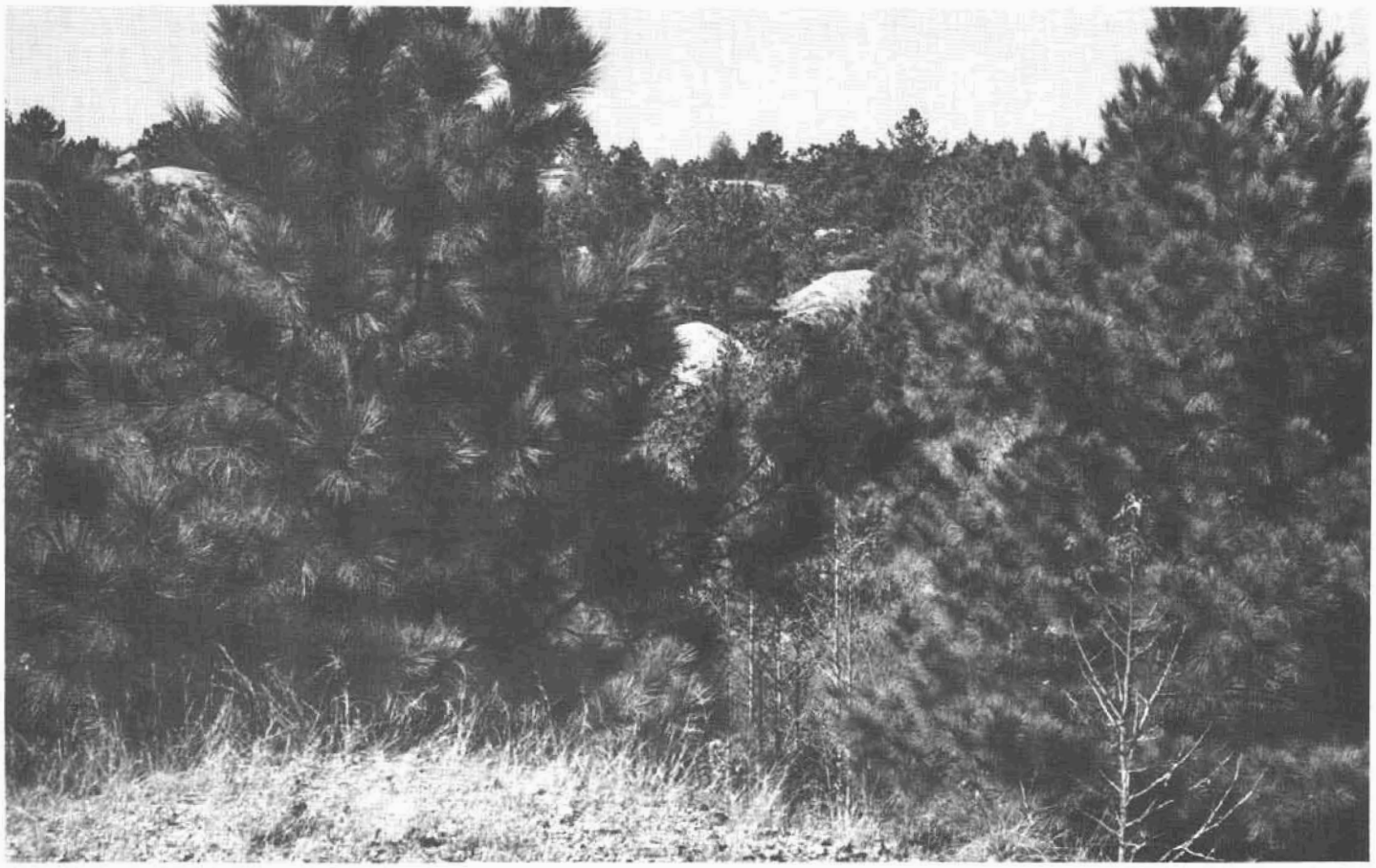
IV, top--This 17-year-old planting of loblolly pine on Pheba silt loam has been thinned to provide space for rapid growth. Trees removed were sold for pulpwood.

IV, bottom--Pensacola bahiagrass produces a large amount of high-quality forage on Pheba silt loam.

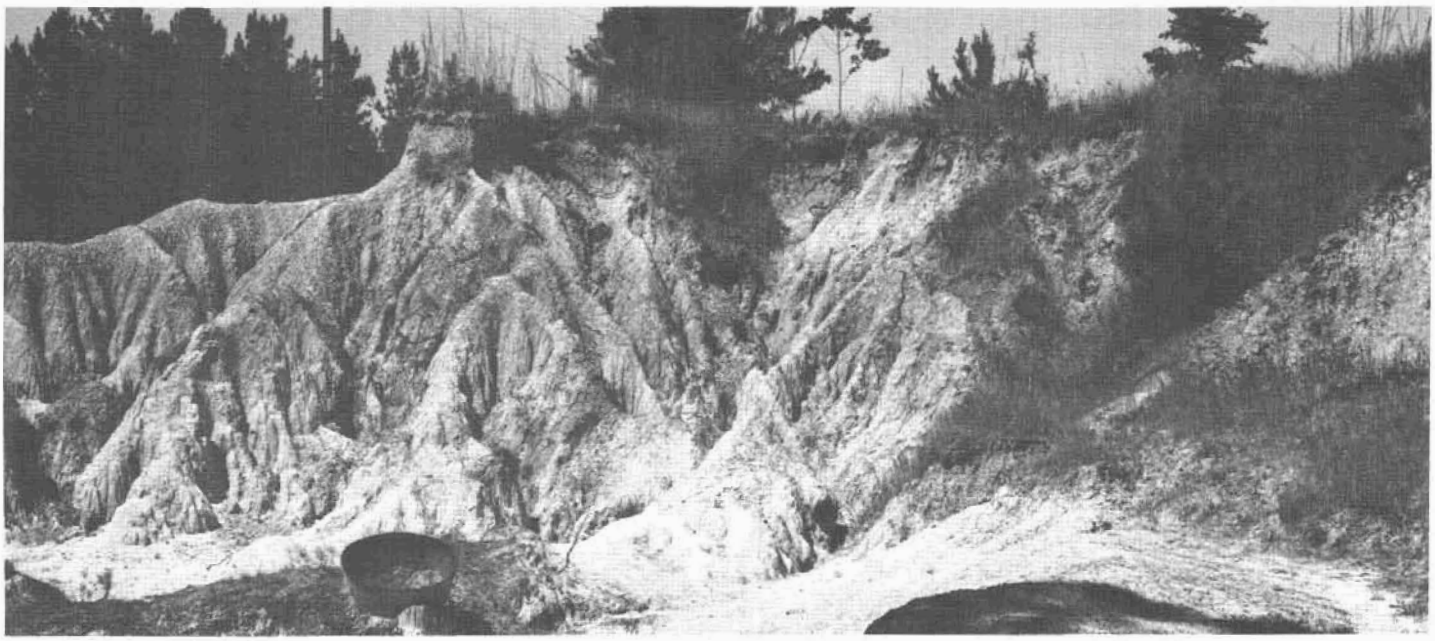
PLATE V

V, top--Cotton grown in a skip-row system on Rilla silt loam, 0 to 1 percent slopes.

V, bottom--Land grading on this field of Rilla silt loam, undulating, resulted in a poor stand of soybeans where deep cuts were made. Yields may be reduced for 2 or 3 years, but the soil recovers ability to produce and the graded fields can be managed more efficiently.



VI, top--Many spots of Saffell gravelly fine sandy loam, 3 to 8 percent slopes, have been mined for gravel. Trees rapidly reclaim the pits and spoil when mining ceases.



VI, bottom--Udorthents and Grenada soils, 8 to 20 percent slopes, severely eroded, are difficult to stabilize. The woody vegetation controls further erosion where it has become established, but other areas continue to erode.

Use and Management of the Soils

This section contains information about the suitability of the soils for crops and pasture, wildlife, woodland, engineering, town and country planning, and recreation.

Use of the Soils for Crops and Pasture 3/

In this section the system of capability grouping used by the Soil Conservation Service and the management of the soils for crops and pasture are described. The predicted yields of selected crops and pasture plants under improved management are shown in table 5.

In the eastern part of the county, most cleared areas are used for row crops. In the central and western parts, most cleared areas are used for pasture, but a few are used for such crops as soybeans, winter small grains, and truck crops. Some of the areas are idle, and are being reforested through natural seeding of pines. Generally the soils in the county, except those on the flood plain of Bayou Bartholomew, are moderate to low in content of nitrogen, potassium, phosphorus, and calcium. Soils on the flood plain of Bayou Bartholomew contain moderate to high amounts of these elements. Content of organic matter is generally moderate to low in all the soils. Many of the soils suitable for cultivation are erodible. Poor surface or internal drainage and susceptibility to flooding are limitations on some soils.

Contour cultivation, terraces, vegetated waterways, or combinations of these erosion controls are needed on sloping soils that are used for clean-tilled crops. Row arrangement and suitable surface drainage are needed for dependable growth on wet areas. Many tracts that are subject to frequent flooding are unsuited or are only marginally suited to most crops commonly grown in the county.

Annual cover crops or grasses and legumes should be grown regularly in the cropping system if the erosion hazard is severe or if the crops grown leave only small amounts of residue. Spreading shredded crop residue evenly on the soil provides protective cover and adds active organic matter to the soils.

A plowpan commonly develops in loamy soils that are improperly tilled or are tilled frequently using heavy equipment. Keeping tillage to a minimum, varying the depth of tillage, and tilling when the content of moisture in the soil is favorable help to prevent formation of a plowpan. Growing deep-rooting grasses and legumes in the cropping system helps to break up plowpans.

If left bare, many soils tend to puddle, crust, and pack during periods of heavy rainfall. Growing cover crops and managing crop residue help to preserve or improve tilth.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume.

Coastal bermudagrass, common bermudagrass, dallisgrass, and Pensacola bahiagrass are the most commonly grown summer perennials. Coastal bermudagrass and Pensacola bahiagrass have been grown only recently in this county, but both are producing good quality forage. Tall fescue, the chief winter perennial grass grown in the county, grows well only on soils that have a favorable soil-moisture relationship. All of these grasses respond well to fertilizer, particularly nitrogen. White clover, crimson clover, annual lespedeza, and sericea lespedeza are the most commonly grown legumes.

Proper grazing is essential for the production of high-quality forage, for the survival of stands, and for the control of erosion. Such other treatments and management practices as brush and weed control, fertilization, and renovation of pasture are also important.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

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

In the capability system, the kinds of soils are grouped at three levels; the capability class, subclass, and unit. These levels are described in the following paragraphs.

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.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class

3/ W. WILSON FERGUSON, conservation agronomist, Soil Conservation Service, assisted in the preparation of this section.

numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless 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 too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by w, s, and c, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture or range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIe-2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Drew County are described and suggestions for the use and management of the soils are given.

Class I. Soils that have few limitations that restrict their use.
- Unit I-1. Level, well-drained, loamy soils having moderate to high natural fertility.

Class II. Soils that have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
- Subclass IIe. Soils subject to moderate erosion if they are not protected.
  - Unit IIe-1. Nearly level, well drained and moderately well drained, loamy soils having moderate to low natural fertility.
  - Unit IIe-2. Nearly level, somewhat poorly drained and moderately well drained, loamy soils having moderate natural fertility.
  - Unit IIe-3. Undulating, well-drained, loamy soils having moderate to high natural fertility.
- Subclass IIw. Soils moderately limited by excess water.
  - Unit IIw-1. Level, somewhat poorly drained and moderately well drained, loamy soils having moderate natural fertility.
  - Unit IIw-2. Level, somewhat poorly drained, loamy soils having moderate to high natural fertility.

Class III. Soils that have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
- Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe-1. Gently sloping, well drained and moderately well drained, loamy soils having moderate to low natural fertility.
  - Unit IIIe-2. Gently sloping, moderately well drained, loamy soils having moderate natural fertility.
  - Unit IIIe-3. Nearly level, moderately well drained, eroded soils having clayey subsoil and low natural fertility.
  - Unit IIIe-4. Gently sloping, well-drained, droughty, gravelly soils having low natural fertility.
- Subclass IIIw. Soils severely limited for cultivation because of excess water.
  - Unit IIIw-1. Predominantly level, poorly drained and somewhat poorly drained, loamy soils having moderate to low natural fertility.
  - Unit IIIw-2. Level, poorly drained, loamy soils having moderate natural fertility.
  - Unit IIIw-3. Level, poorly drained and somewhat poorly drained, predominantly clayey soils having moderate to high natural fertility.

Class IV. Soils that have very severe limitations that reduce the choice of plants or that require very careful management, or both.
- Subclass IVe. Soils subject to very severe erosion if they are cultivated and not protected.
  - Unit IVe-1. Moderately sloping, well drained and moderately well drained, loamy soils having low to moderate natural fertility.
  - Unit IVe-2. Gently sloping, moderately well drained, eroded soils having clayey subsoil and low natural fertility.
- Subclass IVw. Soils very severely limited for cultivation because of excess water.
  - Unit IVw-1. Level, somewhat poorly drained and well drained, frequently flooded, loamy soils having moderate natural fertility.
  - Unit IVw-2. Level, poorly drained soils having a clayey subsoil and low natural fertility.

Class V. Soils that are not likely to erode but that have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.
- Subclass Vw. Soils too wet for cultivation; drainage or protection from flooding not feasible.
  - Unit Vw-1. Level, poorly drained to well-drained, frequently flooded, loamy soils having low to high natural fertility.

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

Subclass VIe. Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Unit VIe-1. Moderately sloping, moderately well drained soils having a clayey subsoil and low natural fertility.

Unit VIe-2. Moderately sloping and moderately steep, well-drained, droughty, gravelly soils having low natural fertility.

Subclass VIs. Soils severely limited because of soil conditions.

Unit VIs-1. Level, somewhat poorly drained, loamy soils having a high content of sodium throughout the subsoil and having low natural fertility.

Class VII. Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Subclass VIIe. Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.

Unit VIIe-1. Moderately sloping and moderately steep, well drained and moderately well drained, severely eroded soils having moderate to low natural fertility.

Class VIII. Soils and landforms that have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes. (None in Drew County)

Predicted Yields

Table 5 lists predicted yields of the princiapl crops grown in the county. The predictions were made by farmers, soil scientists, and others who have knowledge of yields in the county and on information derived from research data. They are for average yields per acre that can be expected on good commercial farms managed at a level that produces the highest economic returns.

Crops other than those shown in table 5 are grown in the county, but their predicted yields are not included because their acreage is small or because reliable data on yields are not available. Absence of a yield figure indicates the crop is not suited to the soil or is not commonly grown on the soil.

The yields given in table 5 can be expected if--

1. Rainfall is effectively used and conserved.
2. Surface and subsurface drainage systems are installed where needed.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Insect-, disease-, and weed-control measures are consistently used.
6. Fertilizer is applied according to soil tests and needs of the crop grown.
7. Adapted crop varieties are used at the recommended seeding rates.
8. Suitable quality of irrigation water is used for rice.
9. Irrigation of rice is timed to meet the needs of the soil and crop.
10. Rice irrigation systems are properly designed and efficiently used.

Use of the Soils for Wildlife 4/

Soils directly influence the kinds and amounts of vegetation and the amount of water available in an area, and, in this way, indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect the growth of wildlife habitat are (1) the thickness of the soil useful to crops, (2) the texture of the surface layer, (3) the available water capacity to a depth of 40 inches, (4) the wetness, (5) the hazard of flooding, (6) the slope, and (7) the permeability of the soil to air and water.

In table 6, the soils of this survey area are rated according to their ability to support three kinds of wildlife. Each soil also is rated according to its suitability for producing various kinds of plants and other elements that make up wildlife habitat. The ratings take into account mainly the characteristics of the soils and the closely related natural factors of the environment. They do not take into account climate, present use of the soils, or present distribution of wildlife and people. For this reason, selection of a site for development as habitat for wildlife requires inspection of the site.

A rating of good means the element of wildlife habitat or the kind of habitat is easily created, improved, and maintained. Few or no limitations affect management in this category, and satisfactory results can be expected if the soil is used for the prescribed purpose.

A rating of fair means the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention are required for satisfactory results.

A rating of poor means the limitations for the designated element of wildlife habitat or kind of wildlife are severe. Habitat can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

A rating of very poor means that restrictions on the use of the soil for the element of wildlife habitat or kind of wildlife are very

4/ ROY A. GRIZZELL, biologist, Soil Conservation Service, assisted in the preparation of this section.

TABLE 5.--PREDICTED ACRE YIELDS OF CROPS AND PASTURE PLANTS

Soil series and map symbols	Cotton	Corn	Soybeans	Rice	Bahiagrass	Bermudagrass	Fescue
	Lbs lint	Bu	Bu	Bu	AUM 1/	AUM 1/	AUM
Amy:							
Ae----------	450	--	25	---	7.5	6.0	6.0
Af----------	---	--	--	---	7.5	6.0	---
Ariel: Ar------	---	--	--	---	7.5	6.5	---
Arkabutla: At---	---	--	35	---	7.5	6.5	---
Cahaba:							
CaB----------	---	90	30	---	8.5	7.5	7.0
CaC----------	---	75	25	---	7.0	6.5	6.5
CaD----------	---	--	--	---	6.0	5.5	---
Calhoun: Ch-----	500	--	30	120	7.0	6.5	7.0
Calloway:							
CoA----------	650	85	35	120	8.0	6.5	8.0
CoB----------	650	80	30	120	8.0	6.5	8.0
Crowley: Cr----	550	--	35	130	8.0	7.0	8.0
Grenada:							
GaA----------	650	90	35	120	9.0	7.5	8.5
GaB----------	600	85	35	---	8.5	7.0	8.0
GaC, GSC------	550	65	30	---	8.0	6.5	7.5
GaD----------	---	90	--	---	7.5	6.0	7.0
Hebert: Ha-----	800	90	35	---	8.5	7.0	8.0
Henry: Hb, HC--	500	50	30	120	7.0	6.5	7.0
Lafe: La-------	---	--	--	---	---	3.5	---
Leaf: Le-------	---	--	30	---	8.5	7.5	8.0
Ouachita: Oa---	---	--	35	---	7.5	7.0	---
Perry: Pe------	500	--	35	130	---	6.5	8.5
Pheba: Ph------	550	75	30	---	8.5	6.5	7.0
Portland:							
Po----------	650	75	35	130	---	7.5	9.5
Pr----------	600	--	35	130	---	7.0	9.0
Rilla:							
RaA----------	900	95	40	---	9.0	8.5	9.0
RbB----------	850	90	35	---	9.0	8.5	9.0
Sacul:							
SaD----------	---	--	--	---	6.5	5.5	5.0
ScB2----------	---	--	25	---	7.5	6.5	6.5
ScC2----------	---	--	--	---	7.5	6.5	6.0

TABLE 5.--PREDICTED ACRE YIELDS OF CROPS AND PASTURE PLANTS--Continued

Soil series and map symbols	Cotton	Corn	Soybeans	Rice	Bahiagrass	Bermudagrass	Fescue
	Lbs lint	Bu	Bu	Bu	AUM 1/	AUM 1/	AUM
Saffell:							
SfC----------	---	--	--	---	5.0	4.0	---
SfE----------	---	--	--	---	4.5	3.5	---
Savannah:							
SvB----------	600	80	35	---	9.0	7.0	8.0
SvC----------	550	70	30	---	9.0	6.5	7.5
Tichnor: TA-----	---	--	--	---	---	6.0	---
Tippah:							
TpB----------	650	80	35	---	9.0	7.5	8.0
TpC----------	600	70	30	---	8.5	7.0	7.5
Udorthents: UgE3-	---	--	--	---	5.5	4.0	---
Udults: UoE3----	---	--	--	---	5.0	3.5	---

1/ 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 a period of 30 days.

TABLE 6.--POTENTIAL OF THE SOILS FOR ELEMENTS OF WILDLIFE HABITAT AND KINDS OF WILDLIFE

Soil series and map symbol	Potential for elements of wildlife habitat--							Potential as habitat for--		
	Grain and seed plants	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Amy:										
Ae	Poor	Fair	Fair	Good	Fair	Good	Good	Fair	Good	Good.
Af	Poor	Fair	Fair	Good	Fair	Good	Poor	Fair	Good	Fair.
Ariel: Ar	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Arkabutla: At	Poor	Fair	Fair	Good	Good	Good	Fair	Fair	Good	Fair.
Cahaba:										
CaB	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaC, CaD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Calhoun: Ch	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Calloway:										
CoA	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.
CoB	Fair	Good	Good	Good	Good	Good	Fair	Good	Good	Fair.
Crowley: Cr	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.
Grenada:										
GaA, GaB	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GaC, GSC 1/	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GaD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hebert: Ha	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Henry: Hb, HC 1/.	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Lafe: La	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Good	Very poor.	Poor	Fair.
Leaf: Le	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ouachita: Oa	Poor	Fair	Fair	Good	Poor	Good.	Fair	Fair	Good	Fair.
Perry: Pe	Fair	Fair	Fair	Fair	Very poor.	Good	Good	Fair	Fair	Good.
Pheba: Ph	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Portland: Po, Pr.	Good	Good	Good	Good	Very poor.	Good	Good	Good	Good	Good.
Rilla: RaA, RbB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 6.--POTENTIAL OF THE SOILS FOR ELEMENTS OF WILDLIFE HABITAT AND KINDS OF WILDLIFE--Cont.

Soil series and map symbol	Potential for elements of wildlife habitat--							Potential as habitat for--		
	Grain and seed plants	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Sacul:										
SaD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ScB2	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ScC2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Saffell:										
SfC	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
SfE	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Savannah:										
SvB	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SvC	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Tichnor: TA 1/	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
Tippah:										
TpB	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TpC	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Udorthents: UgE3 1/.	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Udults: UoE3 1/	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

severe and that unsatisfactory results can be expected. It is either impossible or impractical to create, improve, or maintain wildlife habitat on soils in this category.

The habitat elements rated in table 6 are each explained as follows.

Grain and seed crops are annual grain-producing plants, such as corn, sorghum, millet, and soybeans.

Domestic grasses and legumes are those that are established by planting and that provide food and cover for wildlife. They are such grasses as bahiagrass, ryegrass, and panicgrass and such legumes as annual lespedeza, shrub lespedeza, and other clovers.

Wild herbaceous plants are native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wildbean, pokeweed, and cheatgrass are typical examples.

Hardwood trees are nonconiferous trees, shrubs, and woody vines that produce food for wildlife. The food is in the form of fruits, nuts, buds, catkins, and browse. Such plants commonly grow in a natural environment, but they can also be planted and developed through wildlife management programs. Typical species in this category are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and silverberry.

Coniferous plants are cone-bearing trees and shrubs that provide cover for wildlife and that furnish food in the form of browse, seeds, or fruitlike cones. They commonly grow in their natural environment, but they may be planted and managed. Typical plants in this category are pines, cedars, and ornamental trees and shrubs.

Wetland plants are annual and perennial herbaceous plants that grow wild on moist and wet soils. They furnish food and cover mostly for wetland wildlife. Typical examples of these plants are smartweed, wild millet, spikerush, rushes, sedges, burreed, tearthumb, and aneilema. Submerged and floating aquatic plants are not included in this category.

Shallow water areas are impoundments or excavations for controlling water, generally not more than 5 feet deep, for the purpose of creating a habitat that is suitable for waterfowl. Some areas are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submerged aquatic plants.

Table 6 also rates soils according to their potential as habitat for the three kinds of wildlife--openland, woodland, and wetland. These ratings are consistent with the ratings made for the elements of habitat. For example, soils rated very poor for shallow water developments are rated very poor for wetland wildlife.

Openland wildlife are birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, dove, meadowlark, field sparrow, cottontail rabbit, and fox are typical examples of openland wildlife.

Woodland wildlife are birds and mammals that normally live in wooded areas consisting of hardwood trees, coniferous trees, and shrubs. Woodcock, thrush, wild turkey, vireo, deer, squirrel, and raccoon are typical examples of woodland wildlife.

Wetland wildlife are birds and mammals that normally live in wet areas, marshes, and swamps. Duck, geese, rail, shore birds, heron, mink, and muskrat are typical examples of wetland wildlife.

Use of the Soils as Woodland [5]

Except for scattered prairies in a band through the central part of the county, Drew County was originally wooded. Trees now cover about 72 percent of the county.

Good stands of commercial trees grow in the county. The needleleaf forest types are most frequently on the uplands and the broadleaf types are generally on the bottom land along rivers and creeks.

The value of the wood products in this county is substantial, though below the potential. The woodland is also valuable for grazing livestock and for use as wildlife habitat, recreation areas, scenic areas, and soil and water conservation areas. This section explains how soils affect the growth of trees and the management of timber resources in the county. In table 7, potential productivity and management concerns are listed for soils of Drew County. If a mapping unit contains the names of two series, as in a soil association, the component soils are evaluated separately under their respective series names.

The woodland ordination group, column 2 of table 7, tells much about the nature of soils in the group. All the soils in a given ordination group are suited to the same kinds of trees, need about the same kind of management to produce these trees, and have about the same potential productivity.

Each ordination group is identified by a three-part symbol. The first part of the symbol indicates the productivity of the soils: 1 for very high; 2, high; 3, moderately high; 4, moderate; and 5, low.

The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter x indicates that the main limitation is stoniness or rockiness; w, that excessive water in or on the soil is the chief limitation; t, that toxic substances in the soil are the chief limitation; d, that the rooting depth is restricted; c, that clay in the upper part of

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5/ MAC D. BOLAR, woodland conservationist, and IVAN R. PORTER, range conservationist, Soil Conservation Service, assisted in the preparation of this section.

TABLE 7.--WOODLAND SUITABILITY GROUPS AND FACTORS OF WOODLAND MANAGEMENT

Soil series and map symbols	Ordination group	Management concerns			Productivity	Site index	Species to favor in planting
		Erosion hazard	Equipment limitation	Seedling mortality			
Amy:							
Ae	2w9	Slight	Severe	Severe	Loblolly pine Shortleaf pine Sweetgum	90 80 90	Loblolly pine, sweetgum.
Af	2w9	Slight	Severe	Severe	Loblolly pine Sweetgum Water oak	90 90 90	Loblolly pine, sweetgum, cottonwood, green ash, sycamore, nuttall oak, swamp chestnut oak.
Ariel: Ar	1w8	Slight	Moderate	Moderate	Loblolly pine Sweetgum	95 100	Water oak, sweetgum, yellow-poplar, loblolly pine.
Arkabutla: At	1w9	Slight	Severe	Moderate	Sweetgum	100	Nuttall oak, water oak, sweetgum, loblolly pine, yellow-poplar.
Cahaba: CaB, CaC, CaD.	2o7	Slight	Slight	Slight	Loblolly pine Sweetgum Cherrybark oak	90 90 90	Loblolly pine, sweetgum, cherrybark oak.
Calhoun: Ch	3w9	Slight	Severe	Moderate	Loblolly pine Sweetgum Water oak Nuttall oak	80 80 80 80	Loblolly pine, water oak, sweetgum.
Calloway: CoA, CoB.	3w8	Slight	Moderate	Slight	Cherrybark oak Water oak Loblolly pine Shortleaf pine Sweetgum Sycamore	80 80 80 70 80 80	Cherrybark oak, Shumard oak, water oak, sweetgum, yellow-poplar, loblolly pine.
Crowley: Cr	3w9	Slight	Severe	Moderate	Loblolly pine Shortleaf pine Sweetgum Water oak Willow oak Cherrybark oak	80 70 80 80 80 80	Loblolly pine, sweetgum, water oak, willow oak, cherrybark oak, Shumard oak.
Grenada: GaA, GaB, GaC, GaD, GSC 1/.	3o7	Slight	Slight	Slight	Loblolly pine Shortleaf pine Cherrybark oak Southern red oak Swamp chestnut oak Water oak White oak Sweetgum	80 70 90 80 -- -- -- --	Loblolly pine, yellow-poplar, sweetgum, cherrybark oak, Shumard oak, water oak, white oak.

TABLE 7.--WOODLAND SUITABILITY GROUPS AND FACTORS OF WOODLAND MANAGEMENT--Continued

Soil series and map symbols	Ordination group	Management concerns			Productivity	Site index	Species to favor in planting
		Erosion hazard	Equipment limitation	Seedling mortality			
Hebert: Ha----	2w5	Slight----	Moderate---	Slight----	Cottonwood------ Cherrybark oak-- Sweetgum-------- Water oak------- Nuttall oak----- Green ash------- Sycamore-------- Pecan----------	100 90 90 90 90 -- -- --	Cottonwood, sweetgum, cherrybark oak, water oak, sycamore.
Henry: Hb, HC 1/.	3w9	Slight----	Severe-----	Moderate--	Bottom land oaks---------- Sweetgum-------- Loblolly pine---	80 80 80	Loblolly pine, sweetgum, Shumard oak, water oak.
Lafe: La------	5t0	Slight----	Slight-----	Severe----	None----------	--	None.
Leaf: Le------	2w9	Slight----	Severe-----	Severe----	Slash pine------ Loblolly pine--- Sweetgum--------	90 90 90	Loblolly pine, Shumard oak, sweetgum.
Ouachita: Oa--	1w8	Slight----	Moderate---	Slight----	Loblolly pine--- Sweetgum-------- Cottonwood------	100 100 100	Loblolly pine, sweetgum, cottonwood, yellow-poplar, sycamore, nuttall oak.
Perry: Pe-----	2w6	Slight----	Severe-----	Moderate--	Sweetgum-------- Cottonwood------ Green ash------- Water oak------- Cherrybark oak-- Pecan----------	90 90 80 80 -- --	Cottonwood, sweetgum, cherrybark oak, water oak.
Pheba: Ph-----	2w8	Slight----	Moderate---	Slight----	Loblolly pine--- Shortleaf pine-- Sweetgum--------	90 80 90	Loblolly pine, sweetgum.
Portland: Po, Pr.	2w6	Slight----	Severe-----	Moderate--	Green ash------- Cottonwood------ Sweetgum--------	80 100 90	Green ash, cottonwood, sweetgum.
Rilla: RaA, RbB.	2o4	Slight----	Slight-----	Slight----	Cottonwood------ Cherrybark oak-- Nuttall oak----- Sweetgum-------- Pecan---------- Sycamore--------	100 100 85 100 -- --	Cottonwood, sweetgum.
Sacul: SaD, ScB2, ScC2.	3c2	Moderate--	Slight-----	Slight----	Loblolly pine--- Shortleaf pine--	80 70	Loblolly pine, shortleaf pine.
Saffell: SfC, SfE.	4f2	Slight----	Slight-----	Moderate--	Loblolly pine--- Shortleaf pine-- Eastern red-cedar----------	70 60 --	Loblolly pine, shortleaf pine, eastern red-cedar.

TABLE 7.--WOODLAND SUITABILITY GROUPS AND FACTORS OF WOODLAND MANAGEMENT--Continued

Soil series and map symbols	Ordination group	Management concerns			Productivity	Site index	Species to favor in planting
		Erosion hazard	Equipment limitation	Seedling mortality			
Savannah: SvB, SvC.	3o7	Slight----	Slight-----	Slight----	Loblolly pine--- Shortleaf pine-- Southern red oak----------	80 75 75	Loblolly pine, slash pine, sweetgum.
Tichnor: TA 1/--	1w9	Slight----	Severe-----	Moderate--	Cottonwood------ Nuttall oak----- Cherrybark oak-- Sweetgum--------	105 100 90 100	Cottonwood, nuttall oak, cherrybark oak, sweetgum, sycamore, green ash, water oak.
Tippah: TpB, TpC.	3o7	Slight----	Slight-----	Slight----	Cherrybark oak-- Loblolly pine--- Sweetgum--------	80 80 90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
Udorthents: UgE3.	3o7	Slight----	Slight-----	Slight----	Loblolly pine--- Shortleaf pine-- Sweetgum--------	80 70 80	Loblolly pine, sweetgum.
Udults: UoE3---	3o7	Slight----	Slight-----	Slight----	Loblolly pine--- Sweetgum-------- Shortleaf pine--	80 80 70	Loblolly pine, sweetgum.

1/ For other soils named in this mapping unit, refer to the named soil series.

the soil is a limitation; s, that the soils are sandy; f, that the soils contain large amounts of coarse fragments; r, that the soils are steeply sloping; and o, that the soils have no significant restrictions or limitations for woodland use or management.

The third part of the symbol indicates degree of hazard, limitation, or general suitability of the soils for certain kinds of trees: 1 indicates the soils have no limitation or only slight limitations and that they are best suited to needleleaf trees; 2, that the soils have one or more moderate limitations and are best suited to needleleaf trees; 3, that the soils have one or more severe limitations and are best suited to needleleaf trees; 4, that the soils have no limitations or only slight limitations and that they are best suited to broadleaf trees; 5, that the soils have one or more moderate limitations and are best suited to broadleaf trees; 6, that the soils have one or more severe limitations and are best suited to broadleaf trees; 7, that the soils have no limitations or only slight limitations and that they are suited to either needleleaf or broadleaf trees; 8, that the soils have one or more moderate limitations and are suited to either needleleaf or broadleaf trees; 9, that the soils have one or more severe limitations and are suited to either needleleaf or broadleaf trees; and 0 indicates that the soils are not suitable for producing commercial timber. The hazards or limitations that affect management of soils for woodland are windthrow hazard, erosion hazard, equipment limitations, seedling mortality, and plant competition.

Ratings of the hazard of erosion indicate the risk of loss of soils in well-managed woodland. The risk is slight if expected loss of soil is small; moderate if some measures to control erosion are needed in logging and construction; and severe if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Ratings of equipment limitations reflect the soil conditions that restrict the use of equipment normally used in woodland management or in harvesting. A rating of slight indicates that equipment use is not limited to a particular kind of equipment or time of year. A rating of moderate indicates a seasonal limitation or a need for modification in methods or equipment. A rating of severe indicates the need for specialized equipment or operations.

Seedling mortality ratings indicate degree of expected mortality of planted seedlings when plant competition is not a limiting factor. The ratings are for good planting stock that are properly planted during periods of normal rainfall. A rating of slight indicates that the expected mortality is less than 25 percent; moderate, 25 to 50 percent; and severe, more than 50 percent.

Table 7 also includes a list of potentially productive, commercially important trees that are adapted to the soils. These are the trees that woodland managers generally favor in intermediate or improvement cuttings.

The potential productivity of the trees is shown as a site-index value. The site-index value is the average height of the dominant trees, in feet, at age 30 for cottonwood, 35 for sycamore, 25 for planted pines, and 50 for all other species.

The last column of table 7 is a list of trees that are suitable for planting for commercial wood production.

In table 8 are given the common names of understory grasses, forbs, and low shrubs in stands of trees having 36 to 55 percent canopy. Species are listed in order of their productivity. Potential productivity, given in the last column, is expressed in pounds of air-dry forage per acre in both favorable and unfavorable years. Soils not listed are those on which understory vegetation is not normally grazed.

Engineering Uses of the Soils [6]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who--

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternative routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the

[6] WILLIAM E. ARNOLD, agricultural engineer, Soil Conservation Service, assisted in the preparation of this section.

TABLE 8.--YIELDS OF IMPORTANT UNDERSTORY VEGETATION

Soil series and map symbols	Common species	Potential production during--	
		Favorable years	Unfavorable years
		Pounds per acre	Pounds per acre
Amy: Ae, Af------	Switchgrass, velvetgrass, beaked panicum, bluestem, low panicums, uniolas, sedges, flatsedges, other.	2,000	1,000
Cahaba: CaB, CaC, CaD.	Bluestems, uniolas, beaked panicum, low panicums, other.	3,000	1,800
Calhoun: Ch------	Uniolas, bluestems, beaked panicum, low panicums, velvetgrass, sedges, other.	2,000	1,000
Calloway: CoA, CoB.	Bluestems, switchcane, longleaf uniola, beaked panicum, wildryes, bedtop panicum, sedges.	2,500	2,000
Crowley: Cr------	Bluestems, switchgrass, indiangrass, beaked panicum, uniolas, velvet grass, Florida paspalum, sedges, other.	3,000	1,500
Grenada: GaA, GaB, GaC, GaD, GSC 1/.	Bluestems, uniolas, plumegrasses, beaked panicum, wildryes, other.	2,500	1,200
Henry: Ha, HC 1/-	Bluestems, beaked panicum, velvetgrass, Florida paspalum, uniolas, sedges, other.	2,000	1,200
Lafe: La---------	Bluestems, indiangrass, Canada wildrye, dropseeds, three-awns, sedges, switchgrass, other.	1,500	300
Leaf: Le---------	Bluestems, uniolas, beaked panicum, switchgrass, velvetgrass, sedges, flatsedges, other.	2,000	1,000
Ouachita: Oa-----	Bluestem, switchgrass, eastern gamagrass, plumegrasses, low panicum, velvetgrass, beaked panicum, sedges, other.	3,000	1,800
Pheba: Ph--------	Bluestems, switchgrass, uniolas, beaked panicum, low panicums, paspalums, sedges, other.	2,500	1,000
Sacul: SaD, ScB2, ScC2.	Bluestems, beaked panicum, low panicums, plumegrasses, uniolas, sedges, other.	3,000	1,800
Saffell: SfC, SfE.	Bluestems, indiangrass, Virginia wildrye, low panicums, uniolas, beaked panicum, sedges, other.	2,500	1,200

TABLE 8.--YIELDS OF IMPORTANT UNDERSTORY VEGETATION--Continued

Soil series and map symbols	Common species	Potential production during--	
		Favorable years	Unfavorable years
		Pounds per acre	Pounds per acre
Savannah: SvB, SvC.	Bluestems, beaked panicum, uniolas, plumegrasses, low panicums, sedges, other.	2,500	1,500
Tippah: TpB, TpC.	Longleaf uniola, bluestems, beaked panicum, low panicums, plumegrasses, sedges, other.	2,500	1,200
Udorthents: UgE3.	Bluestems, uniolas, beaked panicum, low panicums, plumegrasses, wildryes, other.	2,500	1,200
Udults: UoE3-----	Bluestems, uniolas, beaked panicum, low panicums, other.	2,500	1,200

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 9, 10, 11, 12, and 13. These tables, show, respectively, several estimated soil properties significant to engineering; interpretations for various engineering uses; and results of engineering laboratory tests on soil samples.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 12, and it can also be used to make other useful maps.

The information in this section does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites especially the small ones, is needed because delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. Many of these terms commonly used in soil science are defined in the Glossary.

Engineering Classification Systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (11) used by the SCS engineers, Department of Defense, and others; and the AASHO system (1) adopted by the American Association of State Highway Officials.

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

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups, ranging from A-1 to A-7, on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clayey soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A-1, A-2, and A-7 groups are divided as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the engineering value of a soil material can be indicated by a group-index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classifications of tested soils are given in table 13. These classifications include group-index numbers in parentheses. The estimated classifications of all the soils mapped in the county are given in table 9. These classifications have no group-index numbers.

Soil Properties Significant in Engineering

Several estimated soil properties and characteristics significant in engineering are given in tables 9, 10, and 11. These estimates are made for typical soil profiles, for the whole soil, and for layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 9.

Soil texture is described in table 9 in the standard terms used by the Department of Agriculture. These terms take into account the percentage of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. The data on liquid limit and plasticity index are estimated in table 9. In

table 13 they are based on tests of soil samples.

Table 10 contains information on the estimated engineering properties of the soils. Following are explanations of some of the terms used in that table.

Erosion factors are used in an equation that predicts the amount of erosion resulting from certain land treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to detachment and transport by rainfall. Soils having the highest numbers are the most erodible. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or wind, that permits a high level of crop productivity to be sustained economically and indefinitely.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 10 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

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

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

Shrink-swell potential is the change in the volume of soil material when the content of moisture changes. It is the extent to which the soil shrinks as it dries out or swells when it gets wet. This shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Corrosivity, as used in table 10, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of low means that there is a low probability of soil-induced corrosion damage. A rating of high means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Table 11 contains information on the hydrologic features of the soils. Following are explanations of some of the terms used in that table.

Flooding is estimated in terms of frequency, duration, and probable time of occurrence.

The high water table column gives the distance from the surface of the soil to the highest level that ground water reaches during most years. The kind of water table and the months when the water table is highest are also given. The depths given are the depths to a seasonal water table that is separated from the permanent water table by an impervious layer or an unsaturated zone.

Hydrologic groups are those soils that have similar runoff potential under similar storm and cover conditions. The soils have been placed in four classes, designated A, B, C, and D. Class A soils have the lowest potential for runoff.

Engineering Interpretations

The interpretations in table 12 are based on the estimated engineering properties of soils shown in tables 9, 10, and 11; on test data for soils in this area and others nearby or adjoining; and on the experience of engineers and soil scientists with the soils of Drew County. Table 12 shows the ratings of the limitations of the soils for specified uses. For these particular uses, it also lists soil features significant in planning, installing, and maintaining cropland and pasture, irrigation, terraces and diversions, and grassed waterways. Additional engineering interpretations of soils are given in the section "Use of the Soils for Town and Country Planning," and in tables 14, 15, and 16.

Soil limitations are indicated by the ratings slight, moderate, and severe. A rating of slight means that the soil properties are generally favorable for the rated use and that any limitations are minor and easily overcome. A rating of moderate means that some soil properties are unfavorable for the rated use but can be overcome or modified by special planning and design. A rating of severe means that the soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance.

Interpretations of soils for water management.--Table 12 contains interpretations of the suitability of the soils for use in water management. Following are explanations of the interpretations given in that table.

Pond reservoirs are areas of water held behind a dam or embankment. Soils suitable for use as pond reservoir areas have low seepage, which is related to their permeability and depth over fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage and

TABLE 9.--ENGINEERING TEST DATA

Soil series and map symbols	Depth	USDA texture	Unified classification	AASHO classification	More than 3 inches	Soil material passing sieve-- No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index
	In.				Pct.	Pct.	Pct.	Pct.	Pct.		
Amy: Ae, Af.	0-13	Silt loam-----	ML	A-4	0	100	95-100	90-100	85-95	1/ NP-20	NP-3
	13-65	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	95-100	95-100	85-95	25-40	8-20
Ariel: Ar-	0-37	Silt loam-----	ML,CL	A-4	0	100	100	100	90-100	NP-30	NP-10
	37-65	Silt loam-----	ML,CL	A-4, A-6	0	100	100	100	90-100	25-40	8-20
Arkabutla: At.	0-9	Silt loam-----	ML,CL	A-4	0	100	100	95-100	90-100	NP-30	NP-10
	9-75	Silty clay loam, silt loam.	CL,ML	A-4, A-6	0	100	100	95-100	90-100	25-40	8-15
Cahaba: CaB, CaC, CaD.	0-11	Fine sandy loam.	SM,ML	A-2, A-4	0	90-100	90-100	55-75	25-55	NP	NP
	11-35	Sandy clay loam.	SC,CL	A-4, A-6	0	85-100	85-100	75-95	40-55	25-35	8-15
	35-49	Fine sandy loam, sandy loam.	SM,ML	A-2, A-4	0	85-100	85-100	55-90	20-55	NP	NP
	49-72	Loamy sand, fine sandy loam, sandy loam.	SM,ML	A-2, A-4	0	85-100	85-100	55-75	15-55	NP-30	NP-7
Calhoun: Ch.	0-23	Silt loam-----	ML,CL-ML	A-4	0	100	100	100	95-100	NP-25	NP-7
	23-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	30-45	11-25
	31-57	Silt loam, silty clay loam.	ML,CL	A-4, A-6	0	100	100	100	95-100	25-40	7-20
Calloway: CoA, CoB.	0-6	Silt loam-----	ML,CL-ML	A-4	0	100	98-100	95-100	90-100	NP-25	NP-7
	6-21	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	98-100	95-100	90-100	25-40	7-20
	21-28	Silt loam-----	ML,CL	A-4, A-6	0	100	98-100	95-100	90-100	20-35	5-15
	28-72	Silt loam, silty clay loam.	ML,CL	A-4, A-6, A-7	0	100	98-100	95-100	90-100	25-45	8-25

TABLE 9.--ENGINEERING TEST DATA--Cont.

Soil series and map symbols	Depth	USDA texture	Unified classification	AASHO classification	More than 3 inches	Soil material passing sieve-- No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index
	In.				Pct.	Pct.	Pct.	Pct.	Pct.		
Crowley: Cr.	0-20	Silt loam----	ML,CL	A-4	0	100	100	95-100	90-100	NP-30	NP-10
	20-28	Clay, silty clay.	CH,MH	A-7	0	100	100	95-100	95-100	52-65	19-35
	28-60	Silty clay loam, silty clay.	CL,CH, ML,MH	A-6, A-7	0	100	100	90-100	90-100	36-55	15-30
Grenada: GaA, GaB, GaC, GaD, GSC 2/.	0-4	Silt loam----	ML,CL-ML	A-4	0	100	100	95-100	90-100	NP-25	NP-7
	4-26	Silt loam, silty clay loam.	CL,ML	A-4, A-6	0	100	100	95-100	90-100	25-40	8-18
	26-29	Silt loam----	ML,CL-ML	A-4	0	100	100	95-100	90-100	NP-25	NP-7
	29-72	Silt loam, silty clay loam.	CL,ML	A-4, A-6, A-7	0	100	100	95-100	90-100	25-45	8-18
Hebert: Ha.	0-8	Silt loam----	ML,CL	A-4	0	100	100	95-100	70-90	NP-30	NP-10
	8-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	80-95	30-45	11-23
	40-72	Silt loam, loam, fine sandy loam, silty clay loam.	CL,ML	A-4, A-6	0	100	100	95-100	70-90	NP-35	NP-20
Henry: Hb, HC 2/.	0-7	Silt loam----	ML,CL-ML	A-4	0	100	100	95-100	90-100	NP-25	NP-7
	7-29	Silt loam----	ML,CL	A-4	0	100	100	95-100	90-100	NP-30	NP-10
	29-54	Silty clay loam, silt loam.	CL	A-4, A-6	0	100	100	95-100	90-100	30-40	10-18
	54-72	Silt loam, silty clay loam.	ML,CL	A-4, A-6	0	100	100	95-100	90-100	NP-35	NP-15
Lafe: La--	0-5	Silt loam----	ML,CL	A-4	0	100	100	95-100	90-100	NP-30	NP-10
	5-54	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	8-20
	54-72	Fine sandy loam, loamy fine sand, fine sand.	ML,CL SM,SC	A-4, A-2	0	100	100	65-85	20-55	NP-30	NP-10

TABLE 9.--ENGINEERING TEST DATA--Cont.

Soil series and map symbols	Depth	USDA texture	Unified classification	AASHO classification	More than 3 inches	Soil material passing sieve-- No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index
	In.				Pct.	Pct.	Pct.	Pct.	Pct.		
Leaf: Le--	0-13	Silt loam----	ML,CL	A-4, A-6	0	100	100	85-100	51-90	NP-35	NP-15
	13-72	Silty clay, clay, silty clay loam.	CH,CL	A-7	0	100	100	90-100	85-95	41-60	20-35
Ouachita: Oa.	0-7	Silt loam----	ML,CL	A-4	0	100	100	85-100	75-95	NP-30	NP-10
	7-75	Silt loam, loam.	ML,CL	A-4, A-6	0	100	100	85-100	80-100	20-35	5-25
Perry: Pe--	0-33	Clay---------	CH	A-7	0	100	100	100	95-100	50-75	30-45
	33-72	Clay---------	CH	A-7	0	90-100	85-100	75-100	70-100	60-80	35-50
Pheba: Ph--	0-30	Silt loam, loam.	ML,CL	A-4	0	100	100	80-100	55-90	NP-30	NP-10
	30-72	Silt loam, silty clay loam.	ML,CL	A-4, A-6	0	100	100	85-100	70-90	20-35	8-15
Portland: Po-------	0-6	Silt loam----	ML,CL	A-4, A-6	0	100	100	95-100	95-100	15-30	2-15
	6-27	Clay---------	CH	A-7	0	100	100	95-100	95-100	60-90	40-55
	27-72	Clay---------	CH	A-7	0	100	100	95-100	95-100	60-90	40-55
Pr-------	0-6	Clay---------	CH	A-7	0	100	100	95-100	95-100	55-80	40-55
	6-27	Clay---------	CH	A-7	0	100	100	95-100	95-100	60-90	40-55
	27-72	Clay---------	CH	A-7	0	100	100	95-100	95-100	60-90	40-55
Rilla: RaA, RbB.	0-15	Silt loam----	ML,CL	A-4	0	100	100	100	90-100	NP-30	NP-10
	15-35	Silty clay loam, silt loam.	CL	A-6	0	100	100	100	90-100	30-40	12-20
	35-47	Loam, silt loam.	ML,CL	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	47-72	Fine sandy loam, silt loam, sandy clay loam, silty clay loam.	CL,ML	A-4, A-6	0	100	100	100	90-100	NP-35	NP-20

TABLE 9.--ENGINEERING TEST DATA--Cont.

Soil series and map symbols	Depth	USDA texture	Unified classification	AASHO classification	More than 3 inches	Soil material passing sieve-- No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index
	In.				Pct.	Pct.	Pct.	Pct.	Pct.		
Sacul: SaD, ScB2, ScC2.	0-12	Loam, clay loam.	ML,CL	A-4, A-6	0	95-100	90-100	80-100	60-80	NP-30	NP-15
	12-55	Clay, silty clay, silty clay loam.	CH,MH, CL	A-7	0	95-100	95-100	95-100	80-95	45-70	20-35
	55-72	Silty clay loam, silt loam, clay loam, sandy clay loam.	CL,CH	A-6, A-7	0	95-100	95-100	80-100	55-90	30-55	15-30
Saffell: SfC, SfE.	0-12	Gravelly fine sandy loam.	GM,SM	A-1, A-2, A-4	0-5	45-80	35-70	25-65	15-45	NP	NP
	12-42	Gravelly fine sandy loam, gravelly sandy clay loam.	GC	A-2	0-5	35-60	20-50	20-40	15-35	15-35	8-15
	42-72	Gravelly fine sandy loam, gravelly loamy sand.	GM,GM-GP,SM, SM-SP	A-1	0-5	25-80	10-70	10-50	5-25	NP	NP
Savannah: SvB, SvC.	0-9	Fine sandy loam.	SM,ML	A-4	0	100	95-100	70-85	40-60	NP-15	NP-3
	9-24	Sandy clay loam, clay loam, loam.	CL,SC	A-4, A-6	0	100	95-100	85-100	45-75	25-40	8-20
	24-65	Sandy clay loam, clay loam, loam.	CL,SC	A-6	0	100	95-100	85-100	45-75	25-40	11-20
	65-72	Fine sandy loam, loam, sandy clay loam.	CL,SC	A-4, A-6	0	100	95-100	85-100	40-75	20-35	8-15
Tichnor: TA 2/.	0-23	Silt loam----	ML,CL	A-4, A-6	0	100	100	95-100	90-100	NP-35	NP-15
	23-72	Silty clay loam, silt loam.	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	8-20

TABLE 9.--ENGINEERING TEST DATA--Cont.

Soil series and map symbols	Depth	USDA texture	Unified classification	AASHO classification	More than 3 inches	Soil material passing sieve-- No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index
	In.				Pct.	Pct.	Pct.	Pct.	Pct.		
Tippah: TpB, TpC.	0-7	Silt loam----	ML,CL	A-4	0	95-100	100	95-100	95-100	20-30	3-10
	7-28	Silty clay loam, silt loam.	CL,ML	A-4, A-6, A-7	0	95-100	100	95-100	85-95	35-50	10-30
	28-72	Silty clay, clay, silty clay loam.	CH,MH, CL,ML	A-7	0	95-100	100	90-100	85-100	45-65	15-35
Udorthents: UgE3 2/. Too variable to rate.											
Udults: UoE3 2/. Too variable to rate.											

1/ Nonplastic.

2/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

TABLE 10.--ESTIMATED ENGINEERING PROPERTIES

Soil series and map symbols	Erosion factors K	Erosion factors T	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity Steel	Corrosivity Concrete
			Inches	Inches per hour	Inches per inch of soil	pH			
Amy: Ae, Af------	--	--	0-13	0.6-2.0	0.16-0.24	4.5-6.0	Low------	High------	Moderate.
			13-65	0.06-0.6	0.16-0.24	4.5-5.5	Low-------	High------	Moderate.
Ariel: Ar--------	--	--	0-37	0.6-2.0	0.22-0.24	4.5-5.5	Low-------	Low-------	Moderate.
			37-65	0.2-0.6	0.16-0.20	4.5-5.5	Low-------	Low-------	Moderate.
Arkabutla: At----	--	--	0-9	0.6-2.0	0.16-0.24	5.1-6.5	Low-------	High------	Moderate.
			9-75	0.6-2.0	0.16-0.24	4.5-5.5	Moderate--	High------	Moderate.
Cahaba: CaB, CaC, CaD.	.24	4	0-11	2.0-6.0	0.11-0.15	5.1-6.0	Low-------	Low-------	Moderate.
			11-35	0.6-2.0	0.12-0.17	4.5-5.5	Low-------	Low-------	High.
			35-49	0.6-6.0	0.10-0.15	4.5-5.5	Low-------	Low-------	High.
			49-72	2.0-6.0	0.06-0.15	4.5-5.5	Low-------	Low-------	High.
Calhoun: Ch------	--	--	0-23	0.2-0.6	0.22-0.24	4.5-6.0	Low-------	High------	Moderate.
			23-31	0.06-0.2	0.18-0.24	4.5-5.5	Moderate--	High------	High.
			31-57	0.06-0.2	0.18-0.24	4.5-5.5	Low-------	High------	Moderate.
Calloway: CoA, CoB.	.43	3	0-6	0.6-2.0	0.22-0.24	4.5-5.5	Low-------	High------	Moderate.
			6-21	0.2-0.6	0.22-0.24	4.5-5.5	Low-------	High------	Moderate.
			21-28	0.2-0.6	0.22-0.24	4.5-5.5	Low-------	High------	Moderate.
			28-72	0.06-0.2	0.10-0.15	4.5-5.5	Low-------	High------	Moderate.
Crowley: Cr------	--	--	0-20	0.2-0.6	0.22-0.24	4.5-6.0	Low-------	High------	Moderate.
			20-28	1/ < 0.06	0.16-0.22	4.5-6.0	High------	High------	Moderate.
			28-60	0.06-0.2	0.18-0.22	4.5-6.0	Moderate--	High------	Moderate.
Grenada: GaA, GaB, GaC, GaD, GSC 1/.	.43	3	0-4	0.6-2.0	0.22-0.24	4.5-5.5	Low-------	Moderate--	Moderate.
			4-26	0.6-2.0	0.18-0.24	4.5-5.5	Low-------	Moderate--	Moderate.
			26-29	0.2-0.6	0.22-0.24	4.5-5.5	Low-------	High------	Moderate.
			29-72	0.06-0.2	0.10-0.15	4.5-6.0	Low-------	High------	Moderate.
Hebert: Ha-------	--	--	0-8	0.2-0.6	0.18-0.24	5.1-6.5	Low-------	High------	Moderate.
			8-40	0.2-0.6	0.18-0.22	5.1-6.0	Moderate--	High------	Moderate.
			40-72	0.2-0.6	0.20-0.24	5.6-7.8	Low-------	High------	Moderate.
Henry: Hb, HC 2/-	--	--	0-7	0.6-2.0	0.22-0.24	4.5-6.5	Low-------	High------	Moderate.
			7-29	0.2-0.6	0.22-0.24	4.5-5.5	Low-------	High------	High.
			29-54	0.06-0.2	0.02-0.10	4.5-5.5	Low-------	High------	Moderate.
			54-72	0.2-0.6	0.02-0.10	4.5-5.5	Low-------	High------	Moderate.
Lafe: La---------	--	--	0-5	0.6-2.0	0.13-0.24	5.6-7.3	Low-------	High------	Moderate.
			5-54	< 0.06	0.09-0.15	7.4-9.0	Moderate--	High------	Low.
			54-72	< 0.2	---------	7.4-9.0	Low-------	High------	Low.
Leaf: Le---------	--	--	0-13	0.6-2.0	0.18-0.22	4.5-5.5	Low-------	High------	High.
			13-72	< 0.06	0.14-0.18	4.5-5.5	High------	High------	High.
Ouachita: Oa-----	--	--	0-7	0.6-2.0	0.16-0.24	4.5-5.5	Low-------	Low-------	Moderate.
			7-75	0.2-0.6	0.15-0.24	4.5-5.5	Low-------	Low-------	Moderate.
Perry: Pe--------	--	--	0-33	< 0.06	0.12-0.18	4.5-6.0	High------	High------	Moderate.
			33-72	< 0.06	0.12-0.18	6.6-8.4	High------	High------	Low.
Pheba: Ph--------	--	--	0-30	0.6-2.0	0.15-0.24	4.5-5.5	Low-------	High------	High.
			30-72	0.2-0.6	0.06-0.10	4.5-5.5	Low-------	High------	High.

TABLE 10.--ESTIMATED ENGINEERING PROPERTIES--Continued

Soil series and map symbols	Erosion factors K	Erosion factors T	Depth	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity Steel	Corrosivity Concrete
			Inches	Inches per hour	Inches per inch of soil	pH			
Portland:									
Po	--	--	0-6	0.2-2.0	0.16-0.24	5.1-6.5	Low	High	Moderate.
			6-27	0.06	0.12-0.18	4.5-5.0	High	High	Moderate.
			27-72	0.06	0.12-0.18	6.1-8.4	High	High	Low.
Pr	--	--	0-6	0.06	0.12-0.18	5.1-6.5	High	High	Moderate.
			6-27	0.06	0.12-0.18	4.5-6.0	High	High	Moderate.
			27-72	0.06	0.12-0.18	6.1-8.4	High	High	Low.
Rilla: RaA, RbB	--	--	0-15	0.6-2.0	0.16-0.24	5.1-6.5	Low	Moderate	Moderate.
			15-35	0.6-2.0	0.16-0.24	4.5-6.0	Moderate	Moderate	Moderate.
			35-47	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	Moderate	Moderate.
			47-72	0.6-2.0	0.11-0.24	4.5-6.0	Low	Moderate	Moderate.
Sacul: SaD, ScB2, ScC2.	.37	3	0-12	0.6-2.0	0.10-0.20	4.5-5.5	Low	Low	Moderate.
			12-55	0.06-0.2	0.12-0.18	3.6-5.5	High	High	Moderate.
			55-72	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	High	Moderate.
Saffell: SfC, SfE.	.20	4	0-12	2.0-6.0	0.06-0.10	4.5-6.0	Low	Low	Moderate.
			12-42	0.6-2.0	0.05-0.10	4.5-6.0	Low	Low	Moderate.
			42-72	2.0-6.0	0.02-0.10	4.5-6.0	Low	Low	Moderate.
Savannah: SvB, SvC.	.37	3	0-9	0.6-2.0	0.11-0.15	5.1-6.0	Low	Moderate	High.
			9-24	0.6-2.0	0.12-0.20	5.1-6.0	Low	Moderate	High.
			24-65	0.2-0.6	0.05-0.08	4.5-5.5	Low	Moderate	High.
			65-72	0.2-0.6	0.10-0.15	4.5-5.5	Low	Moderate	High.
Tichnor: TA 2/	--	--	0-23	0.6-2.0	0.16-0.24	4.5-6.0	Low	High	Moderate.
			23-72	0.06-0.2	0.16-0.24	4.5-5.5	Moderate	High	Moderate.
Tippah: TpB, TpC.	.43	4	0-7	0.6-2.0	0.22-0.24	4.5-5.5	Low	High	Moderate.
			7-28	0.2-0.6	0.18-0.24	4.5-5.5	Moderate	High	Moderate.
			28-72	0.06-0.2	0.12-0.22	4.5-5.5	High	High	Moderate.
Udorthents: UgE3 2/.	.43	2	-----	0.6-6.0	0.10-0.24	4.5-7.3	Low	Low	Moderate.
Udults: UoE3	.24	4	-----	0.6-6.0	0.10-0.17	4.5-5.5	Low	Low	High.

1/ The symbol < means less than.

2/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

The soils in this mapping unit may have different properties, and for this reason it is necessary to refer to the other series mentioned.

TABLE 11.--HYDROLOGIC FEATURES

Soil series and map symbols	Flooding		Months	High water table			Hydrologic group
	Frequency 1/	Duration		Depth	Kind	Months	
				Ft			
Amy:							
Ae----------	----------	----------	-------	0-1.0	Perched	Dec-May	D
Af----------	Frequent----	Long to very long.	Dec-May	0-1.0	Perched	Dec-May	D
Ariel: Ar----------	Frequent----	Brief to long----	Dec-Apr	2.0-3.0	Perched	Dec-Apr	C
Arkabutla: At-------	Frequent----	Brief to long----	Dec-May	1.0-2.0	Perched	Dec-May	C
Cahaba: CaB, CaC, CaD.	----------	----------	-------	2/ >6	-------	-------	B
Calhoun: Ch---------	----------	----------	-------	0.5-1.5	Perched	Dec-May	D
Calloway: CoA, CoB--	----------	----------	-------	1.0-2.0	Perched	Dec-Apr	C
Crowley: Cr---------	----------	----------	-------	0-1.5	Perched	Dec-May	D
Grenada: GaA, GaB, GaC, GaD, GSC 1/.	----------	----------	-------	1.5-2.0	Perched	Jan-Apr	C
Hebert: Ha----------	----------	----------	-------	2.0-3.0	Perched	Dec-Apr	C
Henry: Hb, HC 1/----	----------	----------	-------	0.5-2.0	Perched	Dec-May	D
Lafe: La----------	----------	----------	-------	0-1.0	Perched	Dec-Apr	D
Leaf: Le----------	----------	----------	-------	0-1.0	Perched	Dec-May	D
Ouachita: Oa--------	Frequent----	Long to very long.	Dec-May	>6	-------	-------	C
Perry: Pe----------	----------	----------	-------	0-1.0	Perched	Dec-May	D
Pheba: Ph----------	----------	----------	-------	1.0-2.0	Perched	Dec-Apr	C
Portland: Po, Pr----	----------	----------	-------	0-1.0	Perched	Dec-May	D
Rilla: RaA, RbB-----	----------	----------	-------	5.0-6.0	Perched	Jan-Mar	B
Sacul: SaD, ScB2, ScC2.	----------	----------	-------	>6	-------	-------	D
Saffell: SfC, SfE---	----------	----------	-------	>6	-------	-------	B
Savannah: SvB, SvC.	----------	----------	-------	1.5-2.0	Perched	Jan-Apr	C
Tichnor: TA 1/------	Frequent----	Long to very long.	Dec-May	0-1.0	Perched	Dec-May	D
Tippah: TpB, TpC----	----------	----------	-------	1.5-2.0	Perched	Jan-Apr	C
Udorthents: UgE3 1/-	----------	----------	-------	>6	-------	-------	C
Udults: UoE3 1/-----	----------	----------	-------	>6	-------	-------	B

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

2/ The symbol > means more than.

TABLE 12.--WATER MANAGEMENT

[Seepage," "slope," and other terms that describe restrictive soil features are defined in the Explanation of Key Phrases following the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soils were not evaluated]

Soil series and map symbols	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Amy:						
Ae	Slight	Moderate: compressible; low strength; piping; unstable fill.	Favorable: percs slowly; wet.	Slow intake; wet.	Not needed	Not needed.
Af	Slight	Moderate: compressible; low strength; piping; unstable fill.	Floods: percs slowly; wet.	Slow intake; wet.	Not needed	Not needed.
Ariel: Ar	Moderate: percs rapidly.	Moderate: compressible; piping; unstable fill.	Not wet; floods.	Floods	Not needed	Not needed.
Arkabutla: At	Moderate: percs rapidly.	Moderate: compressible; low strength; piping.	Floods; wet.	Floods; wet.	Not needed	Not needed.
Cahaba:						
CaB	Severe: percs rapidly.	Moderate: piping; unstable fill.	Not wet	Fast intake; favorable.	Favorable	Favorable.
CaC	Severe: percs rapidly.	Moderate: piping; unstable fill.	Not wet	Fast intake; slope.	Favorable	Slope.
CaD	Severe: percs rapidly.	Moderate: piping; unstable fill.	Not wet	Fast intake; slope.	Slope	Slope.
Calhoun: Ch	Slight	Moderate: compressible; low strength; piping; unstable fill.	Cutbanks cave; percs slowly; wet.	Slow intake; wet.	Not needed	Not needed.
Calloway:						
CoA	Slight	Moderate: compressible; low strength.	Cutbanks cave; percs slowly; wet.	Favorable; slow in- wet.	Erodes easily; percs slowly; piping.	Erodes easily; percs slowly.
CoB	Slight	Moderate: compressible; low strength.	Not needed; slope.	Erodes easily; slow intake; slope.	Erodes easily; percs slowly; piping.	Erodes easily; percs slowly.

TABLE 12.--WATER MANAGEMENT--Continued

Soil series and map symbols	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Crowley: Cr------	Slight-----	Moderate: compressible; low strength.	Favorable: percs slowly; wet.	Favorable: slow intake; wet.	Not needed---	Percs slowly; wet.
Grenada:						
GaA----------	Slight-----	Moderate: compressible; low strength; piping.	Cutbanks cave; percs slowly; wet.	Favorable; slow intake.	Erodes easily; percs slowly; piping.	Erodes easily; percs slowly.
GaB, GaC, GSC 1/.	Slight-----	Moderate: compressible; low strength; piping.	Not needed; slope.	Erodes easily; slow intake; slope.	Erodes easily; percs slowly; piping.	Erodes easily; percs slowly.
GaD----------	Slight-----	Moderate: compressible; low strength; piping.	Not needed; slope.	Erodes easily; slow intake; slope.	Erodes easily; percs slowly; piping; slope.	Erodes easily; percs slowly; slope.
Hebert: Ha-------	Moderate: percs rapidly.	Moderate: compressible; piping; unstable fill.	Favorable; percs slowly; wet.	Favorable; slow intake.	Not needed---	Not needed.
Henry: Hb, HC 1/-	Slight-----	Moderate: compressible; low strength; piping; unstable fill.	Cutbanks cave; percs slowly; wet.	Slow intake; wet.	Not needed---	Not needed.
Lafe: La---------	Slight-----	Moderate: compressible; low strength; piping.	Cutbanks cave; excess alkali; percs slowly; wet.	Droughty; excess alkali; rooting depth; slow intake; wet.	Not needed---	Not needed.
Leaf: Le---------	Slight-----	Moderate: compressible; piping.	Percs slowly; poor outlets.	Slow intake.	Not needed---	Not needed.
Ouachita: Oa-----	Moderate: percs rapidly.	Moderate: compressible; piping.	Not wet; floods.	Favorable---	Not needed---	Not needed.
Perry: Pe--------	Slight-----	Moderate: compressible; low strength; unstable fill.	Favorable-	Favorable; percs slowly; wet.	Not needed; slow intake; wet.	Not needed.

TABLE 12.--WATER MANAGEMENT--Continued

Soil series and map symbols	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Pheba: Ph	Slight	Moderate: compressible; piping; unstable fill.	Percs slowly; poor outlets; wet.	Slow intake	Not needed	Not needed.
Portland: Po, Pr	Slight	Moderate: compressible; low strength; unstable fill.	Favorable; percs slowly; wet.	Favorable; slow intake; wet.	Not needed	Not needed.
Rilla:						
RaA	Moderate: percs rapidly.	Moderate: compressible; low strength; piping; unstable fill.	Not wet	Favorable	Favorable	Favorable.
RbB	Moderate: percs rapidly.	Moderate: compressible; low strength; piping; unstable fill.	Not wet	Complex slope.	Complex slope.	Favorable.
Sacul:						
SaD	Slight	Moderate: compressible; low strength.	Not wet	Erodes easily; slow intake; slope.	Slope	Erodes easily; percs slowly; slope.
ScB2	Slight	Moderate: compressible; low strength.	Not wet	Erodes easily; slow intake; slope.	Favorable	Erodes easily; percs slowly.
ScC2	Slight	Moderate: compressible; low strength.	Not wet	Erodes easily; slow intake; slope.	Favorable	Erodes easily; percs slowly; slope.
Saffell:						
SfC	Moderate: percs rapidly.	Moderate: percs rapidly; piping; thin layer.	Not wet	Droughty; percs rapidly; slope.	Erodes easily; piping.	Droughty; erodes easily; slope.
SfE	Moderate: percs rapidly.	Moderate: percs rapidly; piping; thin layer.	Not wet	Droughty; percs rapidly; slope.	Erodes easily; piping; slope.	Droughty; erodes easily; slope.

TABLE 12.--WATER MANAGEMENT--Continued

Soil series and map symbols	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Savannah:						
SvB	Moderate: percs rapidly.	Moderate: compressible; piping; unstable fill.	Not slope.	Favorable	Favorable	Favorable; percs slowly.
SvC	Moderate: percs rapidly.	Moderate: compressible; piping; unstable fill.	Not needed; slope.	Erodes easily; slope.	Favorable	Erodes easily; percs slowly; slope.
Tichnor: TA 1/	Slight	Moderate: compressible; low strength; piping; unstable fill.	Floods; percs slowly; wet.	Slow intake; wet; floods.	Not needed	Not needed.
Tippah:						
TpB	Slight	Moderate: compressible; unstable fill.	Not wet	Slope; slow intake.	Percs slowly	Percs slowly.
TpC	Slight	Moderate: compressible; unstable fill.	Not wet	Slope; slow intake.	Percs slowly	Percs slowly; slope.
Udorthents: UgE3 1/.	Moderate: percs rapidly.	Moderate: low strength; piping; unstable fill.	Complex slope; not wet; slope.	Complex slope; erodes easily; slope.	Complex sloppe; erodes easily; slopes. piping.	Erodes easily; slope.
Udults: UoE3 1/	Moderate: percs rapidly.	Moderate: low strength; percs rapidly; piping.	Not wet; slope.	Complex slope; erodes easily percs rapidly; slope.	Complex slope; erodes easily; piping; slope.	Slope; erodes easily.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

TABLE 13.--ENGINEERING TEST DATA

[Tests made by the Arkansas State Highway Department in accordance with standard procedures of the American Association of State Highway Officials]

Soil name and location	Parent material	SCS report number S-70-Ark-43	Depth	Moisture density 1/		Material passing sieve 2/--				Liquid limit 3/	Plasticity index 4/	Classification	
				Maximum dry density	Optimum moisture	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)			AASHO 5/	Unified 6/
			In	Lbs/cu ft	Pct					Pct			
Cahaba fine sandy loam: SW¼NW¼NW¼ sec. 13, T. 13 S., R. 7 W. (Modal)	Unconsolidated loamy coastal plain deposits.	4-3	11-25	119	13	100	98	90	45	28	9	A-4(1)	SC
		4-5	35-49	127	9	100	98	87	24	--	7/ NP	A-2-4(0)	SM
		4-7	61-72	118	14	---	100	75	34	34	11	A-2-6(0)	SM-SC
Sacul loam: SE¼NE¼SE¼ sec. 22, T. 12 S., R. 7 W. (Modal)	Unconsolidated loamy and clayey coastal plain deposits.	3-4	21-31	94	25	---	--	100	90	54	20	A-7-5(22)	MH
		3-5	31-44	99	23	---	--	100	95	49	22	A-7-6(24)	CL
		3-7	55-72	95	26	100	99	96	88	48	21	A-7-6(21)	CL
Tippah silt loam: SW¼NW¼SW¼ sec. 25, T. 12 S., R. 8 W. (Modal)	Loess over unconsolidated clayey coastal plain deposits.	5-2	7-28	108	17	100	99	95	91	36	14	A-6(13)	CL
		5-3	28-40	102	22	100	99	98	95	46	15	A-7-5(18)	ML
		5-6	66-72	103	21	100	99	97	95	54	30	A-7-6(32)	CH

1/ Based on AASHO Designation: T 99-57, Method A (1).

2/ Mechanical analysis according to AASHO Designation: T 88-57 (1). Results by this procedure may differ somewhat from the results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the various grain-sized fractions are calculated on the basis of all material up to and including that 3 inches in diameter. In the SCS soil survey procedure, the material coarser than 2 millimeters in diameter is excluded from the calculations of grain-sized fractions. The mechanical analysis data in this table are not intended for naming textured classes of soil. All material passed the 3-inch sieve.

3/ Based on AASHO Designation: T 89-60 (1).

4/ Based on AASHO Designation: T 90-56 and AASHO Designation: T 91-54 (1).

5/ Based on AASHO Designation: M 145-66 I (2).

6/ Based on ASTM Designation: D 2487-66 T (3).

7/ Nonplastic.

piping and that has favorable stability, shrink-swell potential, shear strength, and compactibility. The presence of stones or organic matter in a soil are unfavorable factors in the suitability of a soil for use in embankments, dikes and levees.

Drainage of cropland and pasture is affected by such soil properties as permeability; texture; structure; depth over claypan or other layers that influence rate of water movement; depth of the water table; slope; stability of ditchbanks; susceptibility to stream overflow; salinity and alkalinity; and availability of outlets for drainage.

The irrigation of a soil is affected by such features as slope; susceptibility to flooding, water erosion, and soil blowing; texture; accumulations of salts and alkalis; depth of root zone; rate of water intake at the surface; permeability of the soil below the surface layer; available water capacity; need for drainage; and depth of the water table.

Terraces and diversions are embankments, or ridges, constructed across a slope to intercept runoff and allow it to soak into the soil or flow slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth over unfavorable material; permeability; and resistance to water erosion, soil slipping, and soil blowing. A suitable soil provides outlets for runoff and is not difficult to vegetate.

Grassed waterways are used to carry runoff water safely to outlets. The features that affect the use of soils for waterways are permeability, erodibility, and suitability for permanent vegetation.

Engineering Test Data

Table 13 contains engineering test data for three of the major soils in Drew County. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by sieve methods.

Moisture-density, or compaction, data are important in earthwork. If a soil material is compacted at successively higher contents of moisture and the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases as the content of moisture increases. The highest dry density obtained in the compactive tests is the maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

The tests used to determine liquid limit and plastic limit measured the effect of water on the consistence of soil, as has been explained for table 9.

Use of the Soils for Town and Country Planning

Tables 14, 15, and 16 show the degree and kind of limitation or suitability of the soils of Drew County for selected nonfarm uses. The degrees of limitation or suitability reflect the features of the given soil, to a depth of about 6 feet, that affect a particular use.

Soil limitations are indicated by the ratings slight, moderate, and severe. A rating of slight means that the soil properties are generally favorable for the rated use and that any limitations are minor and easily overcome. A rating of moderate means that some soil properties are unfavorable for the rated use but can be overcome or modified by special planning and design. A rating of severe means that the soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance.

Soil suitability is rated as good, fair, and poor; which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe. In addition the term unsuited is used for soils having no potential for use as sources of sand or gravel.

Interpretations of soils for sanitary facilities.--Table 14 contains information on the suitability of the soils for sanitary facilities. Following are explanations of some of the terms used in that table.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 1½ feet to 6 feet is evaluated for this use. The soil properties considered are those that affect both the absorption of effluent and the construction and operation of the system. Properties that affect absorption are permeability, depth to water table, and susceptibility to flooding. Properties that affect difficulty of layout and construction are slope, risk of soil erosion, and lateral seepage. Slope and lateral seepage also effect the flow of effluent.

Sewage lagoons are shallow ponds constructed to hold sewage at a depth of 2 to 5 feet for a long enough period for bacteria to decompose the solid waste. A lagoon has a nearly level floor and has sides, or embankments, of compacted soil material. The embankments are compacted to medium density and the pond is protected from flooding. In determining the suitability of soils for the construction of sewage lagoons, properties are considered that affect the pond floor and the embankments. Those that affect the pond floor are permeability, content of organic matter, and slope. The soil properties that affect embankments are the engineering properties of the embankment material, as interpreted from the Unified Soil Classification, and the amount of stones. Stones influence the ease of excavation and the

TABLE 14.--SUITABILITY OF SOILS FOR SANITARY FACILITIES

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Sanitary landfill--	
			Trenches	Areas
Amy:				
Ae	Severe: percs slowly; wet.	Slight	Severe: wet	Severe: wet.
Af	Severe: floods; percs slowly; wet.	Severe: floods	Severe: floods; wet.	Severe: floods;
Ariel: Ar	Severe: floods; percs slowly; wet.	Severe: floods	Severe: floods; wet.	Severe: floods; wet.
Arkabutla: At	Severe: floods; wet.	Severe: percs rapidly; floods.	Severe: floods; wet.	Severe: floods.
Cahaba:				
CaB, CaC	Slight	Severe: percs rapidly.	Slight	Slight.
CaD	Moderate: slope	Severe: percs rapidly; slope.	Slight	Moderate: slope.
Calhoun: Ch	Severe: percs slowly; wet.	Slight	Severe: wet	Severe: wet.
Calloway: CoA, CoB	Severe: percs slowly; wet.	Slight	Moderate: too clayey; wet.	Moderate: wet.
Crowley: Cr	Severe: percs slowly; wet.	Slight	Severe: too clayey; wet.	Severe: wet.
Grenada:				
GaA	Severe: percs slowly; wet.	Slight	Slight	Slight.
GaB, GaC, GSC 1/	Severe: percs slowly; wet.	Moderate: slope	Slight	Slight.
GaD	Severe: percs slowly; wet.	Severe: slope	Slight	Moderate: slope.
Hebert: Ha	Severe: percs slowly; wet.	Slight	Severe: wet	Severe: wet.
Henry: Hb, HC 1/	Severe: percs slowly; wet.	Slight	Severe: wet	Severe: wet.
Lafe: La	Severe: percs slowly; wet.	Slight	Moderate: too clayey; wet.	Moderate: wet.
Leaf: Le	Severe: percs slowly; wet.	Slight	Severe: too clayey; wet.	Severe: wet.
Ouachita: Oa	Severe: floods	Severe: floods	Severe: floods.	Severe: floods.
Perry: Pe	Severe: percs	Slight	Severe: too	Severe: wet.

TABLE 14.--SUITABILITY OF SOILS FOR SANITARY FACILITIES--Continued

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Sanitary landfill--	
			Trenches	Areas
Pheba: Ph	Severe: percs slowly; wet.	Slight	Severe: wet	Severe: wet.
Portland: Po, Pr	Severe: percs slowly; wet.	Slight	Severe: too clayey.	Severe: wet.
Rilla: RaA, RbB	Slight	Moderate: percs rapidly.	Moderate: too clayey.	Slight.
Sacul:				
ScB2, ScC2	Severe: percs slowly.	Moderate: slope	Severe: too clayey.	Slight.
SaD	Severe: percs slowly.	Severe: slope	Severe: too clayey.	Moderate: slope.
Saffell:				
SfC	Slight	Moderate: slope; percs rapidly.	Slight	Slight.
SfE	Moderate: slope.	Severe: slope; percs rapidly.	Slight	Moderate: slope.
Savannah: SvB, SvC	Severe: percs slowly; wet.	Moderate: slope	Severe: wet	Slight.
Tichnor: TA 1/	Severe: floods; percs slowly; wet.	Severe: floods	Severe: floods; wet.	Severe: floods; wet.
Tippah: TpB, TpC	Severe: percs slowly; wet.	Moderate: slope	Severe: too clayey.	Slight.
Udorthents: UgE3 1/	Severe: slope	Severe: slope	Moderate: slope.	Severe: slope.
Udults: UoE3 1/	Severe: slope	Severe: slope	Moderate: slope.	Severe: slope.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

TABLE 15.--RELATIVE LIMITATIONS OF SOILS AS CONSTRUCTION SITES

["Shrink-swell," "floods," and other terms that describe restrictive soil features are defined in the Explanation of Key Phrases following the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited." Absence of an entry means soils were not evaluated]

Soil series and map symbols	Shallow excavations	Dwellings--		Small commercial buildings	Local roads and streets
		Without basements	With basements		
Amy:					
Ae----------	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Severe: wet.
Af----------	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.
Ariel: Ar-----	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Arkabutla: At--	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; low strength.
Cahaba:					
CaB----------	Slight--------	Slight---------	Slight---------	Slight----------	Moderate: low strength.
CaC----------	Slight--------	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.
CaD----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope--	Moderate: low strength.
Calhoun: Ch---	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Severe: low strength; wet.
Calloway: CoA, CoB.	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Severe: low strength.
Crowley: Cr---	Severe: too clayay; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.
Grenada:					
GaA, GaB-----	Severe: fragipan; wet.	Moderate: low strength; wet.	Severe: wet---	Moderate: low strength; wet.	Moderate: low strength.
GaC, GSC 1/--	Severe: fragipan; wet.	Moderate: low strength; wet.	Severe: wet---	Moderate: low strength; slope; wet.	Moderate: low strength.
GaD----------	Severe: fragipan; wet.	Moderate: low strength; slope; wet.	Severe: wet---	Severe: slope--	Moderate: low strength; slope.
Hebert: Ha----	Severe: wet--	Moderate: low strength; shrink-swell; wet.	Severe: wet---	Severe: wet----	Moderate: low strength; shrink-swell; wet.
Henry: Hb, HC 1/.	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Severe: low strength; wet.
Lafe: La------	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Severe: low strength.

TABLE 15.--RELATIVE LIMITATIONS OF SOILS AS CONSTRUCTION SITES--Continued

Soil series and map symbols	Shallow excavations	Dwellings--		Small commercial buildings	Local roads and streets
		Without basements	With basements		
Leaf: Le------	Severe: too clayey; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength. shrink-swell; wet.
Ouachita: Oa--	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Perry: Pe-----	Severe: too clayey; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.
Pheba: Ph-----	Severe: wet--	Severe: wet---	Severe: wet---	Severe: wet----	Moderate: low strength; wet.
Portland: Po, Pr.	Severe: too clayey; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell; wet.	Severe: low strength; shrink-swell.
Rilla: RaA, RbB.	Slight--------	Moderate: low strength; shrink-swell.	Moderate: low strength; shrink-swell.	Moderate: low strength; shrink-swell.	Moderate: low strength; shrink-swell.
Sacul:					
ScB2, ScC2---	Severe: too clayey.	Severe: low strength; shrink-swell.	Severe: low strength; shrink-swell.	Severe: low strength; shrink-swell.	Severe: low strength; shrink-swell.
SaD----------	Severe: too clayey.	Severe: low strength; shrink-swell.	Severe: low strength; shrink-swell.	Severe: low strength; shrink-swell; slope.	Severe: low strength; shrink-swell.
Saffell:					
SfC----------	Severe: small stones.	Slight---------	Slight---------	Moderate: slope.	Slight.
SfE----------	Severe: small stones.	Moderate: slope.	Moderate: slope.	Severe: slope--	Moderate: slope.
Savannah:					
SvB----------	Severe: fragipan; wet.	Moderate: wet-	Severe: wet---	Moderate: wet.	Moderate: low strength.
SvC----------	Severe: wet; fragipan.	Moderate: wet-	Severe: wet---	Moderate: slope; wet.	Moderate: low strength.
Tichnor: TA 1/.	Severe: floods; wet.	Severe: floods; low strength; wet.	Severe: floods; low strength; wet.	Severe: floods; low strength; wet.	Severe: floods; low strength; wet.
Tippah: TpB, TpC.	Moderate: too clayey; wet.	Severe: shrink-swell; low strength.	Severe: shrink-swell; low strength; wet.	Severe: shrink-swell; low strength.	Severe: shrink-swell; low strength.

TABLE 15.--RELATIVE LIMITATIONS OF SOILS AS CONSTRUCTION SITES--Continued

Soil series and map symbols	Shallow excavations	Dwellings--		Small commercial buildings	Local roads and streets
		Without basements	With basements		
Udorthents: UgE3 1/.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Udults: UoE3 1/.	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope; low strength.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

ease of compaction of the embankment material.

Sanitary landfills are used to dispose of refuse. The waste is spread in thin layers, compacted, and covered with soil. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill use are ease of excavation, hazard of polluting ground water, and trafficability. Ratings apply only to a depth of about 6 feet, and therefore ratings of slight or moderate may not be valid if excavations are much deeper. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but in most instances geologic investigations are needed below a depth of about 6 feet.

Trench sanitary landfills are dug trenches in which refuse is buried daily, or more frequently if necessary. The refuse is covered with a layer of soil material at least 6 inches thick, usually soil excavated in digging the trench. When a trench is full, a final cover of soil material, at least 2 feet thick, is placed over the landfill.

In areas of sanitary landfill, refuse is placed on the surface of the soil in successive layers. The daily and final cover material generally must be imported. A final cover of soil material, at least 2 feet thick, is placed over the completed fill.

Interpretations of soils for use as construction sites.--Table 15 contains information on the suitability of the soils for use as construction sites. Following are explanations of some of the interpretations given in that table.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet. Examples are excavations for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, resistance to sloughing, gentle slopes, and freedom from flooding or a high water table.

The ratings for dwellings and small commercial buildings in table 15 are for structures not more than three stories high and supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to the capacity to support a load and to resist settlement under load and are those that relate to the ease of excavation. Soil properties that affect the capacity to support a load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect ease of excavation are wetness, slope, and content of stones.

The ratings for local roads and streets in table 15 are for an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are the load supporting capacity and the stability of the subgrade, and the workability and the quantity of cut and fill material available. The AASHO and Unified classifications and the shrink-swell potential indicate the traffic supporting capacity of a soil. Wetness and flooding affect the stability of soils. Slope and wetness

affect the ease of excavation of soils and the amount of cut and fill needed to reach an even grade.

Interpretations of soils as sources of construction material.--Table 16 contains information on the suitability of soils as sources of various material. Following are explanations of the interpretations given in that table.

Roadfill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 16 provide guidance about where to look for probable sources of sand and gravel. A soil rated as a good or fair source generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and they do not indicate the quality of the deposit.

Topsoil is used to topdress an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. The texture of a soil and the content of coarse fragments are characteristics that affect the suitability of a soil for use as topdressing. Also considered in the ratings is the damage that results in the area from which the topsoil is taken.

Daily cover for landfill must frequently be obtained from a source away from the site of use, and therefore soils from an area away from the landfill must be rated for suitability for use as cover material. Soils rated as suitable can be used as both daily and final cover material.

The suitability of a soil for use as cover is based on properties that reflect workability; ease of digging, moving, and spreading over the refuse daily during both wet and dry periods; slope; and thickness of the soil material.

The detailed soil map and information given in tables 14, 15, and 16 are guides for evaluating areas for the specific uses. They do not eliminate the need for detailed onsite investigations before a final determination is made.

Additional information that may be useful in town and country planning is given in the sections "Engineering Uses of the Soils" and "Use of Soils for Recreational Development."

Use of the Soils for Recreational Development

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 17, the soils of Drew County are rated according to limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails.

The soils are rated as having slight, moderate, or severe limitations for the specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limitation of slight means that soil properties are generally favorable and limitations are so minor that they can easily be overcome. A moderate limitation can be overcome or modified by plans, by designs, or special maintenance. A severe limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these, is required.

Camp areas are used intensively as sites for tents and small camp trailers and for the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils are gently sloping, are well drained, are free of rocks and coarse fragments on the surface, are not subject to flooding during periods of heavy use, have a surface that is firm after rains and not dusty when dry, and do not perc slowly (water does not percolate through the soil slowly).

Picnic areas are attractive natural or landscaped tracts used primarily for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry, are not subject to flooding during the period of use, and do not have slopes and stones that greatly increase the cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use should be able to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops on the surface, are well drained, are not subject to flooding during periods of heavy use, are firm after rains, and are not dusty when dry. If grading and leveling are required, the depth over rock is an important consideration.

Paths and trails are used for local and cross-country travel on foot or horseback. The design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, and firm when wet, are not dusty when dry, are not subject to flooding more than once during the period of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

TABLE 16.--SUITABILITY OF SOILS FOR CONSTRUCTION

["Shrink-swell," "floods," and other terms that describe restrictive soil features are defined in the Explanation of Key Phrases following the Glossary. See text for definitions of "good," "fair," "poor," and "unsuitable." Absence of an entry means soils were not evaluated]

Soil series and map symbols	Roadfill	Sand	Gravel	Topsoil	Daily cover for landfill
Amy: Ae, Af---	Poor: wet----	Unsuitable-------	Unsuitable------	Poor: wet-----	Poor: wet.
Ariel: Ar-----	Fair: low strength.	Unsuitable-------	Unsuitable------	Good----------	Good.
Arkabutla: At--	Poor: low strength.	Unsuitable-------	Unsuitable------	Fair: too clayey.	Fair: too clayey.
Cahaba:					
CaB, CaC-----	Fair: low strength.	Poor: locally fair.	Unsuitable: locally fair.	Good----------	Good.
CaD----------	Fair: low strength.	Poor: locally fair.	Unsuitable: locally fair.	Fair: slope---	Fair: slope.
Calhoun: Ch---	Poor: low	Unsuitable-------	Unsuitable------	Poor: wet-----	Poor: wet.
Calloway: CoA, CoB.	Poor: low strength.	Unsuitable-------	Unsuitable------	Fair: area reclaim; thin layer.	Fair: thin layer.
Crowley: Cr---	Poor: low strength; too clayey; wet.	Unsuitable-------	Unsuitable------	Poor: wet-----	Poor: thin layer; too clayey; wet.
Grenada:					
GaA, GaB, GaC GSC 1/.	Fair: low strength.	Unsuitable-------	Unsuitable------	Fair: area reclaim.	Fair: thin layer.
GaD----------	Fair: low strength.	Unsuitable-------	Unsuitable------	Fair: area reclaim; slope.	Fair: thin layer.
Hebert: Ha----	Fair: low strength; shrink-swell; wet.	Unsuitable-------	Unsuitable------	Fair: thin layer; too clayey.	Fair: too clayey.
Henry: Hb, HC 1/.	Poor: low strength; wet.	Unsuitable-------	Unsuitable------	Poor: wet-----	Poor: wet.
Lafe: La------	Poor: area reclaim; low strength.	Unsuitable-------	Unsuitable------	Poor: area reclaim; excess alkali; thin layer.	Poor: hard to pack; thin layer.
Leaf: Le------	Poor: low strength; shrink-swell; wet.	Unsuitable-------	Unsuitable------	Poor: thin layer; too clayey; wet.	Poor: thin layer; too clayey; wet.
Ouachita: Oa--	Fair: low strength.	Unsuitable: locally poor.	Unsuitable------	Good----------	Fair: too clayey.

TABLE 16.--SUITABILITY OF SOILS FOR CONSTRUCTION--Continued

Soil series and map symbols	Roadfill	Sand	Gravel	Topsoil	Daily cover for landfill
Perry: Pe-----	Poor: low strength; shrink-swell; wet.	Unsuitable-------	Unsuitable------	Poor: too clayey; wet.	Poor: too clayey; wet.
Pheba: Ph-----	Fair: low strength; wet.	Unsuitable-------	Unsuitable------	Fair: area reclaim.	Fair: thin layer.
Portland: Po, Pr.	Poor: low strength; shrink-swell.	Unsuitable-------	Unsuitable------	Poor: too clayey.	Poor: too clayey.
Rilla: RaA, RbB.	Fair: low strength; shrink-swell.	Unsuitable-------	Unsuitable------	Fair: thin layer.	Fair: too clayey.
Sacul: SaD, ScB2, ScC2.	Poor: low strength; shrink-swell.	Unsuitable-------	Unsuitable------	Poor: thin layer; too clayey.	Poor: too clayey.
Saffell: SfC, SfE.	Good----------	Poor----------	Fair----------	Poor: small stones.	Poor: small stones.
Savannah: SvB, SvC.	Fair: low strength.	Unsuitable-------	Unsuitable------	Fair: area reclaim.	Fair: thin layer.
Tichnor: TA 1/.	Poor: low strength; wet.	Unsuitable-------	Unsuitable------	Poor: wet-----	Poor: wet.
Tippah: TpB, TpC.	Poor: shrink-swell; low strength.	Unsuitable-------	Unsuitable------	Fair: thin layer; too clayey.	Fair: thin layer; too clayey.
Udorthents: UgE3 1/.	Fair: area reclaim; low strength.	Unsuitable: locally fair.	Unsuitable------	Poor: slope---	Poor: slope.
Udults: UoE3 1/.	Fair: area reclaim; low strength.	Poor: locally fair.	Unsuitable: locally fair.	Fair: area reclaim; slope.	Fair: slope.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoF3	Udorthents

TABLE 17.--LIMITATIONS OF THE SOILS FOR RECREATIONAL DEVELOPMENT

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Amy:				
Ae----------	Severe: wet-----	Severe: wet---------	Severe: wet-------	Severe: wet.
Af----------	Severe: floods; wet.	Severe: wet---------	Severe: floods; wet.	Severe: wet.
Ariel: Ar-----	Severe: floods--	Moderate: floods----	Severe: floods----	Slight.
Arkabutla: At-	Severe: floods; wet.	Moderate: floods; wet.	Severe: floods; wet.	Moderate: floods; wet.
Cahaba:				
CaB----------	Slight----------	Slight----------	Moderate: slope---	Slight.
CaC----------	Slight----------	Slight----------	Severe: slope-----	Slight.
CaD----------	Moderate: slope-	Moderate: slope-----	Severe: slope-----	Slight.
Calhoun: Ch---	Severe: wet-----	Severe: wet---------	Severe: wet-------	Severe: wet.
Calloway:				
CoA----------	Moderate: percs slowly; wet.	Moderate: wet-------	Moderate: percs slowly; wet.	Moderate: wet.
CoB----------	Moderate: percs slowly; wet.	Moderate: wet; slope.	Moderate: percs slowly; wet. slope.	Moderate: wet.
Crowley: Cr---	Severe: percs slowly; wet.	Severe: wet---------	Severe: percs slowly; wet.	Severe: wet.
Grenada:				
GaA----------	Moderate: percs slowly.	Slight----------	Moderate: percs slowly; wet.	Slight.
GaB----------	Moderate: percs slowly.	Slight----------	Moderate: percs slowly; slope; wet.	Slight.
GaC, GSC 1/--	Moderate: percs slowly.	Slight----------	Severe: slope-----	Slight.
GaD----------	Moderate: percs slowly; slope.	Moderate: slope-----	Severe: slope-----	Slight.
Hebert: Ha----	Moderate: percs slowly; wet.	Moderate: wet-------	Moderate: percs slowly; wet.	Moderate: wet.
Henry: Hb, HC 1/.	Severe: wet-----	Severe: wet---------	Severe: wet-------	Severe: wet.
Lafe: La------	Severe: dusty; percs slowly; wet.	Moderate: dusty; wet.	Severe: dusty; percs slowly; wet.	Moderate: dusty; wet.
Leaf: Le------	Severe: percs slowly; wet.	Severe: wet---------	Severe: percs slowly; wet.	Severe: wet.
Ouachita: Oa--	Severe: floods--	Moderate: floods----	Severe: floods----	Moderate: floods.

TABLE 17.--LIMITATIONS OF THE SOILS FOR RECREATIONAL DEVELOPMENT--Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Perry: Pe-----	Severe: percs slowly; too clayey; wet.	Severe: too clayey; wet.	Severe: percs slowly; too clayey; wet.	Severe: too clayey; wet.
Pheba: Ph-----	Moderate: percs slowly; wet.	Moderate: wet-------	Severe: wet-------	Moderate: wet.
Portland:				
Po----------	Severe: percs slowly; too clayey; wet.	Moderate: wet-------	Severe: percs slowly; too clayey; wet.	Moderate: wet.
Pr----------	Severe: percs slowly; too clayey; wet.	Severe: too clayey--	Severe: percs slowly; too clayey; wet.	Severe: too clayey; wet.
Rilla:				
RaA----------	Slight----------	Slight----------	Slight----------	Slight.
RbB----------	Slight----------	Slight----------	Moderate: slope---	Slight.
Sacul:				
SaD----------	Moderate: percs slowly; slope.	Moderate: slope-----	Severe: slope-----	Slight.
ScB2---------	Moderate: percs slowly.	Slight----------	Moderate: percs slowly; slope.	Slight.
ScC2---------	Moderate: percs slowly.	Slight----------	Severe: slope-----	Slight.
Saffell: SfC, SfE.	Severe: small stones.	Moderate: small stones; slope.	Severe: small stones; slope.	Moderate: small stones.
Savannah:				
SvB----------	Moderate: percs slowly.	Slight----------	Moderate: percs slowly; slope.	Slight.
SvC----------	Moderate: percs slowly.	Slight----------	Severe: slope-----	Slight.
Tichnor: TA 1/.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: wet.
Tippah:				
TpB----------	Moderate: wet; percs slowly.	Slight----------	Moderate: wet; slope; percs slowly.	Slight.
TpC----------	Moderate: wet; percs slowly.	Slight----------	Severe: slope-----	Slight.

TABLE 17.--LIMITATIONS OF THE SOILS FOR RECREATIONAL DEVELOPMENT--Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Udorthents: UgE3 1/.	Severe: slope---	Severe: slope-------	Severe: slope-----	Moderate: slope.
Udults: UoE3 1/.	Moderate: slope-	Moderate: slope-----	Severe: slope-----	Slight.

1/ This mapping unit, and several others, consists of more than one kind of soil. The soil series for the other soil is shown as follows:

Map symbol	Series
GSC	Calloway
HC	Calloway
TA	Arkabutla
UgE3	Grenada
UoE3	Udorthents

Formation and Classification of the Soils

Described in this section are the factors that affect soil formation in Drew County. The current system of soil classification is explained and the soil series are placed in a few of the higher categories of that system. Mechanical and chemical analyses are given for representative profiles of selected soils. The soil series in the county, including a representative profile of each series, are described in detail in the section "Descriptions of the Soils."

Factors of Soil Formation

Soil is formed by weathering and other processes that act on the regolith. The characteristics of any soil depend on climate, living organisms, parent material, relief, and time. Each of these factors acts on the soil and modifies the effects of the other four. If climate, living organisms, or any one of the five factors is varied to a significant extent, a different soil may be formed (8).

Climate and living organisms are the active forces in soil formation. Relief modifies the effects of climate and living organisms mainly through its influence on temperature and runoff. Because climate, vegetation, parent material, and relief interact over a period of time, time is the fifth factor of soil formation; and its affect is also reflected in the characteristics of soil.

The interaction of the five factors of soil formation is more complex for some soils than for others. For example, in places where the environment has changed, the characteristics of a young soil are often superimposed on those of an older soil. Such is the case in Ariel soils, where younger alluvium has been deposited over an older, buried soil. The five factors of soil formation are discussed in the following paragraphs.

Climate

The climate of Drew County is characterized by mild winters, warm summers, and generally abundant rainfall. The normally warm temperatures and high precipitation probably are similar to the climate under which the soils in the county formed. For additional information about the climate, refer to the section "General Nature of the County."

The warm, moist climate promotes rapid soil formation, and the warm temperatures encourage rapid chemical reactions. The large amount of water that moves through the soil is instrumental in translocating or removing dissolved or suspended materials. Organic matter decomposes rapidly and the organic acids thus produced hasten the formation of clay minerals and the removal of carbonates. Because the soil is frozen only to shallow depths and for short periods, soil formation continues almost the year round. The climate is relatively uniform throughout the county, though its effect is modified locally by runoff. Climate alone does not account for differences in the soils of the county.

Living Organisms

The higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in structure and porosity.

Before settlement of the county, native vegetation had more influence on soil formation than did animal activity. Except for scattered small prairies of tall native grasses through the central part, the county was covered by forests. Calhoun and Crowley soils formed in the prairie areas.

On the flood plains the trees were mainly hardwoods. Stands of baldcypress and water tupelo filled swamp areas where some of the Perry soils formed. On the poorly drained to well-drained flood plains and natural levees, where Ariel, Arkabutla, Hebert, Ouachita, Portland, Rilla, Tichnor, and some of the Amy and Perry soils formed, the trees were chiefly oaks, sweetgum, ash, sycamore, pecan, hickory, and baldcypress.

On the uplands, where the Cahaba, Calloway, Grenada, Henry, Leaf, Pheba, Sacul, Saffell, Savannah, Tippah, and some of the Amy soils formed, the forests were mainly mixed stands of shortleaf and loblolly pines, oaks, and hickory. Lafe soils formed in places where the parent material accumulated large amounts of sodium and magnesium. The vegetation in these areas was savanna, or native grasses growing among scattered trees, chiefly pines, oak, and elm.

Man's influence on the formation of the soils grew with the development of agriculture in the county. By clearing forests and tilling the soil; by introducing new plants; by fertilizing and adding chemicals for control of insects, disease, and weeds; and by improving drainage and controlling floods, man has changed the formation of soils. Even in many of the areas that have remained in woodland man has influenced soil formation through such woodland management practices as harvesting selectively, improving timber stands, and planting pure stands of preferred species. Only a few results of man's activities can be seen now, such as changes in structure, color, content of organic matter and nutrients, and thickness of the surface layer or plow layer. Many results of man's activities will probably not be evident for several centuries.

Parent Material

Parent material is the unconsolidated mass from which a soil forms. It determines the chemical and mineral composition of the undisturbed soil. In Drew County the soils formed in three broad classes of parent material: alluvium deposited by the Arkansas and Mississippi Rivers, loess blown from older Mississippi Valley alluvial surfaces (12), and coastal plain sediment deposited in the Gulf of Mexico when it covered southern and eastern Arkansas (4).

The gulf deposits consist mainly of noncalcareous, loamy and clayey sediment and include some gravelly strata. This sediment has been strongly leached, and the content of bases is low. The loess mantle is silt loam and silty clay loam extending from a depth of about 1 foot to more than 12 feet. It has been moderately leached, but it contained large amounts of weatherable minerals and the soils therefore contain moderate amounts of bases. On the flood plains of such streams as the Saline River and its tributaries and the upland tributaries of Cut-Off-Creek, the parent material is loamy recent alluvium washed from adjacent uplands. The alluvium from the Arkansas and Mississippi Rivers is loamy and moderately leached on the natural levees around Bayou Bartholomew. Soils formed in this sediment contain moderate to high amounts of bases. The sediment in the slack-water areas is predominantly clayey. It is less intensely leached than other sediment and is high in content of bases. The clay is dominantly montmorillonite.

Relief

In Drew County, relief influences soil formation chiefly through its effect on surface and internal drainage and on erosion.

A belt of rolling upland crosses the county in a general north-south direction, passing through Monticello. Within this area, slopes are mainly 3 to 12 percent, but range from 1 to 20 percent. Upland flats lie both east and west of the rolling upland. Slopes are predominantly less than 1 percent on the flats, but some low ridges have slopes as steep as 8 to 12 percent.

Flood plains of the smaller streams are long and narrow and are level, having slopes of less than 1 percent. The flood plain of Bayou Bartholomew is predominantly level, but within it are undulating areas of alternating long, narrow swales and low ridges. The ridges have slopes ranging from 1 to 8 percent.

Time

The length of time required for the formation of soil depends largely on the other factors of soil formation. Less time generally is required if the climate is warm and humid, the vegetation is luxuriant, and the parent material is loamy. Older soils typically show a greater degree of differentiation between horizons than do younger soils.

Except for the Udorthents, which have formed in material exposed by recent erosion on the bottoms of gullies, all the soils in Drew County have developed B horizons. Some of the soils on flood plains, such as Arkabutla and Ouachita soils, have been in place too little time to form argillic horizons, but have formed cambic horizons. Others, such as Perry and Portland soils, formed in slack-water deposits of clay that shrinks and swells. The mixing caused by the shrinking and swelling precludes the formation of argillic horizons. Most soils in the county have been forming long enough and in material stable enough so that they have developed argillic horizons, and many have fragipans. Generally, the soils on the coastal plain uplands have been forming for a greater period of time. They have the most strongly developed argillic horizons and are the most mature soils in Drew County.

Processes of Soil Formation

In this subsection a brief definition of the horizon nomenclature and processes responsible for soil formation are given.

The effects of the factors of soil formation are reflected in the soil profile, which is a succession of layers, or horizons, from the surface down to the parent material that has been altered little by soil forming processes. The horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction.

Most soil profiles contain three major horizons, called A, B, and C horizons. Very young soils do not have a B horizon.

The A horizon is either the horizon of maximum accumulation of organic matter, called the A1 horizon or the surface layer, or the horizon of maximum leaching of dissolved or suspended materials, called the A2 or the subsurface layer.

The B horizon lies immediately beneath the A horizon and is sometimes called the subsoil. It is the horizon of maximum accumulation of dissolved or suspended materials, such as iron and clay. Commonly, the B horizon has blocky structure (13) and is firmer than the horizons immediately above and below it.

Beneath the B is the C horizon. It typically has been little affected by the soil-forming processes, though it is sometimes materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms as well as by weathering.

Several processes have been active in the formation of soil horizons in the soils of Drew County. Among these processes are (1) the accumulation of organic matter, (2) the leaching of calcium carbonates and bases, (3) the

reduction and transfer of iron, and (4) the formation and translocation of silicate clay minerals. In most of the soils more than one of these processes was involved.

The accumulation of organic matter in the upper part of the profile to form an A1 horizon is an important process of soil formation. The soils of Drew County range from medium to low in content of organic matter.

Leaching of carbonates and bases has occurred to some degree in nearly all the soils of Drew County. Among soil scientists, it is generally accepted that bases are leached downward in soils before silicate clay minerals begin to move. Most of the soils in the county are moderately or strongly leached, an important factor in the development of horizons.

Reduction and transfer of iron has occurred to a significant degree in the somewhat poorly drained and poorly drained soils of the county. In the naturally wet soils, this process is called gleying. Gray colors in the layers below the surface indicate the reduction or loss of iron. Some horizons contain reddish or yellowish mottles and concretions derived from segregated iron. Gleying is pronounced in many of the soils. Among the strongly gleyed soils are the Amy, Calhoun, Henry, Leaf, Perry, and Tichnor soils.

In several soils of Drew County, the translocation of clay minerals has contributed to the formation of horizons. In many places the eluviated A2 horizon has been destroyed by cultivation. Where it remains, however, the A2 horizon has blocky to platy structure, has less clay than the lower horizons; and is lighter colored than the rest of the soil. Clay films generally have accumulated in pores and on surfaces of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before the translocation of silicate clay occurred, even though the content of bases is still high in many soils in the county. Cahaba and Rilla soils are examples of soils that show the effects of these processes.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of Drew County.

Classification of the Soils

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

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

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 (10). Because this system is under continual study, readers interested in developments of the current system should search the latest literature available.

The current system of classification has six categories. Beginning with broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 18, the soil series of Drew County are placed in four categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates.

SUBORDER. Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the order. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation.

GREAT GROUP. Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like.

SUBGROUP. Great groups are subdivided into subgroups, one representing the central (typic) segment of the group, and others called intergrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order.

FAMILY. Soil families are separated within a subgroup primarily on the basis of properties

TABLE 18.--CLASSIFICATION OF THE SOIL SERIES OF DREW COUNTY

Series	Family	Subgroup	Order
Amy	Fine-silty, siliceous, thermic	Typic Ochraquults	Ultisols.
Ariel	Coarse-silty, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Arkabutla	Fine-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Cahaba	Fine-loamy, siliceous, thermic	Typic Hapudults	Ultisols.
Calhoun	Fine-silty, mixed, thermic	Typic Glossaqualfs	Alfisols.
Calloway	Fine-silty, mixed, thermic	Glossaquic Fragiudalfs	Alfisols.
Crowley	Fine, montmorillonitic, thermic	Typic Albaqualfs	Alfisols.
Grenada	Fine-silty, mixed, thermic	Glossic Fragiudalfs	Alfisols.
Hebert	Fine-silty, mixed, thermic	Aeric Ochraqualfs	Alfisols.
Henry	Coarse-silty, mixed, thermic	Typic Fragiagualfs	Alfisols.
Lafe	Fine-silty, mixed, thermic	Glossic Natrudalfs	Alfisols.
Leaf	Clayey, mixed, thermic	Typic Albaquults	Ultisols.
Ouachita	Fine-silty, siliceous, thermic	Fluventic Dystrochrepts	Inceptisols.
Perry	Very-fine, montmorillonitic	Vertic Haplaquepts	Inceptisols.
Pheba	Coarse-silty, siliceous, thermic	Glossaquic Fragiudults	Ultisols.
Portland	Very-fine, mixed, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Rilla	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols.
Sacul	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Saffell	Loamy-skeletal, siliceous, thermic	Typic Hapludults	Ultisols.
Savannah	Fine-loamy, siliceous, thermic	Typic Fragiudults	Ultisols.
Tichnor	Fine-silty, mixed, thermic	Typic Ochraqualfs	Alfisols.
Tippah	Fine-silty, mixed, thermic	Aquic Paleudalfs	Alfisols.

important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineral, reaction, soil temperature, permeability, thickness of horizons, and consistence.

Mechanical and Chemical Analyses

Table 19 contains mechanical and chemical data, resulting from laboratory analyses, that can be useful to soil scientists in classifying soils. These data are helpful in estimating available water capacity, acidity, base-exchange capacity, mineral composition, content of organic matter, and other soil characteristics that affect management. The data are also helpful in developing concepts of soil formation. Recently, laboratory data have been used to rate soils for such nonfarm uses as residential areas, industrial areas, recreational sites, and transportation routes.

Several factors are involved in selecting soils for laboratory analyses. Soils that are extensive and most important in the survey area are considered first. A review of available laboratory data is made to determine the need for additional information about these soils. Priority is given those soils for which little or no laboratory data are available.

In Drew County, the soils of five series were selected for laboratory analyses. Profiles of these soils are described in the section "Descriptions of the Soils." The analyses were made by the University of Arkansas, Fayetteville. The results are given in table 19.

Particle-size distribution was determined by the hydrometer method (6).

The content of organic carbon was determined through use of the Walkley-Black method of digestion by potassium dichromate-sulfuric acid (7). The percentage of organic matter was then determined by multiplying the percentage of organic carbon by 1.72.

Soil reaction was determined using a Beckman pH meter on a one-to-one mixture of soil and water. Available phosphorus was extracted by a Bray No. 1 solution (0.03N NH_4F in 0.025N HCL) and determined colorimetrically.

The bases were extracted using pH7 I N ammonium acetate. The content of magnesium was determined colorimetrically (7). The other bases were determined through flame-photometry. The extractable acidity was determined through use of the barium chloride-triethanolamine method (5).

The total amount of extractable calcium, potassium, magnesium, sodium, and extractable acidity in the soil is approximately the cation exchange capacity of the soil. The percentage of base saturation was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium, and multiplying the result by 100.

TABLE 19.--MECHANICAL AND CHEMICAL ANALYSES OF SELECTED SOILS

[Analyses made by the University of Arkansas, Fayetteville, Arkansas. Dashes indicated that no analysis was made or that the data resulting from the analysis were insignificant]

Soil, pedon number, and depth in inches	Horizon	Mechanical analysis 1/						Chemical analysis								
		Very coarse through medium sand (2.0-0.25 mm.)	Fine sand (0.25-0.10 mm.)	Very fine sand (0.10-0.05 mm.)	Total sand (2.0-0.05 mm.)	Silt (0.05-0.002 mm.)	Clay (<0.002 mm.)	Extractable bases 2/				Extractable acidity 2/	Base saturation	Reaction 3/	Organic matter	Available phosphorus
								Ca	Mg	Na	K					
		Pct.	Pct.	Pct.	Pct.	Pct.	Pct.						Pct.	pH		Parts per million
Cahaba fine sandy loam: S-70-Ark-43-4.																
0-6	Ap	41	34	3	78	18	4	0.8	0.3	0.1	0.1	1.6	45	5.9	1.1	6
6-11	A2	38	33	3	74	21	5	1.0	.4	.1	.1	1.0	46	5.8	.9	6
11-25	B21t	25	22	2	49	24	27	2.8	1.4	.1	.2	8.5	35	5.4	.6	4
25-35	B22t	33	29	3	65	19	16	1.1	.7	.1	.1	6.4	24	5.4	.3	5
35-49	B3	47	30	2	79	12	9	.9	.6	.1	.1	2.6	40	5.5	.3	6
49-61	C1	59	21	3	83	9	8	.3	.4	.1	.1	2.3	28	5.3	.3	5
61-72	C2	64	7	1	72	3	25	.3	.8	.1	.1	8.8	13	5.1	.2	3
Henry silt loam: S-69-Ark-22-2.																
1-7	A1	9	2	3	14	73	13	.4	.3	.1	.1	8.9	9	4.5	1.1	2
7-14	A21g	7	2	3	12	71	17	.6	.3	.2	.1	9.1	12	4.8	.5	2
14-29	A22g	6	2	3	11	74	15	.3	.4	.3	.1	8.5	11	5.3	.3	2
29-54	Bx	5	2	2	9	61	30	.4	1.8	1.4	.1	14.6	20	5.5	.2	2
54-72	B3g	5	2	3	10	71	19	1.3	1.4	1.9	.1	6.2	44	5.3	.2	2
Ouachita silt loam: S-69-Ark-22-6.																
0-7	A11	--	21	26	47	40	13	1.7	1.1	.2	.2	6.8	32	4.7	1.6	3
7-23	A12	--	7	19	26	55	19	.9	.7	.2	.2	9.8	17	4.8	1.0	5
23-46	B21	--	1	5	6	74	20	.5	.6	.2	.2	13.4	10	4.6	.6	5
46-62	B22	3	12	16	31	47	22	.5	.6	.2	.2	11.6	11	4.6	.6	5
62-75	B3	4	12	17	33	43	24	.4	.5	.2	.2	12.0	10	4.6	.5	3

TABLE 19.--MECHANICAL AND CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil, pedon number, and depth in inches	Horizon	Mechanical analysis 1/						Chemical analysis								
		Very coarse through medium sand (2.0-0.25 mm.)	Fine sand (0.25-0.10 mm.)	Very fine sand (0.10-0.05 mm.)	Total sand (2.0-0.05 mm.)	Silt (0.05-0.002 mm.)	Clay (<0.002 mm.)	Extractable bases 2/				Extractable acidity 2/	Base saturation	Reaction 3/	Organic matter	Available phosphorus
								Ca	Mg	Na	K					
		Pct.	Pct.	Pct.	Pct.	Pct.	Pct.						Pct.	pH		Parts per million
Sacul loam: S-70-Ark-43-3.																
0-6	Ap	1	7	38	46	45	9	1.4	0.7	0.1	0.2	6.2	28	5.3	2.4	17
6-12	B1	1	7	32	40	40	20	1.0	1.1	.2	.1	9.4	20	4.9	1.1	6
12-21	B21t	1	2	27	29	21	50	.9	2.6	.3	.3	23.8	15	4.8	1.0	5
21-31	B22t	--	1	32	33	17	50	.8	3.2	.3	.3	23.1	17	4.6	.5	3
31-44	B23t	--	1	20	21	37	42	.8	3.2	.3	.3	23.7	16	4.6	.4	4
44-55	B24t	--	1	13	14	39	47	2.1	5.2	.5	.4	25.4	24	4.4	.4	4
55-72	C	4	2	35	41	21	38	3.7	5.7	.8	.6	15.5	41	4.3	.4	2
Savannah fine sandy loam: S-70-Ark-43-7.																
0-9	A1	13	18	11	42	52	6	2.1	.7	.1	.2	5.8	35	5.9	3.1	6
9-24	B2t	11	15	8	34	47	19	3.9	.9	.1	.1	4.6	52	5.8	1.1	5
24-37	Bx1	13	19	11	43	37	20	.9	.7	.1	.1	6.9	21	5.3	.5	6
37-53	Bx2	12	21	11	44	37	19	.3	.5	.1	.2	7.4	13	5.3	.4	4
53-65	Bx3	12	22	9	43	28	29	.2	.7	.2	.2	10.5	11	5.2	.3	5
65-72	C	22	43	3	68	9	23	.3	.7	.1	.2	8.6	13	5.3	.2	4

1/ Analysis is of all material less than 2.0 mm. in diameter. The symbol < means less than.

2/ Expressed as milliequivalents per 100 grams of soil.

3/ Samples were 1-to-1 ratios of soil and water.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali soil. Generally, a highly alkaline soil. Specifically, an alkali soil has so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that the growth of most crop plants is low from this cause.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water 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 capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) 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.

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 clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site; it reproduces itself and does not change so long as the environment does not change.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds,

or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

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

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

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

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

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

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 and brittle; little affected by moistening.

Drainage class (natural). Refers to the condition of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, 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 different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has been allowed to drain away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Genesis, soil. The manner in which a soil originates. Refers especially to the processes initiated by climate and organisms that are responsible for the development of the solum, or true soil, from the unconsolidated parent material, as conditioned by relief and age of landform.

Gleization. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the lower horizons, as a result of waterlogging with poor aeration and drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoother over by ordinary tillage. V-shaped gullies result if the material is more difficult to erode with depth; whereas U-shaped gullies result if the lower material is more easily eroded than that above it.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.--The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.--The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay and sesquioxides (iron and aluminum oxides).

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

C horizon.--The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the materail is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.--Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are--

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.

Basin.--Water is applied rapidly to relatively level plots surrounded by levees or dikes.

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, to confine the flow of water to one direction.

Furrow.--Water is applied in small ditches made by cultivation implements 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.--Irrigation water, released at high points, flows onto the field without controlled distribution.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state. In engineering, a high liquid limit indicates that the soil has a high content of clay and a low capacity for supporting loads.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineralogical, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of 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 these; fine, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and coarse, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables--hue, value, and chroma. For example, a notation of 10YR 6/4 is a color

with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a blocky, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: very slow, slow, moderately slow, moderate, moderately rapid, rapid, and very rapid.

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

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

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

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Poorly graded. A soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles in poorly graded soil material, density can be increased only slightly by compaction.

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

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

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

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. If two sequa are present in a single soil profile, it is said to have a bisequum.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silica. Silica is a combination of silicon and oxygen. The mineral form is called quartz.

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

Site index. A numerical means of expressing the quality of a forest site that is based on the height of the dominant stand at an arbitrarily chosen age; for example, the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on relatively steep slopes and in swelling clays, where there is marked change in moisture content.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that 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 of separates recognized in the United States are as follows: Very coarse sand (2.0 to 1.0 millimeter); coarse sand (1.0 to 0.5 millimeter); medium sand (0.5 to 0.25 millimeter); fine sand (0.25 to 0.10 millimeter); very fine sand (0.10 to 0.05 millimeter); silt (0.05 to 0.002 millimeter); and clay (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter: IV (less than 0.002 millimeter).

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

Stone line. A concentration of coarse rock fragments in soils that generally represents an old weathering surface. In a cross section, the line may be one stone or more thick. The line generally overlies material that weathered in place, and it is ordinarily overlain by sediment of variable thickness.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. 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 grain (each grain by itself, as in dune sand) or massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

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

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

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."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Well-graded soil. A soil or soil material consisting of particles that are well distributed over a wide range in size or diameter. Such a 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 oven-dry basis, at which plants (specifically sunflower) wilt so much that they do not recover when placed in a dark, humid atmosphere.

Explanation of Key Phrases

Area reclaim	*Borrow areas hard to reclaim.*
Cemented pan	*Cemented pan too close to surface.*
Complex slope	*Slopes short and irregular.*
Compressible	*Decrease in soil volume excessive under load.*
Corrosive	*Soils corrode uncoated steel pipe.*
Cutbanks cave	*Walls of cuts not stable.*
Deep to water	*Deep to permanent water table during dry season.*
Depth to rock	*Bedrock too close to surface.*
Droughty	*Soils cannot hold enough water for plants during dry periods.*
Dusty	*Soil particles detach easily and cause dust.*
Erodes easily	*Water erodes soil easily.*
Excess alkali	*Exchangeable sodium affects soil properties and restricts growth of plants.*
Excess humus	*Contains too much organic matter.*
Excess lime	*Carbonates restrict plant growth.*
Excess salt	*Soluble salts restrict plant growth.*
Fast intake	*Water infiltrates rapidly.*
Favorable	*Features of soil favorable.*
Floods	*Soil floods by stream overflow, runoff or high tides.*
Frost action	*Freezing may damage structures.*
Hard to pack	*Difficult to compact.*
Large stones	*Rock fragments 10 inches or more across.*
Low strength	*Not enough strength to adequately support the load.*
No water	*Too deep to ground water.*
Not needed	*Practice not applicable.*
Percs rapidly	*Water moves through soil too fast.*
Percs slowly	*Water moves through the soil too slowly.*
Piping	*Water may form tunnels or pipelike cavities.*
Poor outlets	*Difficult or expensive to install outlets for drainage.*
Rock outcrops	*Outcrops of fixed rock.*
Rooting depth	*Soil is thin over layer that restricts root growth.*
Shrink-swell	*Soil expands significantly on wetting and shrinks on drying.*
Slope	*Slope is too great.*
Slow intake	*Water infiltration restricted.*
Slow refill	*Ponds fill slowly because of restricted soil permeability.*
Small stones	*Contains many rock fragments less than 10 inches across.*
Soil blowing	*Soil easily moved and deposited by wind.*
Thin layer	*Inadequate thickness of suitable soil.*
Too clayey	*Soil slippery and sticky when wet and slow to dry.*
Too sandy	*Soil soft and loose; droughty and low in fertility.*
Unstable fill	*Banks of fills likely to cave or slough.*
Wet	*Soil wet during period of use.*

Guide to Mapping Units

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. The suitability of the soils for use as cropland and pasture is given in the soil descriptions. For information about the capability grouping, refer to page 34. For information about the suitability of the soils as woodland or as wildlife habitat, read the introduction to that section and refer to the table in each section. Other information is given in tables as follows:

Acreage and extent, table 4, page 11.
Predicted yields, table 5, page 37.
Engineering uses of the soils, tables 9, 10, 11, 12, and 13, pages 50 through 62.
Use of the soils for town and country planning, tables 14 and 15, pages 64 through 68, and table 16, page 70.
Use of the soils for recreational development, table 17, page 72.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland group
			Symbol	Symbol
Ae	Amy silt loam	12	IIIw-1	2w9
Af	Amy silt loam, frequently flooded	12	Vw-1	2w9
Ar	Ariel silt loam, frequently flooded	13	Vw-1	1w8
At	Arkabutla silt loam, frequently flooded	13	IVw-1	1w9
CaB	Cahaba fine sandy loam, 1 to 3 percent slopes	14	IIe-1	2o7
CaC	Cahaba fine sandy loam, 3 to 8 percent slopes	14	IIIe-1	2o7
CaD	Cahaba fine sandy loam, 8 to 12 percent slopes	15	IVe-1	2o7
Ch	Calhoun silt loam	16	IIIw-2	3w9
CoA	Calloway silt loam, 0 to 1 percent slopes	16	IIw-1	3w8
CoB	Calloway silt loam, 1 to 3 percent slopes	17	IIe-2	3w8
Cr	Crowley silt loam	17	IIIw-2	3w9
GaA	Grenada silt loam, 0 to 1 percent slopes	18	IIw-1	3o7
GaB	Grenada silt loam, 1 to 3 percent slopes	18	IIe-2	3o7
GaC	Grenada silt loam, 3 to 8 percent slopes	19	IIIe-2	3o7
GaD	Grenada silt loam, 8 to 12 percent slopes	19	IVe-1	3o7
GSC	Grenada association, undulating	19	IIIe-2	3o7
Ha	Hebert silt loam	20	IIw-2	2w5
Hb	Henry silt loam	21	IIIw-2	3w9
HC	Henry-Calloway association	21	------	---
	Henry soil	--	IIIw-2	3w9
	Calloway soil, level part	--	IIw-1	3w8
	Calloway soil, nearly level part	--	IIe-2	3w8
La	Lafe silt loam	22	VIs-1	5t0
Le	Leaf silt loam	22	IVw-2	2w9
Oa	Ouachita silt loam	23	IVw-1	1w8
Pe	Perry clay	24	IIIw-3	2w6
Ph	Pheba silt loam	25	IIIw-1	2w8
Po	Portland silt loam	26	IIIw-3	2w6
Pr	Portland clay	26	IIIw-3	2w6
RaA	Rilla silt loam, 0 to 1 percent slopes	27	I-1	2o4
RbB	Rilla silt loam, undulating	27	IIe-3	2o4
SaD	Sacul loam, 8 to 12 percent slopes	28	VIe-1	3c2
ScB2	Sacul soils, 1 to 3 percent slopes, eroded	28	IIIe-3	3c2
ScC2	Sacul soils, 3 to 8 percent slopes, eroded	28	IVe-2	3c2
SfC	Saffell gravelly fine sandy loam, 3 to 8 percent slopes	29	IIIe-4	4f2
SfE	Saffell gravelly fine sandy loam, 8 to 20 percent slopes	29	VIe-2	4f2
SvB	Savannah fine sandy loam, 1 to 3 percent slopes	30	IIe-1	3o7
SvC	Savannah fine sandy loam, 3 to 8 percent slopes	30	IIIe-1	3o7
TA	Tichnor and Arkabutla soils, frequently flooded	31	Vw-1	1w6
TpB	Tippah silt loam, 1 to 3 percent slopes	32	IIe-2	3o7
TpC	Tippah silt loam, 3 to 8 percent slopes	32	IIIe-2	3o7
UgE3	Udorthents and Grenada soils, 8 to 20 percent slopes, severely eroded	32	VIIe-1	3o7
UoE3	Udults and Udorthents, 8 to 20 percent slopes, severely eroded	33	VIIe-1	3o7

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