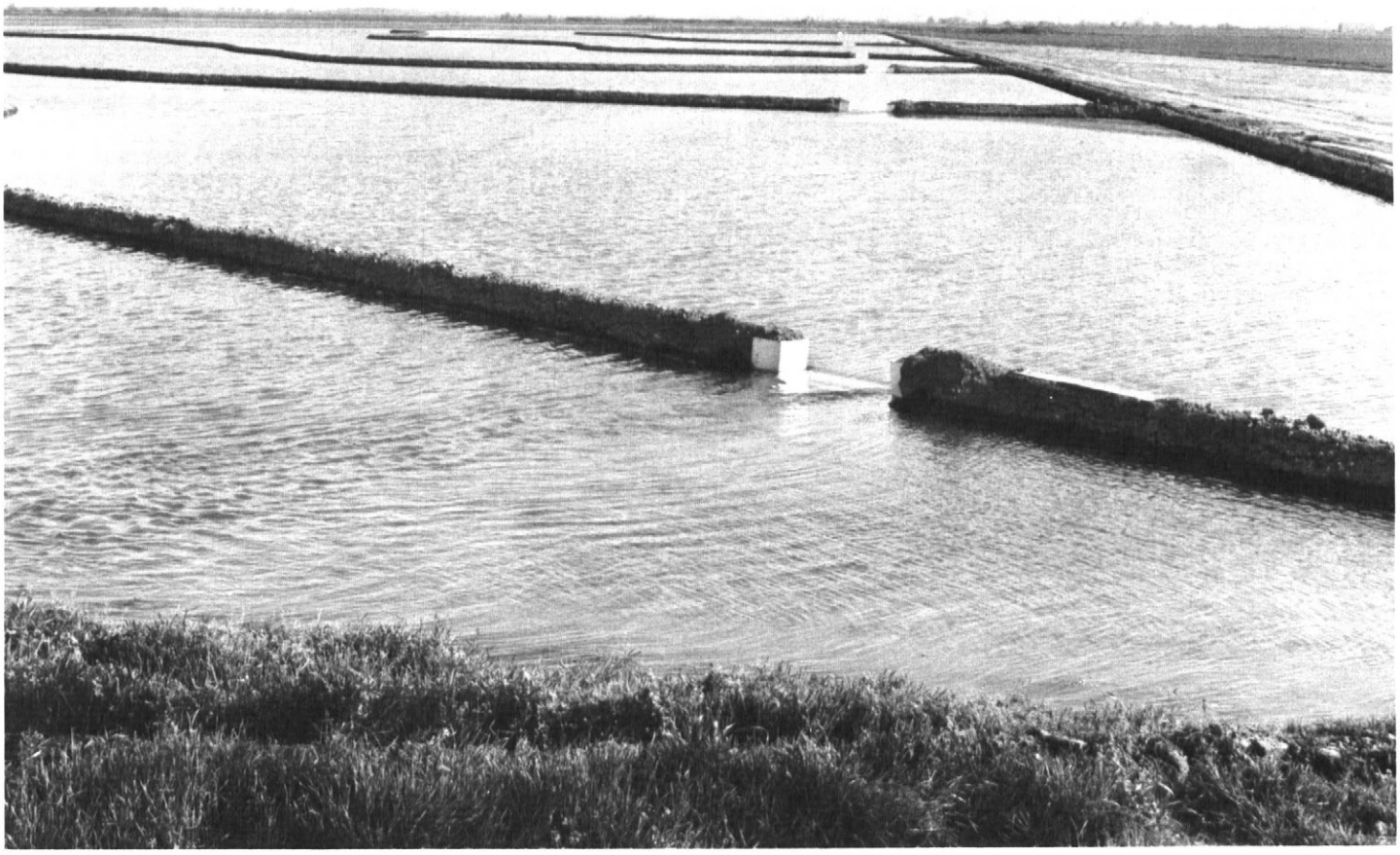
SOIL SURVEY OF

Arkansas County, Arkansas



U. S. Department of Agriculture
Soil Conservation Service
In cooperation with
Arkansas Agricultural Experiment Station

Issued September 1972

Major fieldwork for this soil survey was done in the period 1956-66. Soil names and descriptions were approved in 1968. Unless otherwise indicated, statements in this publication refer to conditions in the county in 1966. 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 Arkansas County Soil and Water Conservation District.

Either enlarged or reduced 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, or recreation.

Locating Soils

All of the soils of Arkansas 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 in this publication. This guide lists all of the soils of the county in alphabetic order by map symbol. It shows the capability unit and woodland group for each soil. It also shows the page where each kind of soil and each capability unit 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, from the discussions of the capability units, and from the sections "Use of Soils as Woodland" and "Use of Soils for Wildlife."

Foresters and others can refer to the section "Use of 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 habitat in the section "Use of Soils for Wildlife."

Community planners and others can read about soil properties that affect the choice of homesites, industrial sites, and recreational sites in the section "Town and Country Planning."

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

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

Newcomers in Arkansas 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 section "General Nature of the County."

Cover picture: Irrigating newly seeded rice on Crowley silt loam.

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SOIL SURVEY OF ARKANSAS COUNTY, ARKANSAS

BY GEORGE R. MAXWELL, DEMPSIE G. BINKLEY, AND DONALD G. WEST, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE

ARKANSAS AGRICULTURAL EXPERIMENT STATION

ARKANSAS COUNTY is in the southeastern part of Arkansas (fig. 1). It has a total area of 666,880 acres, or 1,042 square miles. It is about 60 miles long and 40 miles wide.

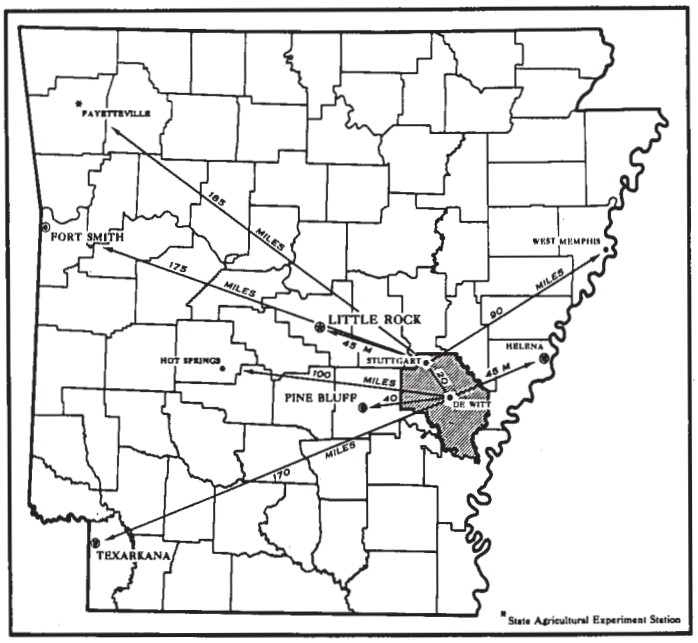

Figure 1.--Location of Arkansas County in Arkansas.

About 57 percent of the county consists of level to moderately sloping, loamy soils that formed in thick beds of loess. About 43 percent consists of level, nearly level, or gently undulating, loamy and clayey soils that formed in alluvium. About 50 percent of the alluvial area along the eastern border, including a large part of the White River National Wildlife Refuge, is subject to frequent flooding. The State-owned Bayou Meto Game Management Area is in the western part of the county. The soils of the uplands generally occur on broad plains at the higher elevations. Short steep escarpments separate these areas from the flood plain.

The total annual rainfall in this county is more than is needed for most crops, but the distribution of rainfall throughout the year is not favorable for the best growth of plants. Many soils need drainage in winter and spring. The amount of water available to plants is somewhat limited in summer. Supplemental irrigation is beneficial.

Rice and soybeans are the principal crops. Small acreages are in cotton, corn, grain sorghums, winter small grain, and pecan groves. A few small areas are in pasture. The production of soybeans has increased in recent years because of the improved varieties that grow well in a cropping system with rice.

The soils in this county are moderate to high in plant nutrients. A large supply of ground water is available for farming and for industrial use, but the depth to ground water has increased with continued use. For this reason, large reservoirs have been constructed to store surface water for use in irrigation.

HOW THIS SURVEY WAS MADE

Soil scientists made this survey to learn what kinds of soils are in Arkansas County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose 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. Amagon and Loring, 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 soil 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, Loring silt loam, 3 to 8 percent slopes, is one of several phases within the Loring 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 the 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 other 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. One such kind of mapping unit is shown on the soil map of Arkansas County as an undifferentiated group.

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. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Crowley and Stuttgart silt loams is an example.

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

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, 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 present methods of use and management.

GENERAL SOIL MAP

The general soil map at the back of this publication shows, in color, the soil associations in Arkansas 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 locating sites for engineering work and recreational facilities and for town and country planning. It is not suitable 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, texture, drainage, and other characteristics that affect their management.

The six soil associations in Arkansas County are discussed in the following pages. The terms for texture used in the title of an association apply to the surface layer of the major soils in the association. For more detailed information about the individual soils in each association, refer to the detailed map and to the section "Descriptions of the Soils."

The boundaries and names of the soil associations in Arkansas County do not match perfectly with those of adjoining areas in Desha County, which is adjacent to the south and southeast. Some soils are major soils in one county and minor or nonexistent in the adjacent one.

1. Perry-Rilla-Portland Association

Poorly drained to well-drained, level, clayey and loamy soils on bottom land along the Arkansas River

This association is in the western part of the county. It consists of broad slack water flats and low natural levees along, but mainly west of, Bayou Meto. The slope gradient is mainly less than 1 percent.

This association, which includes the State-owned Bayou Meto Game Management Area, makes up about 13 percent of the county. It is about 60 percent Perry soils, 12 percent Rilla soils, and 10 percent Portland soils. The remaining 18 percent is mainly Amagon, Hebert, and McKamie soils.

The Perry soils are on the slack water flats and are poorly drained. They have a surface layer of gray or dark-gray silty clay and a subsoil of gray, mottled clay. Their underlying material is dark-red or dark reddish-brown clay or silty clay over dark reddish-brown or reddish-brown silty clay or silty clay loam.

The Rilla soils occur on the natural levees. They are well drained. Their surface layer is dark grayish-brown or dark-brown to brown silt loam. The subsoil is light reddish-brown to brown or dark-brown silt loam or very fine sandy loam in the uppermost part, is reddish-brown or dark reddish-brown silty clay loam in the middle part, and is reddish-brown to red fine sandy loam to silty clay loam in the lowermost part.

The Portland soils are on the slack water flats and are somewhat poorly drained. They have a surface layer of black or dark-gray silty clay loam. The upper part of the subsoil is reddish-brown and grayish-brown, mottled clay, and the lower part is reddish-brown clay. Below this is dark reddish-brown clay or silty clay.

Farms in this association range from 320 to 640 acres in size. Most are highly mechanized. About half the farms are operated by owners, and the rest are rented. About 65 percent of the acreage is cultivated. Soybeans is the main crop, but rice, cotton, winter small grain, and pasture plants are also grown. Some areas are used for fish farming; both bait and food fish are grown in shallow reservoirs.

The Perry and Portland soils shrink and crack when dry and expand and seal over when wet. In some areas they are subject to frequent flooding, and most areas need surface drainage. They are considered poor sites for residences and other buildings and for highways. The Rilla soils are fair to good sites for most structures.

2. Crowley-Stuttgart-Grenada Association

Poorly drained to moderately well drained, level to gently sloping, loamy soils that formed in windblown silts overlying old alluvium on upland flats and low ridges

Most of this association is in the central part of the county, in an area commonly known as the Grand Prairie. It consists of broad flats that are separated by low ridges. The slope gradient of the ridges ranges from 1 to 8 percent but is dominantly less than 2 percent. Slow-flowing, intermittent streams drain the flats.

This association makes up about 57 percent of the county. It is about 36 percent Crowley soils, 27 percent Stuttgart soils, and 12 percent Grenada soils. The remaining 25 percent is mainly Amagon, Calhoun, Calloway, McKamie, and Tichnor soils.

The Crowley soils are on the broad flats and are poorly drained. The upper part of their surface layer is very dark grayish-brown to brown silt loam. The lower part of the surface layer and the subsurface layer are gray, mottled silt loam. The upper part of the subsoil is gray silty clay or clay mottled with shades of red, and the lower part is gray silty clay or silty clay loam mottled with shades of brown.

The Stuttgart soils are on the flats and low ridges. They are somewhat poorly drained to moderately well drained. Their surface layer is grayish-brown to dark-gray silt loam over a few inches of

dark yellowish-brown or yellowish-brown silt loam. The subsurface layer is brown to light yellowish-brown, mottled silt loam. The subsoil is mottled reddish and grayish silty clay loam or silty clay in the upper part and mottled grayish and brownish silt loam or silty clay loam in the lower part.

The Grenada soils occur mainly on the low ridges and are moderately well drained. They have a surface layer of very dark grayish-brown to brown silt loam. The uppermost part of the subsoil is yellowish-brown to dark-brown silt loam or silty clay loam, and the middle part is light brownish-gray to light-gray silt loam. The lower part is a firm, brittle fragipan of light-gray to dark-brown, mottled silty clay loam.

This association is the major area in the county for the production of rice and soybeans. Winter small grain and pasture plants are also grown. About 95 percent of the acreage is cultivated. Most areas, except those on low ridges, need surface drainage. The farms average about 1,000 acres in size and are highly mechanized. About half the farms are operated by owners, and the rest are rented.

If all of the major soils in this association are drained, they are fair sites for residences, other buildings, and highways. They are poor sites for septic tank filter fields because of their compact subsoil.

3. Tichnor Association

Poorly drained, level, loamy soils that formed in sediments from local streams

This association generally occurs in narrow, level areas and depressions, mainly along local streams that drain the central part of the county.

This association makes up about 7 percent of the county. It is about 98 percent Tichnor soils and 2 percent Falaya soils.

The Tichnor soils are poorly drained. Their surface layer is gray to dark grayish-brown, mottled silt loam. The subsurface layer is gray, mottled silt loam, and the subsoil is light-gray or gray, mottled silty clay loam or silt loam.

This association is used mainly for reservoirs of irrigation water and for fishing and duck hunting. A large part of the acreage is woodland. Some areas are used for soybeans, rice, and pasture plants. Many areas are subject to flooding in winter and in spring. Before these soils can be safely farmed, surface drainage and protection from flooding are needed. Only a few farms are entirely within this association. Most areas are parts of farms that are in other associations and that range from 160 to 2,000 acres in size. About 75 percent of the farms are owner operated, and the other farms are rented.

Because of wetness and the hazard of frequent flooding, the soils in this association are poor sites for residences, other buildings, and highways.

4. Grenada-Loring-Calhoun Association

Moderately well drained and poorly drained, level to moderately sloping, loamy soils that formed in windblown silts on upland flats, low ridges, and escarpments

This association is in the northeastern part of the county. It lies between the White River and Lagrue Bayou and consists mainly of broad flats broken by low ridges that are 3 to 10 feet higher than the flats. A strip of escarpments and gently rolling breaks occurs along the eastern side of the association. These areas are adjacent to the bottom land along the White River.

This association makes up about 10 percent of the county. It is about 65 percent Grenada soils, 13 percent Loring soils, and 12 percent Calhoun soils. The remaining 10 percent is mainly Calloway, Crowley, Stuttgart, and Tichnor soils.

The Grenada soils are on flats and low ridges and are moderately well drained. They have a surface layer of very dark grayish-brown to brown silt loam. The uppermost part of the subsoil is yellowish-brown to dark-brown silt loam or silty clay loam, the middle part is light brownish-gray to light-gray silt loam, and the lowermost part is a firm, brittle fragipan of light-gray to dark-brown, mottled silty clay loam.

The Loring soils are on the low ridges and rolling breaks. They are moderately well drained. Their surface layer is dark grayish-brown to brown silt loam. The uppermost part of the subsoil is dark-brown to yellowish-brown silty clay loam, the middle part is a firm, brittle fragipan of silt loam or silty clay loam mottled with shades of brown and gray, and the lowermost part is dark-brown to yellowish-brown, mottled silt loam.

The Calhoun soils occur on flats and are poorly drained. They have a surface layer of gray to dark grayish-brown silt loam over a subsurface layer of gray silt or silt loam that tongues into the subsoil. The subsoil is predominantly gray or dark-gray, mottled silty clay loam.

This association is one of the major areas in the county for the production of soybeans and rice. About 90 percent of the acreage is cultivated. In cultivated areas the level soils need surface drainage, and the sloping and moderately sloping soils need protection against erosion. The average farm is about 1,000 acres in size and is generally highly mechanized. About 60 percent of the farms are operated by the owners, and the rest are rented. Soybeans and rice are the main crops, but winter small grain, lespedeza, cotton, and pasture plants are also grown.

The Grenada and Loring soils are fair sites for residences and other buildings and for highways. The Calhoun soils are considered poor sites. All of the soils in this association are poorly suited to septic tank filter fields.

5. Norwood Association

Well-drained, level and gently undulating, loamy soils on bottom land along the Arkansas River

This association is in the southern part of the county. It consists of broad flats broken by areas that have a slightly irregular surface.

This association makes up about 3 percent of the county. It is about 90 percent Norwood soils. The remaining 10 percent is mainly Portland and Miller soils.

The Norwood soils are well drained. Their surface layer is reddish-brown or dark reddish-brown silt loam or silty clay loam. Below this is dark reddish-brown and reddish-brown, thinly stratified silt loam, very fine sandy loam, and silty clay loam.

This association is subject to occasional flooding in winter and early in spring. About 20 percent of the association is cultivated. Soybeans is the main crop. A small acreage is in winter small grain. About half of the farms are operated by the owners, and the rest are rented.

Because of the flooding hazard, the soils in this association are not considered good sites for residences and other buildings or for highways.

6. Sharkey-Acadia Association

Poorly drained and somewhat poorly drained, level, predominantly clayey soils in slack water areas on bottom land along the White River

This association occurs along the eastern side of the county. It occupies the flood plain along the White River.

This association makes up about 10 percent of the county. It is about 60 percent Sharkey soils and 35 percent Acadia soils. The remaining 5 percent is mainly Miller and Norwood soils.

Sharkey soils are poorly drained. They have a surface layer of dark-gray, very dark gray or very dark grayish-brown clay that is mottled in the lower part. The subsoil is dark-gray or gray, mottled clay, and the underlying material is gray, mottled clay.

The Acadia soils are somewhat poorly drained. Their surface layer is very dark grayish-brown to brown silty clay loam. Below this is a subsurface layer of dark grayish-brown to brown silt loam or silty clay loam. The upper part of the subsoil is dark grayish-brown, mottled silty clay loam or silty clay. The lower part is mottled grayish and brownish silty clay over silty clay loam. Below this is dark-brown to pale-brown loam.

About 99 percent of this association is woodland. Nearly all of it is within the White River National Wildlife Refuge or in areas used by private hunting clubs. Most of the cleared areas are used to grow food for wildlife. Most areas are subject to flooding at least once each year.

The Sharkey soils and, to a lesser degree, the Acadia soils shrink and crack when dry and expand and seal over when wet. These soils are unstable, have low-bearing strength, are wet, and are subject to frequent flooding. They are considered poor sites for structures.

DESCRIPTIONS OF THE SOILS

This section describes the soil series and the mapping units in Arkansas County. The procedure is first to describe each soil series, and then the mapping units in that series. Thus, to get full information on any one mapping unit, it is necessary to read both the description of that unit and the description of the soil series to which it belongs.

Each soil series contains two descriptions of a soil profile. The first is brief and in terms familiar to a layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils.

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 on which each capability unit is described 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 1. Many of the terms used in describing soils can be found in the Glossary at the end of this survey.

Acadia Series

The Acadia series consists of level, somewhat poorly drained, very slowly permeable soils that developed in alluvium.

Typically, the surface layer is very dark grayish-brown silty clay loam, and the subsurface layer is brown silt loam. The uppermost part of the subsoil is dark grayish-brown, mottled silty clay loam, and the lower part is silty clay and silty clay loam mottled with shades of brown and gray. Below this is brown loam.

The Acadia soils are associated with the poorly drained Sharkey soils. They are coarser textured, are better drained, and are browner below the surface layer than the Sharkey soils.

Representative profile of Acadia silty clay loam in a moist, wooded area in the NE1/4 NE1/4 NW1/4 sec. 2, T. 7 S., R. 2 W.:

A1--0 to 4 inches, very dark grayish-brown (10YR 3/2) silty clay loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, subangular blocky structure; firm, slightly plastic; plentiful roots; few, fine, dark-colored concretions; medium acid; clear, smooth boundary.

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONAL EXTENT OF THE SOILS

Soil	Area	Extent
	Acres	Percent
Acadia silty clay loam	24,971	3.7
Amagon silt loam	21,217	3.2
Amagon silt loam, heavy substratum	3,070	.5
Calhoun silt loam	11,094	1.7
Calloway silt loam	7,724	1.2
Crowley silt loam	87,729	13.2
Crowley and Stuttgart silt loams	71,913	10.8
Falaya silt loam	2,220	.3
Grenada silt loam, 0 to 1 percent slopes	15,836	2.4
Grenada silt loam, 1 to 3 percent slopes	40,837	6.1
Grenada silt loam, 3 to 8 percent slopes	32,746	4.9
Hebert silt loam	12,016	1.8
Loring silt loam, 1 to 3 percent slopes	1,447	.2
Loring silt loam, 3 to 8 percent slopes	1,418	.2
Loring silt loam, 8 to 12 percent slopes	6,229	.9
McKamie silt loam, 0 to 1 percent slopes	469	.1
McKamie silt loam, 1 to 3 percent slopes	2,764	.4
Miller silty clay	1,780	.3
Norwood silt loam	16,843	2.5
Norwood silty clay loam, gently undulating	3,281	.5
Perry silty clay	52,481	7.9
Portland silty clay loam	9,924	1.5
Rilla silt loam	11,632	1.7
Sharkey clay	39,726	6.0
Stuttgart silt loam, 0 to 1 percent slopes	46,371	6.9
Stuttgart silt loam, 1 to 3 percent slopes	34,326	5.1
Stuttgart silt loam, 3 to 8 percent slopes	4,122	.6
Tichnor silt loam	70,396	10.6
Water	32,298	4.8
Total	666,880	100.0

A2--4 to 10 inches, brown (10YR 5/3) silt loam; common, medium, distinct mottles of grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; friable; plentiful roots; common pores; few, fine, dark-colored concretions; medium acid; clear, smooth boundary.

B21t--10 to 18 inches, dark grayish-brown (10YR 4/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; firm, slightly plastic; common, thin, patchy clay films; plentiful roots; common pores; few, fine, dark-colored concretions; medium acid; clear, smooth boundary.

B22t--18 to 32 inches, mottled yellowish-brown (10YR 5/6), dark grayish-brown (10YR 4/2), and dark-brown (7.5YR 4/2) silty clay; moderate, medium, subangular blocky structure; firm, plastic; continuous thick clay films on ped faces; common roots; common pores; many, coarse, dark-colored concretions; few organic stains on some peds; medium acid; gradual, smooth boundary.

B23t--32 to 58 inches, mottled light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), yellowish-brown (10YR 5/6), and grayish-brown (10YR 5/2) silty clay loam; firm, slightly plastic; continuous thick clay films on ped faces; common roots; common, coarse, dark-colored concretions; common organic stains on peds; slightly acid; clear, smooth boundary.

IIC--58 to 72 inches, brown (10YR 5/3) loam; common, medium, faint mottles of pale brown (10YR 6/3); massive; friable; few roots; few, medium, dark-colored concretions; slightly acid.

The A1 horizon is very dark grayish brown, dark grayish brown, or brown. The A2 horizon is dark grayish-brown to brown silt loam or silty clay loam. The B21t horizon is dark grayish-brown or grayish-brown silty clay loam or silty clay. The IIC horizon is dark brown to pale brown. Depth to the IIC horizon ranges from 3 to 6 feet but averages about 4 1/2 feet. Reaction is medium acid or slightly acid in the A and B horizons and slightly acid or neutral in the IIC horizon.

The Acadia soils in Arkansas County lack red mottles and are less acid than is defined in the range for the Acadia series, but these differences do not affect their usefulness and behavior, and a new series is not warranted.

Acadia silty clay loam (Ac).--This level soil occupies areas along the White River, mainly in the White River National Wildlife Refuge. It is subject to frequent overflow. The surface layer is very dark grayish-brown to brown silty clay loam about 4 inches thick, and the subsurface layer is dark grayish-brown to brown silt loam or silty clay loam about 6 inches thick. The uppermost part of the subsoil is dark grayish-brown, mottled silty clay loam or silty clay. The lower part is silty clay and silty clay loam mottled with shades of brown and gray. Below this is dark-brown to pale-brown loam.

Included with this soil in mapping are a few spots of Sharkey soils.

This soil is medium acid or slightly acid in the surface layer and the subsurface layer and is slightly acid or neutral below. It is high in natural fertility and medium to high in organic-matter content. Permeability is very slow. Runoff is slow, and the available water capacity is high.

This soil is flooded so frequently that it is not suitable for any regular use except timber production and wildlife habitat. Excess water is a very severe hazard. Most of the acreage is woodland. (Capability unit Vw-1; woodland group 3w6)

Amagon Series

The Amagon series consists of level, poorly drained, slowly permeable soils that developed in alluvium.

Typically, the surface layer and the subsurface layer are gray silt loam. The subsoil is gray and dark-gray, mottled silty clay loam.

The Amagon soils are associated with the poorly drained Crowley and Tichnor soils, the somewhat poorly drained to moderately well drained Stuttgart soils, and the moderately well drained Grenada soils. The texture of the Amagon soils changes gradually between the subsurface layer and the subsoil, whereas the texture of the Crowley soils changes abruptly. The Amagon soils have a thinner surface layer and subsurface layer than the Tichnor soils. They are grayer and more poorly drained than the Grenada and Stuttgart soils. The Amagon soils do not have the fragipan that is typical of Grenada soils. They are less clayey in the subsoil than the Stuttgart soils, which have a moderately high sodium content in the subsoil.

Representative profile of Amagon silt loam in a moist, cultivated area in the NW1/4 SE1/4 SW1/4 sec. 6, T. 4 S., R. 5 W.:

Ap--0 to 6 inches, gray (10YR 5/1) silt loam; root channels coated with strong brown (7.5YR 5/6); weak, fine, granular structure; friable; many roots; few, fine, dark-colored concretions; medium acid; clear, smooth boundary.

A2g--6 to 17 inches, gray (10YR 6/1) silt loam; root channels coated with strong brown (7.5YR 5/6); weak, fine, subangular blocky structure; friable; few roots; few fine pores; few, fine, dark-colored concretions; strongly acid; gradual, smooth boundary.

B2tg--17 to 30 inches, gray (10YR 5/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4); weak, fine, subangular blocky structure; firm; common, thin, patchy clay films; few roots; few fine pores; few, fine, dark-colored concretions; strongly acid; diffuse boundary.

B3g--30 to 72 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6) and faint, dark

grayish-brown (10YR 4/2) mottles; moderate, fine, subangular blocky structure; firm; few fine pores; few, fine, dark-colored concretions; strongly acid.

The Ap horizon is gray or dark gray. The A2g horizon is gray or light gray. In some profiles the A2g horizon is lacking and the Ap horizon rests directly on the B horizon. The B2tg horizon is grayish brown to light gray. The B3g horizon is dark-gray or gray silty clay loam or silty clay. Reaction is medium acid to very strongly acid throughout the profile.

Amagon silt loam (Am).--This soil is in upland depressions and old, filled stream channels. It is nearly level and poorly drained. It has the profile described as representative of the series. The surface layer is dark-gray or gray silt loam about 6 inches thick, and the subsurface layer is gray or light-gray silt loam about 11 inches thick. The uppermost part of the subsoil is grayish-brown to light-gray, mottled silty clay loam. At a depth of about 30 to 36 inches, the subsoil is dark-gray or gray, mottled silty clay loam or silty clay.

Included with this soil in mapping are a few spots of Crowley, Stuttgart, and Tichnor soils.

This soil is medium acid to very strongly acid throughout. It has moderate to high natural fertility and medium to low organic-matter content. Runoff is slow, and wetness is a severe hazard. The available water capacity is high. The surface layer is readily permeable to roots and water, but the subsoil restricts the growth of roots and the movement of water.

This soil is easy to keep in good tilth, and it can be tilled throughout a wide range of moisture content. Farm work commonly has to be delayed after a rain unless surface drainage has been provided. The response to lime and fertilizer is good in drained areas. The main crops are rice and soybeans. This soil is well suited to irrigation. No irrigating should be done unless a drainage system is installed to remove excess irrigation water and excess rainfall. (Capability unit IIIw-1; woodland group 2w6)

Amagon silt loam, heavy substratum (An).--This level soil is in depressions and old, filled stream channels on uplands. Its surface layer is dark-gray or gray silt loam about 4 to 6 inches thick. The uppermost part of the subsoil is gray silty clay loam mottled with yellowish brown, and the lower part is gray, mottled silty clay.

Included with this soil in mapping are a few spots of Crowley and Tichnor soils and spots where the surface layer is silty clay loam or silty clay.

This soil is very strongly acid or strongly acid throughout. It has moderate natural fertility. Runoff is slow or ponded, and wetness is a severe hazard. The available water capacity is high. The surface layer is readily permeable to roots and water, but the subsoil restricts the growth of roots and the movement of water.

Tillage is somewhat difficult in areas where the surface layer is thin. Most areas can be tilled only within a narrow range of moisture content. Farming operations commonly have to be delayed for several days after a rain unless surface drainage has been provided. The response to lime and fertilizer is good in drained areas. The main crops are rice and soybeans. This soil is well suited to irrigation, but no irrigating should be done unless a drainage system has been installed to remove excess irrigation water and excess rainfall. (Capability unit IIIw-1; woodland group 2w6)

Calhoun Series

The Calhoun series consists of level, poorly drained, slowly permeable soils that developed in a thick mantle of loess.

Typically, the surface layer is dark grayish-brown silt loam, and the subsurface layer is gray silt loam. The subsoil is dark-gray and grayish-brown, mottled silty clay loam and silt loam. Tongues of gray silt loam from the subsurface layer extend into the uppermost part of the subsoil.

The Calhoun soils are associated with the somewhat poorly drained Calloway soils and the moderately well drained Grenada and Loring soils. The Calhoun soils are grayer and more poorly drained than the Calloway, Grenada, and Loring soils, and they do not have the fragipan that is typical of those soils.

Representative profile of Calhoun silt loam in a moist, wooded area in the NW1/4 NW1/4 SW1/4 sec. 22, T. 2 S., R. 3 W.:

A1--0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; plentiful roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

A2g--5 to 11 inches, gray (10YR 6/1) silt loam; weak, platy structure that breaks to weak, fine, subangular blocky structure; friable, slightly brittle; plentiful roots; few pores; few, fine, dark-colored concretions; strongly acid; clear, irregular boundary.

B&A--11 to 22 inches, dark-gray (10YR 4/1) silty clay loam; common, fine, faint mottles of very dark gray and grayish brown; common tongues of gray (10YR 6/1) silt loam from the A2g horizon about 1 inch wide at the top and tapering to about 1/2 inch at the bottom and terminating in cups of gray (10YR 5/1) clay; moderate, medium, subangular blocky structure that breaks to fine angular blocky structure; firm, slightly brittle; continuous medium clay films on ped faces and in pores; thin silt coating on most peds; plentiful roots; few pores; few, fine, dark-colored concretions; strongly acid; clear, wavy boundary.

B21tg--22 to 32 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, distinct mottles

of grayish brown (10YR 5/2) and yellowish brown (10YR 5/4); moderate, medium, angular blocky structure; firm, slightly brittle, slightly plastic; thick continuous clay films on ped faces; gray silt coatings on some ped faces; plentiful roots; few, fine, dark-colored concretions; strongly acid; gradual, wavy boundary.

B22tg--32 to 55 inches, grayish-brown (10YR 5/2) silty clay loam; moderate, medium, angular blocky structure; firm, slightly brittle; continuous thick clay films on ped faces; gray streaks of silt on some vertical ped faces; few roots; strongly acid; gradual, smooth boundary.

B23tg--55 to 72 inches, dark-gray (10YR 4/1) silt loam; common, medium, distinct mottles of grayish brown (10YR 5/2); weak prismatic structure that breaks to moderate, medium, angular blocky structure; firm, slightly sticky; continuous thick clay films on ped faces; gray streaks of silt on some ped faces; few roots; few, fine, dark-colored concretions; strongly acid.

The A1 horizon is dark grayish brown to gray. The A2g horizon ranges from silt to silt loam. The B&A horizon is dark-gray or gray in the remnants of the B horizon and gray or light gray in the tongues from the A2g horizon. The B21tg horizon is dark gray or gray, the B22tg is grayish-brown or gray, and the B23tg is dark gray or gray. Reaction is strongly acid or very strongly acid throughout the profile.

Calhoun silt loam (Ca).--This soil is on broad flats. The surface layer is gray to dark grayish-brown silt loam about 5 inches thick. The subsurface layer is gray silt or silt loam that is about 6 inches thick and that tongues into the subsoil. The subsoil is predominantly gray, dark-gray, or grayish-brown, mottled silty clay loam.

Included with this soil in mapping are a few spots of Calloway and Amagon soils.

This soil is strongly acid or very strongly acid throughout. It is moderate in natural fertility and medium to low in organic-matter content. The surface layer is readily permeable to roots and water, but the compact subsoil restricts the growth of roots and the movement of water. The available water capacity is moderate to high. Runoff is slow to ponded, and excess water is a severe hazard.

This soil is easy to keep in good tilth, and it can be tilled throughout a wide range of moisture content. Farm work commonly has to be delayed for several days after a rain unless surface drainage has been provided (pl. I). The response to lime and fertilizer is good. The main crops are rice and soybeans. (Capability unit IIIw-1; woodland group 3w9)

Calloway Series

The Calloway series consists of level, somewhat poorly drained, slowly permeable soils that have a fragipan. These soils developed in a thick mantle of loess.

Typically, the surface layer is dark grayish-brown silt loam. The uppermost part of the subsoil is silt loam mottled with shades of gray and brown. Below this is a firm, brittle fragipan of grayish-brown or gray, mottled silty clay loam. The lower part of the subsoil is grayish-brown, mottled silt loam.

The Calloway soils are associated with the poorly drained Calhoun soils and the moderately well drained Grenada and Loring soils. In contrast with the Calhoun soils, they are better drained, are not so gray in the subsoil, and have a fragipan. Calloway soils are more poorly drained and are grayer in the subsoil than Grenada and Loring soils.

Representative profile of Calloway silt loam in a moist, cultivated area in the SW1/4 NE1/4 NW1/4 sec. 31, T. 3 S., R. 1 W.:

Ap--0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; plentiful roots; few fine and medium concretions; strongly acid; clear, smooth boundary.

B2--5 to 9 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, fine, granular structure; very friable, plentiful roots; few, fine and medium, dark-colored concretions; strongly acid; clear, smooth boundary.

B&A--9 to 14 inches, yellowish-brown (10YR 5/4) silt loam; common, medium or coarse, distinct mottles of grayish brown (10YR 5/2) and gray (10YR 6/1); moderate, medium, subangular blocky structure; friable; plentiful roots; few, thin, patchy clay films on some ped faces; common, fine, dark-colored concretions; medium acid; clear, wavy boundary.

B'x1--14 to 19 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/4); coarse polygons that break to moderate, medium, subangular blocky structure; firm, brittle, slightly plastic; common, thin, patchy clay films on most ped faces; streaks of gray silt on vertical ped faces and between polygons; common fine roots concentrated in streaks of silt between polygons; common, fine and medium, dark-colored concretions; medium acid; clear, smooth boundary.

B'x2--19 to 50 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4); coarse polygons that break to moderate, medium, subangular blocky structure; firm, brittle; continuous thin clay films on ped faces and in pores; common fine roots concentrated in streaks of gray silt between polygons; common pores, partly clogged with clay; common, fine and medium, dark-colored concretions; strongly acid; gradual, wavy boundary.

B3g--50 to 72 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/4) and brown (7.5YR 5/4);

moderate, medium, subangular blocky structure; firm; common pores; few, fine, dark-colored concretions; neutral.

The Ap horizon is dark grayish brown, grayish brown, or brown. The B&A horizon is yellowish brown to gray. It has common or many, medium or coarse mottles of shades of gray and brown. The B'x horizon is silt loam or silty clay loam. The B3g horizon is grayish-brown or gray silt loam or silty clay loam. Reaction is strongly acid or medium acid in the upper horizons and is medium acid to neutral in the B3g horizon.

The Calloway soils in Arkansas County have slightly less clay in the upper part of the B horizon than is defined in the range for the Calloway series, but this difference does not alter their usefulness and behavior, and a new series is not warranted.

Calloway silt loam (Cb).--This level soil is in broad flats and on the tops of low ridges. Its surface layer is dark grayish-brown, grayish-brown, or brown silt loam about 5 inches thick. The upper part of the subsoil is silt loam mottled with shades of gray and brown. Below this is a firm, brittle fragipan of gray or grayish-brown silt loam or silty clay loam mottled with yellowish brown or brown. The lower part of the subsoil is grayish-brown or gray, mottled silt loam or silty clay loam.

Included with this soil in mapping are spots of Grenada and Calhoun soils.

This soil is strongly acid or medium acid from the surface layer through the fragipan and is medium acid to neutral below. It has moderate natural fertility and medium to low organic-matter content. Roots and water easily penetrate as far down as the compact, brittle fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is slow, and wetness is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Planting may be delayed in spring unless surface drainage is provided. The response to lime and fertilizer is good. Rice, soybeans, and winter small grain are the main crops. There are a few areas of improved pasture. (Capability unit IIw-1; woodland group 3w8)

Crowley Series

The Crowley series consists of level, poorly drained, very slowly permeable soils on broad flats.

Typically, the upper part of the surface layer is very dark grayish-brown silt loam. The lower part of the surface layer and the subsurface layer are gray, mottled silt loam. The upper part of the subsoil is gray silty clay mottled with shades of red, and the lower part is gray silty clay loam mottled with shades of brown.

The Crowley soils are associated with the poorly drained Amagon soils, the somewhat poorly drained to moderately well drained Stuttgart soils, and the moderately well drained Grenada soils. Crowley soils are grayer and more poorly drained than Stuttgart and Grenada soils. They have a claypan instead of the fragipan that is characteristic of Grenada soils. The texture of Crowley soils changes abruptly between the subsurface layer and the subsoil, whereas the texture of the Amagon soils changes gradually.

Representative profile of Crowley silt loam in a moist, cultivated area in the SW1/4 SW1/4 SW1/4 sec. 4, T. 2 S., R. 5 W.:

Ap--0 to 5 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; dark-colored stains on some peds; mildly alkaline; abrupt, smooth boundary.

A12--5 to 9 inches, gray (10YR 5/1) silt loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, fine, subangular blocky structure; very friable; plentiful roots; common, fine and medium, dark-colored concretions; mildly alkaline; clear, smooth boundary.

A2g--9 to 15 inches, gray (10YR 6/1) silt loam; common, medium, distinct mottles of dark brown (10YR 4/3) and yellowish brown (10YR 5/4); weak, medium, subangular blocky structure; friable; plentiful roots; common pores; common, fine and medium, dark-colored concretions; neutral; abrupt, wavy boundary.

B21tg--15 to 30 inches, gray (10YR 5/1) silty clay; common, medium, prominent mottles of red (2.5YR 4/6), and few, fine, distinct mottles of yellowish red (5YR 4/6); moderate, fine, subangular blocky structure; firm; common thick clay films on ped faces and in pores; few roots; few pores; few, medium, dark-colored concretions; strongly acid; gradual, wavy boundary.

B22tg--30 to 72 inches, gray (10YR 5/1) silty clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; firm; common medium clay films on ped faces; few pores; dark-colored stains on some peds; few, fine, dark-colored concretions; few pockets of gray silt loam; medium acid.

The Ap horizon ranges from very dark grayish-brown to brown. The B21tg horizon is silty clay or clay. It has common to many red mottles and few to common yellowish-red mottles. The B22tg horizon is silty clay or silty clay loam mottled with brown, strong brown, or dark yellowish brown. Reaction is mildly alkaline to slightly acid in the A horizon and strongly acid to medium acid in the B horizon.

The Crowley soils in Arkansas County contain less sand and have a thicker solum than is defined in the range for the Crowley series, but these differences do not alter their usefulness and behavior, and a new series is not warranted.

Crowley silt loam (Cr).--This level, poorly drained soil is on broad flats. It has the profile described as representative of the series. The surface layer is about 9 inches thick. The upper part is very dark grayish-brown to brown silt loam. The lower part of the surface layer and the subsurface layer are gray, mottled silt loam. The upper part of the subsoil is gray silty clay or clay mottled with shades of red, and the lower part is gray silty clay or silty clay loam mottled with shades of brown.

Included with this soil in mapping are spots of Stuttgart and Calhoun soils.

This soil is mildly alkaline to slightly acid in the surface layer and the subsurface layer and is medium acid to strongly acid in the subsoil. Natural fertility is moderate, and the content of organic matter is medium. The surface layer is readily permeable to roots and water, but the firm, clayey subsoil restricts the penetration of roots and the movement of water. The available water capacity is moderate to high. Runoff is slow to ponded, and wetness is a severe hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farming operations frequently have to be delayed after a rain unless surface drainage has been provided. The response to lime and fertilizer is good. Rice and soybeans are the main crops. (Capability unit IIIw-1; woodland group 3w9)

Crowley and Stuttgart silt loams (Cs).--This mapping unit is on broad flats in the Grand Prairie area of the county. Both soils occur in most areas, but in varying proportions. The Crowley soil makes up 40 to 90 percent of each area. The Stuttgart soil makes up as much as 50 percent of some areas but is lacking from others.

Included with these soils in mapping are spots of Amagon, Calhoun, and Calloway soils.

The Crowley soil has a surface layer about 9 inches thick. The upper part is very dark grayish-brown to brown silt loam. The lower part of the surface layer and the subsurface layer are gray, mottled silt loam. The upper part of the subsoil is gray silty clay or clay mottled with shades of red, and the lower part is gray silty clay or silty clay loam mottled with shades of brown.

The surface layer of the Stuttgart soil is about 5 inches of dark grayish-brown, grayish-brown, or dark-gray silt loam over about 5 inches of dark yellowish-brown or yellowish-brown silt loam. The subsurface layer, about 13 inches thick, is brown to light yellowish-brown, mottled silt loam. The upper part of the subsoil is mottled with shades of red and gray silty clay loam or silty clay. The lower part is mottled with shades of brown and gray silt loam or silty clay loam.

For both soils, natural fertility is moderate and the content of organic matter is medium. The available water capacity is moderate to high. Runoff is slow, and wetness is a moderate to severe hazard. The surface layer of both soils is readily permeable to roots and water, but the firm, clayey subsoil restricts the penetration of roots and the movement of water. The Crowley soil is mildly alkaline to slightly acid in the surface and subsurface layers and medium acid to strongly acid in the subsoil. The Stuttgart soil is neutral to strongly acid in the surface and subsurface layers and is medium acid or slightly acid in the subsoil. The lower layers of the Stuttgart soil have a moderately high content of sodium.

These soils are easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farm work frequently has to be delayed after a rain unless surface drains have been provided. The response to lime and fertilizer is good. If leveling is necessary in areas of the Stuttgart soils, the depth to the concentration of sodium should be determined before cuts are made; productivity is impaired if sodium is too near the surface. The main crops are rice and soybeans. Lespedeza is grown in some areas. (Capability unit IIIw-1 and woodland group 3w9 for Crowley soil. Capability unit IIw-1 and woodland group 3w8 for Stuttgart soil)

Falaya Series

The Falaya series consists of level, somewhat poorly drained, moderately permeable soils on the flood plain of local streams in the Grand Prairie area of the county.

Typically, the surface layer is dark grayish-brown silt loam. Below this is a few inches of dark-brown silt loam. This layer is underlain by grayish-brown, light brownish-gray, and gray silt loam.

The Falaya soils are associated with the poorly drained Tichnor soils. In contrast with those soils, Falaya soils are better drained, are browner, are less clayey just below the surface layer, and do not have a well developed subsoil.

Representative profile of Falaya silt loam in a moist pasture in the SE1/4 NE1/4 NW1/4 sec. 3, T. 3 S., R. 3 W.:

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

C1--6 to 14 inches, dark-brown (10YR 3/3) silt loam; common, fine, distinct mottles of grayish brown; massive; friable; common fine roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

C2g--14 to 26 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct mottles of dark brown (10YR 4/3) and common, fine, distinct mottles of yellowish brown; massive; friable; common fine roots; few, fine, dark-colored concretions; very strongly acid; gradual, smooth boundary.

C3g--26 to 44 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/4); massive; friable; few roots; common pores; few, medium, dark-colored concretions; strongly acid; gradual, wavy boundary.

C4g--44 to 72 inches, gray (10YR 6/1) silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/4); massive; friable; common pores; few, medium, dark-colored concretions; medium acid.

The Ap horizon ranges from dark grayish-brown to brown. The C1 horizon is dark brown or brown. The C2g horizon is dark grayish brown or grayish brown and is mottled with brown, dark brown, or yellowish brown. The C3g horizon is grayish brown or light brownish gray. The C4g horizon is dark gray or gray. Reaction ranges from very strongly acid to medium acid throughout the profile.

Falaya silt loam (Fa).--This somewhat poorly drained, level soil has a surface layer of brown to dark grayish-brown silt loam about 6 inches thick. The next layer is a few inches of dark-brown or brown silt loam. Below this is grayish-brown and gray silt loam mottled with shades of brown.

Included with this soil in mapping are spots of Tichnor soils.

This soil is medium acid to very strongly acid throughout. It is moderately high in natural fertility and is medium in organic-matter content. This soil is readily penetrated by roots and water. The available water capacity is high. Runoff is slow, and excess water is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farming operations commonly have to be delayed in spring unless surface drainage has been provided. The response to lime and fertilizer is good. The main crops are soybeans and pasture plants. (Capability unit IIw-2; woodland group 1w5)

Grenada Series

The Grenada series consists of moderately well drained, slowly permeable soils on uplands. These soils developed in a thick mantle of loess. The slope gradient ranges from 0 to 8 percent.

In most cultivated areas the surface layer is very dark grayish-brown silt loam. The uppermost part of the subsoil is yellowish-brown and dark-brown silt loam or silty clay loam, the middle part is light brownish-gray or light-gray, mottled silt loam and the lower part is a firm brittle fragipan of light-gray to brown, mottled silty clay loam.

The Grenada soils are associated with the poorly drained Calhoun and Crowley soils, the somewhat poorly drained Calloway soils, the somewhat poorly drained to moderately well drained Stuttgart soils, and the moderately well drained Loring soils. The Grenada soils are browner and better drained than the Calhoun, Calloway, and Crowley soils. They have a fragipan, which the Calhoun and Crowley soils do not have. They have a layer of light-colored silt loam between the more clayey layers, which the Loring soils lack. In comparison with Stuttgart soils, they have a fragipan instead of a claypan and they lack the moderately high content of sodium in the subsoil.

Representative profile of Grenada silt loam, 0 to 1 percent slopes, in a moist, cultivated area in the SE1/4 SE1/4 NE1/4 sec. 31, T. 3 S., R. 1 W.:

Ap--0 to 5 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

B21t--5 to 13 inches, dark-brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; few, thin, patchy clay films on ped faces; plentiful roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

B22t--13 to 20 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; few, thin, patchy clay films on ped faces; plentiful roots; few, fine, dark-colored concretions; strongly acid; clear, wavy boundary.

A'2x--20 to 27 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, distinct mottles of yellowish brown; weak, fine and medium, subangular blocky structure; friable, brittle; few roots; many pores; common, fine and medium, dark-colored concretions; very strongly acid; clear, wavy boundary.

B'x1--27 to 39 inches, brown (10YR 5/3) silty clay loam; common, fine, faint mottles of yellowish brown and grayish brown; coarse polygons that break to moderate, medium, subangular blocky structure; firm; brittle; common medium clay films on ped faces and in pores; light brownish-gray (10YR 6/2) silt coatings in seams between polygons; few roots; few pores; few, fine and medium, dark-colored concretions; very strongly acid; diffuse boundary.

B'x2--39 to 72 inches, brown (10YR 5/3) silty clay loam; common, coarse, distinct mottles of dark brown (7.5YR 4/4); coarse polygons that break to moderate, medium, subangular blocky structure; firm; brittle; few roots; few pores; few, fine and medium, dark-colored concretions; very strongly acid.

The Ap horizon ranges from very dark grayish brown to brown. The B21t and B22t horizons range from dark-brown to yellowish-brown silt loam and silty clay loam. The A'2x horizon ranges from light brownish gray to light gray, and the B'x1 horizon is brown or dark brown. Reaction ranges from strongly acid to very strongly acid throughout the profile.

Grenada silt loam, 0 to 1 percent slopes (GrA).--This moderately well drained soil has the profile described as representative of the series. It has a surface layer of very dark grayish-brown to brown silt loam about 5 inches thick. The uppermost 15 inches of the subsoil is dark-brown to yellowish-brown silt loam or silty clay loam, the middle part is light brownish-gray to light gray silt loam, and the lowermost part, beginning at a depth of about 27 inches, is a firm, brittle fragipan of light-gray to dark-brown, mottled silty clay loam.

Included with this soil in mapping are a few spots of Calloway, Crowley, and Calhoun soils.

This soil is strongly acid or very strongly acid throughout. Natural fertility is moderate, and the organic-matter content is medium. Roots and water easily penetrate as far down as the firm, brittle fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is slow, and excess water is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farm work is likely to be delayed unless surface drains are provided. The response to lime and fertilizer is good. Rice and soybeans are the main crops. (Capability unit IIw-1; woodland group 3o7)

Grenada silt loam, 1 to 3 percent slopes (GrB).--This soil has a surface layer of very dark grayish-brown to brown silt loam about 5 inches thick. The uppermost 12 to 20 inches of the subsoil is dark-brown to yellowish-brown silt loam or silty clay loam, the middle part is light brownish-gray to light-gray silt loam, and the lower part, beginning at a depth of about 24 inches, is a firm, brittle fragipan of light-gray to dark-brown, mottled silty clay loam.

Included with this soil in mapping are a few spots of Loring and Stuttgart soils.

This soil is strongly acid or very strongly acid throughout. It is moderate in natural fertility and is medium in organic-matter content. The available water capacity is moderate. Roots and water easily penetrate as far down as the firm, brittle fragipan, which restricts further penetration. Runoff is slow to medium, and erosion is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. Rice and soybeans are the main crops, but small grain, lespedeza, and pasture plants are also grown. (Capability unit IIe-1; woodland group 3o7)

Grenada silt loam, 3 to 8 percent slopes (GrC).--This soil has a surface layer of very dark grayish-brown to brown silt loam about 5 inches thick. The uppermost 12 to 20 inches of the subsoil is dark-brown to yellowish-brown silt loam or silty clay loam. The middle part is light brownish-gray to light-gray silt loam. Beginning at depth of about 24 inches is a firm, brittle fragipan of light-gray to dark-brown, mottled silty clay loam.

Included with this soil in mapping are a few spots of Loring soils and of other Grenada soils.

This soil is strongly acid or very strongly acid throughout. Natural fertility is moderate, and the organic-matter content is medium. Roots and water easily penetrate to the firm, brittle fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is medium to rapid, and erosion is a severe hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. Winter small grain and pasture plants are suitable crops. (Capability unit IIIe-1; woodland group 3o7)

Hebert Series

The Hebert series consists of level, somewhat poorly drained, moderately slowly permeable soils on natural levees. These soils developed in loamy alluvium.

Typically, the surface layer is very dark grayish-brown silt loam, and the subsurface layer is light-brown silt loam. The upper part of the subsoil is grayish-brown, mottled clay loam, and the lower part is reddish-brown, mottled loam. The underlying material is light reddish-brown loamy fine sand and yellowish-red fine sand.

The Hebert soils are associated with the well-drained Rilla soils, the somewhat poorly drained Portland soils, and the poorly drained Perry soils. They are grayer and more poorly drained than the Rilla soils and are coarser textured than Portland soils. Hebert soils are browner, better drained, and coarser textured than Perry soils.

Representative profile of Hebert silt loam in a moist, wooded area in the SE1/4 NE1/4 NE1/4 sec. 26, T. 4 S., R. 6 W.:

A1--0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; medium acid; abrupt, smooth boundary.

A2--3 to 14 inches, light-brown (7.5YR 6/4) silt loam; weak, fine and medium, subangular blocky structure; friable; plentiful roots; common pores; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

B21t--14 to 28 inches, grayish-brown (10YR 5/2) clay loam; common, medium, prominent mottles of reddish brown (5YR 4/4) and few, fine, faint mottles of light brownish gray; moderate, medium, subangular blocky structure; firm; continuous medium clay films on ped faces; common roots; few, fine, dark-colored concretions; strongly acid; gradual, smooth boundary.

B22t--28 to 41 inches, reddish-brown (5YR 5/3) loam; common, medium, prominent mottles of light

brownish gray (10YR 6/2); moderate, medium, subangular blocky structure; firm; continuous medium clay films on ped faces; dark-colored stains on some peds; silt coatings on some peds; few roots; common pores; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

IIC1--41 to 52 inches, light reddish-brown (5YR 6/3) loamy fine sand; very friable; few roots; few, fine, dark-colored concretions; strongly acid; gradual, smooth boundary.

IIC2--52 to 72 inches, yellowish-red (5YR 5/6) fine sand; few thin lenses of sandy clay loam; common bedding planes; single grain; loose; few, medium, dark-colored concretions; medium acid.

The A1 horizon is very dark grayish-brown to brown. The Ap horizon is about 6 inches thick. The A2 horizon is light brown or pale brown to grayish brown, and in some profiles it has common, medium, faint mottles of gray or light brownish gray. The B21t horizon is grayish-brown or light brownish-gray clay loam or silty clay loam that has few to common, fine or medium mottles and faint to prominent mottles in shades of red, brown, and gray. The B22t horizon ranges from silty clay loam to loam. The IIC horizon is light reddish-brown and yellowish-red sandy clay loam to fine sand that has bedding planes and thin lenses of contrasting textures. Reaction is medium acid to strongly acid in the A and B horizons and is strongly acid to neutral in the IIC horizon.

Hebert silt loam (Hb).--This level soil is on natural levees along Bayou Meto and the Arkansas River and its old meanders. It has a surface layer of very dark grayish-brown to brown silt loam 2 to 6 inches thick. The subsurface layer is about 11 inches of light-brown to grayish-brown silt loam. The upper part of the subsoil is grayish-brown or light brownish-gray, mottled clay loam or silty clay loam, and the lower part is reddish-brown, mottled silty clay loam to loam. Below this is light reddish-brown to yellowish-red sandy clay loam to fine sand.

Included with this soil in mapping are a few spots of Rilla and Portland soils.

This soil is strongly acid to medium acid. It is moderate in natural fertility and medium to high in organic-matter content. Roots and water readily penetrate the soil. The available water capacity is high. Runoff is slow, and excess water is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farm work is commonly delayed in spring unless surface drainage is provided. The response to lime and fertilizer is good. Soybeans and cotton are the main crops. (Capability unit IIw-2; woodland group 2w5)

Loring Series

The Loring series consists of moderately well drained, moderately slowly permeable soils on uplands. These soils formed in a thick mantle of loess. The slope gradient ranges from 1 to 12 percent.

Typically, the surface layer is brown silt loam. The upper part of the subsoil is brown and strong-brown silty clay loam. The middle part is a firm, brittle fragipan of silt loam mottled with shades of brown and gray. The lower part is dark-brown to yellowish-brown, mottled silt loam.

The Loring soils are associated with the moderately well drained Grenada soils, the somewhat poorly drained Calloway soils, and the poorly drained Calhoun soils. They are browner and are better drained than Calloway and Calhoun soils. They have a fragipan, which the Calhoun soils do not have. The Loring soils do not have the light-colored layer of silt loam between the more clayey layers that is typical of the Grenada soils.

Representative profile of Loring silt loam, 3 to 8 percent slopes, in a moist, wooded area in the SW1/4 SE1/4 SE1/4 sec. 9, T. 3 S., R. 2 W.:

Ap--0 to 4 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; medium acid; abrupt, smooth boundary.

B21t--4 to 8 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films on ped faces; plentiful roots; many pores; few, fine and medium, dark-colored concretions; medium acid; clear, smooth boundary.

B22t--8 to 15 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; continuous thin clay films on ped faces and in pores; plentiful roots; common fine pores; few, fine and medium, dark-colored concretions; strongly acid; gradual, smooth boundary.

B23t--15 to 21 inches, brown (10YR 5/3) silty clay loam; few, fine, faint mottles of dark yellowish brown and yellowish brown; moderate, medium, subangular blocky structure; friable; common roots; continuous thin clay films on ped faces and in pores; few, fine and medium, dark-colored concretions; medium acid; clear, smooth boundary.

Bx1--21 to 29 inches, mottled light brownish-gray (10YR 6/2), brown (10YR 5/3), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) silt loam; coarsely polygonal parting to moderate, medium, subangular blocky structure; firm, brittle; silt coatings in seams between polygons; continuous medium clay films on ped faces and in pores; few roots; common pores; few, fine, dark-colored concretions; medium acid; gradual, smooth boundary.

Bx2--29 to 42 inches, mottled light brownish-gray (10YR 6/2), brown (10YR 5/3), yellowish-brown

(10YR 5/6), and dark yellowish-brown (10YR 4/4) silt loam; coarsely polygonal parting to moderate, medium, subangular blocky structure; firm, brittle; silt coatings in seams between polygons; few, thin, patchy clay films on ped faces; common pores; few, fine, soft, dark-colored concretions; medium acid; gradual, wavy boundary.

B3--42 to 72 inches, dark-brown (7.5YR 4/4) silt loam; common, coarse mottles of yellowish-brown (10YR 5/6); pockets of light brownish-gray (10YR 6/2) silt 2 to 4 inches in diameter; massive in place, breaks to weak, fine and medium, subangular blocky structure; friable; common pores; few, fine, dark-colored concretions; strongly acid.

The Ap horizon ranges from dark grayish brown to brown. It is 3 to 8 inches thick. In some profiles there is a B1 horizon of dark-brown, friable silt loam that has moderate, medium, subangular blocky structure. The B2t horizon is dark brown or brown to yellowish brown or strong brown. Depth to the Bx horizon (fragipan) ranges from 20 to 30 inches. This horizon is silty clay loam or silt loam 18 to 36 inches thick. The B3 horizon ranges from dark brown to yellowish brown. Reaction is medium acid or strongly acid throughout the profile.

Loring silt loam, 1 to 3 percent slopes (LoB).--This moderately well drained soil has a surface layer of dark grayish-brown to brown silt loam about 5 inches thick. The uppermost part of the subsoil is dark-brown, brown, strong-brown, or yellowish-brown silty clay loam. The middle part is a firm, brittle fragipan of silt loam or silty clay loam mottled with shades of brown and gray. The fragipan begins at a depth of 20 to 30 inches and is 18 to 36 inches thick. The lowermost part is dark-brown to yellowish-brown, mottled silt loam.

Included with this soil in mapping are small areas of Grenada and Calloway soils.

This soil is medium acid or strongly acid throughout. It is moderate in natural fertility and medium in content of organic matter. Roots and water readily penetrate to the firm, brittle fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. Soybeans and cotton are the main crops. (Capability unit IIe-1, woodland group 3o7)

Loring silt loam, 3 to 8 percent slopes (LoC).--This moderately well drained soil has the profile described as representative of the series. The surface layer is dark grayish-brown to brown silt loam about 4 inches thick. The uppermost part of the subsoil is dark-brown, brown, strong-brown, or yellowish-brown silty clay loam. The middle part is a firm, brittle fragipan of silt loam or silty clay loam mottled with shades of brown and gray. The upper boundary of the fragipan is at a depth of 20 to 30 inches, and the pan is 18 to 36 inches thick. The lowermost part of the subsoil is dark-brown to yellowish-brown, mottled silt loam.

Included with this soil in mapping are a few small areas of Grenada soils and of other Loring soils.

This soil is medium acid to strongly acid throughout. It is moderate in natural fertility and is medium in organic-matter content. Roots and water readily penetrate as far down as the firm, brittle fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is medium to rapid, and erosion is a severe hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. Winter small grain and pasture plants are the main crops. Many areas are woodland consisting of upland hardwoods. (Capability unit IIIe-1; woodland group 3o7)

Loring silt loam, 8 to 12 percent slopes (LoD).--This moderately well drained soil has a surface layer of dark grayish-brown to brown silt loam 3 to 5 inches thick. The uppermost part of the subsoil is dark-brown, brown, strong-brown, or yellowish-brown silty clay loam. The middle part is a firm, brittle fragipan of silt loam or silty clay loam mottled with shades of brown and gray. The upper boundary of the fragipan is at a depth of 20 to 30 inches, and the pan is 18 to 36 inches thick. The lowermost part of the subsoil is dark-brown to yellowish-brown, mottled silt loam.

Included with this soil in mapping are a few small areas of Grenada soils and of other Loring soils.

This soil is medium acid to strongly acid throughout. Natural fertility is moderate, and the organic-matter content is medium. Roots and water readily penetrate to the fragipan, which restricts further penetration. The available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. A few areas are used for winter small grain and pasture, but most of the acreage is woodland consisting of mixed upland hardwoods. (Capability unit IVe-1, woodland group 3o7)

McKamie Series

The McKamie series consists of well-drained, very slowly permeable soils that developed in old alluvium. The slope gradient ranges from 0 to 3 percent.

Typically, the surface layer is brown silt loam. The uppermost part of the subsoil is yellowish-red clay, the middle part is dark-red silty clay, and

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the lowermost part is dark reddish-brown silty clay loam. The underlying material is reddish-brown very fine sandy loam.

The McKamie soils are associated with the well-drained Rilla soils, the somewhat poorly drained Hebert and Portland soils, and the poorly drained Perry soils. They are redder and finer textured in the subsoil than the Hebert and Rilla soils. The McKamie soils are redder than the Perry and Portland soils. They have films of translocated clay on structural aggregates in the subsoil, which the Perry and Portland soils do not have.

Representative profile of McKamie silt loam, 1 to 3 percent slopes, in a moist, wooded area in the NW1/4 SE1/4 SE1/4 sec. 13, T. 4 S., R. 6 W.:

A1--0 to 7 inches, brown (7.5YR 5/4) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; strongly acid; abrupt, smooth boundary.

B21t--7 to 25 inches, yellowish-red (5YR 4/6) clay; moderate, medium, subangular blocky structure; firm, plastic; continuous thick clay films on ped faces and in root channels; common roots; strongly acid; gradual, smooth boundary.

B22t--25 to 35 inches, dark-red (2.5YR 3/6) silty clay; moderate, medium, subangular blocky structure; firm, plastic; continuous thick clay films on ped faces and on lining of root channels; organic stains on some ped faces; few roots; strongly acid; gradual, smooth boundary.

B23t--35 to 69 inches, dark reddish-brown (5YR 3/4) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; common patchy clay films on ped faces; organic stains on some ped faces; few roots; few, fine, dark-colored concretions; neutral; clear, smooth boundary.

IIC--69 to 72 inches, reddish-brown (5YR 4/4) very fine sandy loam; massive; very friable; mildly alkaline.

The A1 horizon is brown or grayish brown. The B21t horizon is silty clay or clay. The B22t horizon is dark-red to dark reddish-brown or reddish-brown silty clay or clay. The B23t horizon is dark reddish-brown or reddish-brown silty clay loam or silty clay. The IIC horizon is reddish-brown or yellowish-red clay loam to very fine sandy loam. Reaction is strongly acid or very strongly acid in the A horizon and the upper part of the B horizon and is medium acid to mildly alkaline in the lower part of the B horizon and in the IIC horizon.

The McKamie soils in Arkansas County have no cracks within a depth of 20 inches and no slickensides and are therefore outside the range defined for the McKamie series, but these differences do not alter their behavior and usefulness, and a new series is not warranted.

McKamie silt loam, 0 to 1 percent slopes (MkA).--This soil has a surface layer of brown or grayish-brown silt loam about 7 inches thick. The subsoil is dark-red, red, yellowish-red, dark reddish-brown, or reddish-brown silty clay or clay over dark reddish-brown or reddish brown silty clay loam or silty clay. The underlying material is reddish-brown or yellowish-red clay loam to fine sandy loam.

Included with this soil in mapping are spots of Portland, Hebert, and Perry soils.

This soil is strongly acid or very strongly acid in the surface layer and the upper part of the subsoil. It is medium acid to mildly alkaline in the lower part of the subsoil and the underlying material. Natural fertility is moderate, and the organic-matter content is medium. Roots and water penetrate this soil very slowly. The available water capacity is moderate. Runoff is slow, and excess surface water is a moderate to severe hazard.

This soil is somewhat difficult to till because the plastic, clayey subsoil material is near the surface. Farming operations are commonly delayed unless surface drainage has been provided. The response to lime and fertilizer is good. Rice and soybeans are the main crops. This soil is fairly well suited to irrigation, but land smoothing should be kept to the minimum because the loamy surface layer is thin. A surface drainage system should be installed before this soil is irrigated. (Capability unit IIIw-2; woodland group 3c8)

McKamie silt loam, 1 to 3 percent slopes (MkB).--This soil occurs mainly as narrow strips between areas of other soils. It has the profile described as representative of the series. The surface layer is brown or grayish-brown silt loam about 7 inches thick. The subsoil is dark-red, red, yellowish-red, dark reddish-brown, or reddish-brown silty clay or clay over dark reddish-brown or reddish-brown silty clay loam or silty clay. The underlying material is reddish-brown to yellowish-red clay loam to fine sandy loam.

Included with this soil in mapping are a few spots of Rilla and Stuttgart soils. Also included are areas of soils that are mottled in the subsoil.

This soil is strongly acid or very strongly acid in the surface layer and the upper part of the subsoil. The lower part of the subsoil and the underlying material is medium acid to mildly alkaline. Natural fertility is moderate, and the organic-matter content is medium. Roots and water move very slowly into the soil. The available water capacity is moderate to high. Runoff is medium to rapid, and the hazard of erosion is severe.

This soil is somewhat difficult to till because the plastic, clayey subsoil is near the surface. The response to lime and fertilizer is good. Most of the acreage is pastured, but a few areas are used for winter small grain and soybeans. (Capability unit IIIe-2; woodland group 3c8)

Miller Series

The Miller series consists of level, moderately well drained to well drained, very slowly permeable soils. These soils developed in thick beds of clayey sediments deposited by the Arkansas River.

In most cultivated areas the surface layer and the subsoil are dark reddish-brown silty clay. The underlying material is reddish-brown silt loam.

The Miller soils are associated with the well-drained Norwood soils, the poorly drained Perry soils, and the somewhat poorly drained Portland soils. Miller soils are finer textured and less stratified than Norwood soils. They are better drained, redder, and more alkaline and calcareous than the Perry and Portland soils, and they are less clayey in the subsoil.

Representative profile of Miller silty clay in a moist, cultivated area approximately 400 feet north of Dumond Lake in the southwestern part of Land Grant 2401 that adjoins sec. 19, T. 8 S., R. 2 W.:

Ap--0 to 7 inches, dark reddish-brown (5YR 3/2) silty clay; fine and medium, moderate, subangular blocky structure; firm, plastic; few roots; few fine pores; mildly alkaline and calcareous; abrupt, smooth boundary.
B2--7 to 45 inches, dark reddish-brown (5YR 3/2) silty clay; moderate, medium, angular blocky structure; firm, plastic; common slickensides that do not intersect; few roots; common fine and medium pores; few worm holes; mildly alkaline and calcareous; gradual, smooth boundary.
IIC1--45 to 55 inches, reddish-brown (5YR 4/3) silt loam; massive; very friable; few roots; common pores; few, fine, dark-colored concretions; moderately alkaline and calcareous; diffuse boundary.
IIC2--55 to 72 inches, reddish-brown (5YR 4/4) silt loam; massive; very friable; few pores; moderately alkaline and calcareous.

The B2 horizon is clay or silty clay, the IIC1 horizon is silt loam or silty clay loam, and the IIC2 horizon is silt loam, very fine sandy loam, or loam.

Miller silty clay (Mr).--This level, moderately well drained to well drained soil has a surface layer of dark reddish-brown silty clay about 7 inches thick. The subsoil is dark reddish-brown silty clay or clay to a depth of about 45 inches. Below this is reddish-brown silt loam, silty clay loam, loam, or fine sandy loam.

Included with this soil in mapping are a few spots of Norwood soils.

This soil is mildly alkaline in the surface layer and subsoil and is moderately alkaline in the underlying material. It is calcareous throughout. Natural fertility is high, and the organic-matter content is medium to high. This soil contracts and cracks when dry and expands and seals over when wet. Water moves into this soil rapidly until the cracks seal over, and then it enters very slowly. The available water capacity is high. Runoff is slow, and excess water is a moderate hazard.

This soil is difficult to till, and it can be tilled only within a narrow range of moisture content. If plowed when wet, the surface layer forms hard clods. Farming operations commonly have to be delayed for several days after a rain unless surface drains are provided. The response to fertilizer is good. Cotton, soybeans, and winter small grain are the main crops. (Capability unit IIw-3; woodland group 2w5)

Norwood Series

The Norwood series consists of level to gently undulating, well-drained, moderately permeable soils. These soils developed in stratified, young alluvium deposited by the Arkansas River.

In most wooded areas the surface layer is reddish-brown silt loam. Below this is dark reddish-brown and reddish-brown, thinly stratified silt loam and silty clay loam.

The Norwood soils are associated with the moderately well drained and well drained Miller soils and the poorly drained Perry soils. They are better drained, more stratified, and coarser textured than the Miller and Perry soils. They are redder than Perry soils.

Representative profile of Norwood silt loam in a moist, wooded area in the SE1/4 NE1/4 SE1/4 sec. 30, T. 8 S., R. 2 W.:

O1--1/2 inch to 0, partly decomposed forest litter.
A1--0 to 8 inches, reddish-brown (5YR 4/4) silt loam; massive; many bedding planes; very friable; common roots; moderately alkaline and calcareous; clear, smooth boundary.
C1--8 to 33 inches, dark reddish-brown (5YR 3/3) silty clay loam; massive; many bedding planes; few lenses of very fine sandy loam; friable; few roots; common fine pores; mildly alkaline and calcareous; clear, smooth boundary.
C2--33 to 52 inches, dark reddish-brown (5YR 3/4) silt loam; massive; many bedding planes; very friable; few roots; common pores; few, fine, dark-colored concretions; mildly alkaline and calcareous; clear, smooth boundary.
C3--52 to 72 inches, reddish-brown (5YR 4/4) silt loam; massive; many bedding planes; very friable; few roots; mildly alkaline and calcareous.

The A1 horizon is dark reddish-brown or reddish-brown silt loam or silty clay loam. The C horizon is dark reddish-brown or reddish-brown silt loam, silty clay loam, or very fine sandy loam in subhorizons that vary in thickness and order. All of the horizons, except the Ap, have common to many bedding planes and few to common thin lenses of silty clay,

clay loam, very fine sandy loam, or loam. Reaction is mildly alkaline or moderately alkaline throughout the profile. In cultivated areas an Ap horizon occurs that is similar to the A1 horizon described, and it has moderate, medium, granular structure.

Norwood silt loam (No).--This level, well-drained soil has the profile described as representative of the series. It has a surface layer of reddish-brown or dark reddish-brown silt loam about 8 inches thick. Below this is dark reddish-brown and reddish-brown, thinly stratified silt loam, silty clay loam, or very fine sandy loam.

Included with this soil in mapping are a few spots of Norwood silty clay loam and of Miller soils.

This soil is mildly alkaline to moderately alkaline and is calcareous throughout. It is high in natural fertility and medium to low in organic-matter content. It is readily permeable to roots and water. Runoff is slow, and the available water capacity is high.

This soil is easy to keep in good tilth, and it can be tilled throughout a wide range of moisture content. The main crops are soybeans and cotton. (Capability unit I-1; woodland group 1o4)

Norwood silty clay loam, gently undulating (NrU).--This soil occupies low, parallel ridges and swales. The ridges are 1 to 4 feet high, 100 to 300 feet wide, and 1/8 to 1/2 mile long. Between the ridges are swales 25 to 100 feet wide. The surface layer is reddish-brown or dark reddish-brown silty clay loam 4 to 8 inches thick. The underlying material is dark reddish-brown and reddish-brown, thinly stratified silt loam, silty clay loam, or very fine sandy loam.

Included with this soil in mapping are a few spots of Norwood silt loam and of Miller soils.

This soil is mildly alkaline to moderately alkaline and is calcareous throughout. Natural fertility is high, and the organic-matter content is medium to low. This soil is readily penetrated by roots and water. Runoff is slow, and the available water capacity is high.

This soil is somewhat difficult to till. It can be cultivated only within a narrow range of moisture content. Water accumulates in the swales after a rain and delays farming operations. Soybeans and cotton are the main crops. (Capability unit IIs-1; woodland group 1o4)

Perry Series

The Perry series consists of level, poorly drained, very slowly permeable soils. These soils developed in thick beds of clayey sediments.

In most wooded areas the surface layer is gray, mottled silty clay and the subsoil is gray, mottled clay. The underlying material is dark-red clay or silty clay and dark reddish-brown silty clay loam.

The Perry soils are associated with the somewhat poorly drained Portland and Hebert soils and the well-drained Rilla soils. They are more poorly drained and grayer than the Hebert, Portland, and Rilla soils. Perry soils are finer textured throughout than Hebert and Rilla soils.

Representative profile of Perry silty clay in a moist, wooded area in the NW1/4 NE1/4 NW1/4 sec. 2, T. 3 S., R. 6 W.:

O1--1 inch to 0, thin litter of partly decomposed hardwood twigs and leaves.

A1--0 to 13 inches, gray (10YR 5/1) silty clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); massive, parting to subangular blocky fragments when dry; firm, plastic; plentiful roots; few, fine, dark-colored concretions; strongly acid; gradual, wavy boundary.

B21g--13 to 22 inches, gray (10YR 6/1) clay; common, fine, distinct mottles of dark yellowish brown and yellowish brown; massive, parting to angular and subangular blocky fragments when dry; firm, plastic; common slickensides; few roots; few pores; few, fine, dark-colored concretions; strongly acid; gradual, smooth boundary.

B22g--22 to 37 inches, gray (10YR 6/1) clay; common, fine, distinct mottles of yellowish brown and strong brown; massive, parting to angular and subangular blocky fragments when dry; firm, plastic; common slickensides; few, fine, dark-colored concretions; few roots; few pores; strongly acid; clear, wavy boundary.

IIC1--37 to 50 inches, dark-red (2.5YR 3/6) silty clay; massive, parting to angular and subangular blocky fragments when dry; firm, plastic; few roots; many slickensides; few pores; common dark-colored concretions; medium acid; gradual, wavy boundary.

IIC2--50 to 72 inches, dark reddish-brown (5YR 3/4) silty clay loam; massive; firm, plastic; few roots; common dark-colored concretions; slightly acid.

The A1 horizon is gray or dark gray. The IIC1 horizon is dark-red or dark reddish-brown clay or silty clay. The IIC2 horizon is dark reddish-brown or reddish-brown silty clay or silty clay loam. The reaction is medium acid or strongly acid in the A and B horizons, medium acid to neutral in the IIC1 horizon, and slightly acid or neutral in the IIC2 horizon.

The Perry soils in Arkansas County are noncalcareous in the C horizon and are therefore outside the range defined for the Perry series, but this difference does not alter their behavior and usefulness, and a new series is not warranted.

Perry silty clay (Pe).--This level, poorly drained soil has a surface layer of gray or dark-gray silty clay about 13 inches thick. The subsoil

is gray, mottled clay. The underlying material is dark-red or dark reddish-brown clay or silty clay, grading to dark reddish-brown or reddish-brown silty clay or silty clay loam below a depth of 50 inches.

Included with this soil in mapping are a few spots of Portland and Hebert soils.

This soil is medium acid or strongly acid in the surface layer and the subsoil and medium acid to neutral below. Natural fertility is moderate to high, and the organic-matter content is medium. This soil contracts and cracks when dry and expands and seals over when wet. Water moves into this soil rapidly until the cracks seal over, and then it enters very slowly. Roots penetrate the soil very slowly. The available water capacity is high. Runoff is slow to ponded, and excess water is a severe or very severe hazard.

This soil is difficult to till and can be tilled only within a narrow range of moisture content. If plowed when wet, the surface layer forms hard clods. Farming operations frequently have to be delayed after a rain unless surface drainage has been provided. This soil is suited to irrigation, but no irrigating should be done unless a drainage system is installed. The main crops are rice and soybeans. Some areas are subject to frequent flooding. (Capability unit IIIw-2 and woodland group 2w6; if frequently flooded, capability unit Vw-1 and woodland group 3w6)

Portland Series

The Portland series consists of level, somewhat poorly drained, very slowly permeable soils. These soils developed in thick beds of sediments deposited by slack water.

In most wooded areas the surface layer is black silty clay loam. The subsoil is reddish-brown, mottled clay in the upper part and dark reddish-brown clay in the lower part. The underlying material is dark reddish-brown clay and silty clay.

The Portland soils are associated with the somewhat poorly drained Hebert soils, the poorly drained Perry soils, and the well-drained Rilla soils. They are finer textured throughout than the Hebert and Rilla soils and are more poorly drained and grayer than the Rilla soils. Portland soils are redder and better drained than Perry soils.

Representative profile of Portland silty clay loam in a moist, wooded area in the NW1/4 NE1/4 NE1/4 sec. 2, T. 3 S., R. 6 W.:

O1--1 inch to 0, litter of partly decomposed hardwood leaves and twigs.
A1--0 to 4 inches, black (10YR 2/1) silty clay loam; moderate, fine, subangular blocky structure; firm, plastic; plentiful roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.
B21--4 to 12 inches, reddish-brown (5YR 4/4) clay; common, prominent, medium mottles of grayish brown (10YR 5/2); moderate, medium, angular blocky structure; firm, plastic; few slickensides; plentiful roots; few pores; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.
B22--12 to 27 inches, reddish-brown (5YR 5/4) clay; common, medium, prominent mottles of grayish brown (10YR 5/2); moderate, medium, angular blocky structure; firm, plastic; common slickensides; common roots; few, fine, dark-colored concretions; strongly acid; clear, smooth boundary.
B23--27 to 40 inches, dark reddish-brown (5YR 3/3) clay; weak, medium, angular blocky structure; firm, plastic; common slickensides; few roots; few, fine, dark-colored concretions; medium acid; diffuse boundary.
C1--40 to 60 inches, dark reddish-brown (5YR 3/4) clay; massive; firm, plastic; common slickensides; few, fine, dark-colored concretions; slightly acid; gradual, smooth boundary.
C2--60 to 72 inches, dark reddish-brown (5YR 3/4) silty clay; massive; firm, plastic; mildly alkaline and calcareous.

The A1 horizon is black, very dark gray, or dark gray, and the Ap horizon is very dark gray or dark gray. The C horizon is clay or silty clay. The reaction is strongly acid to slightly acid in the A horizon, strongly acid or medium acid in the B horizon, and slightly acid to mildly alkaline and calcareous in the C horizon.

The Portland soils in Arkansas County are noncalcareous within the upper 40 inches and are therefore outside the defined range for the Portland series, but this difference does not alter their behavior and usefulness, and a new series is not warranted.

Portland silty clay loam (Po).--This level, somewhat poorly drained soil has a surface layer of black to dark-gray silty clay loam about 4 inches thick. The upper part of the subsoil is reddish-brown and grayish-brown, mottled clay, and the lower part is dark reddish-brown clay. Below this is dark reddish-brown clay or silty clay.

Included with this soil in mapping are spots of Perry and Hebert soils and a few areas of soils that have a surface layer of silt loam or clay.

This soil is strongly acid to slightly acid in the surface layer and strongly acid or medium acid in the subsoil. The material below is slightly acid to mildly alkaline and calcareous. Natural fertility is high, and the organic-matter content is medium. This soil contracts and cracks when dry and expands and seals over when wet. Water moves into this soil rapidly until the cracks seal over, and then it enters very slowly. The available water capacity is high. Runoff is slow or very slow, and excess water is a severe hazard.

This soil is somewhat difficult to till and it can be tilled only within a narrow range of moisture content. Farm work frequently has to be delayed

after a rain unless surface drainage has been provided. This soil is suited to irrigation, but no irrigating should be done unless a drainage system is installed. Frequent flooding, a hazard in some areas, severely limits use of the soil for crops. (Capability unit IIIw-2 and woodland group 2w6; if frequently flooded, capability unit Vw-1 and woodland group 3w6)

Rilla Series

The Rilla series consists of level, well-drained, moderately slowly permeable soils. These soils developed in loamy alluvium on natural levees.

In most cultivated areas the surface layer is brown to dark-brown silt loam. The upper part of the subsoil is brown and light reddish-brown silt loam, the middle part is reddish-brown silty clay loam, and the lower part is reddish-brown silt loam.

The Rilla soils are associated with the somewhat poorly drained Hebert and Portland soils, the poorly drained Perry soils, and the well-drained McKamie soils. They are redder and better drained than Hebert, Perry, and Portland soils. They have a coarser textured subsoil than McKamie, Perry, and Portland soils.

Representative profile of Rilla silt loam in a moist, cultivated area in the SW1/4 SW1/4 SW1/4 sec. 16, T. 5 S., R. 5 W.:

Ap--0 to 7 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; very friable; plentiful roots; few, fine, dark-colored concretions; neutral; abrupt, smooth boundary.

A12--7 to 12 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, subangular blocky structure; very friable; plentiful roots; few, fine, dark-colored concretions; slightly acid; clear, smooth boundary.

B11--12 to 22 inches, brown (7.5YR 5/4) silt loam; weak, fine, subangular blocky structure; very friable; plentiful roots; common pores; few, fine, dark-colored concretions; very strongly acid; clear, smooth boundary.

B12--22 to 32 inches, light reddish-brown (5YR 6/4) silt loam; weak, fine, subangular blocky structure; very friable; few roots; common pores; few, fine, dark-colored concretions; very strongly acid; abrupt, smooth boundary.

B2t--32 to 53 inches, reddish-brown (5YR 4/4) silty clay loam; moderate, medium and coarse, subangular blocky structure; firm; continuous thin clay films on ped faces, in pores, and in root channels; silt coatings on major ped faces; few roots; common pores; few, fine, dark-colored concretions; very strongly acid; gradual, wavy boundary.

B3--53 to 72 inches, reddish-brown (5YR 5/4) silt loam; weak, fine, subangular blocky structure; very friable; few roots; few pores; strongly acid.

The Ap horizon is dark grayish brown to brown. The A12 horizon is dark brown or brown. Some profiles lack an A12 horizon. The B1 horizon is silt loam or very fine sandy loam. The B11 horizon is brown or dark brown, and, where present, the B12 horizon ranges from light reddish brown to brown. The B2t horizon is reddish brown or dark reddish brown. The B3 horizon is reddish-brown to red silt loam, fine sandy loam, or silty clay loam. Depth to the B3 horizon ranges from 3 to 5 feet but averages 4 1/2 feet. The reaction ranges from neutral to medium acid in the A horizon, very strongly acid to medium acid in the B1 and B2t horizons, and strongly acid to neutral in the B3 horizon.

Rilla silt loam (Rs).--This level soil has a dark grayish-brown or dark-brown to brown surface layer about 12 inches thick. The uppermost part of the subsoil is light reddish-brown to brown or dark-brown silt loam or very fine sandy loam. The middle part is reddish-brown or dark reddish-brown silty clay loam. The lowermost part is reddish-brown to red fine sandy loam to silty clay loam.

Included with this soil in mapping are spots of Hebert and McKamie soils, a few undulating areas, and a few narrow strips of soils that have slopes of as much as 6 percent.

This soil is medium acid to neutral in the surface layer and very strongly acid to medium acid in the subsoil. It is moderate in natural fertility and is medium to low in organic-matter content. Water and roots readily penetrate the soil. Runoff is slow, and the available water capacity is high.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. It warms up early in spring. The response to lime and fertilizer is good. This soil is well suited to cotton, soybeans, winter small grain, and other commonly grown crops. (Capability unit I-1; woodland group 2o4)

Sharkey Series

The Sharkey series consists of level, poorly drained, very slowly permeable soils on the flood plain of the White River. These soils developed in thick beds of clay deposited by slack water.

In most cultivated areas the surface layer is very dark grayish-brown and very dark gray clay that is mottled in the lower part. The subsoil is dark-gray or gray, mottled clay. The underlying material is gray, mottled clay.

The Sharkey soils are associated with the somewhat poorly drained Acadia soils. They are grayer and finer textured throughout than those soils.

Representative profile of Sharkey clay in a moist, cultivated area in the NE1/4 NW1/4 SW1/4 sec. 31, T. 6 S, R. 1 W.:

Ap--0 to 5 inches, very dark grayish-brown (10YR 3/2) clay; weak, fine, subangular blocky structure; firm, plastic; plentiful roots; few, fine, dark-colored concretions; slightly acid; clear, smooth boundary.

A12--5 to 9 inches, very dark gray (10YR 3/1) clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); massive; firm, plastic; plentiful roots; few, fine, dark-colored concretions; slightly acid; clear, wavy boundary.

B21g--9 to 18 inches, dark-gray (10YR 4/1) clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); massive; firm, plastic; common slickensides; plentiful roots; neutral; clear, wavy boundary.

B22g--18 to 53 inches, gray (10YR 5/1) clay; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); massive; firm; common slickensides; common roots; mildly alkaline; gradual, wavy boundary.

Cg--53 to 72 inches, gray (10YR 5/1) clay; few, fine, distinct mottles of yellowish brown; massive; firm, plastic; many slickensides; few roots; mildly alkaline.

The Ap horizon is very dark grayish brown, very dark gray, or dark gray. The B2g horizon is dark gray or gray and has few to common yellowish-brown or dark yellowish-brown mottles. The reaction is slightly acid to mildly alkaline in the A horizon and neutral to mildly alkaline in the B and C horizons.

Sharkey clay (Sh).--This level soil is along the White River, mainly within the White River National Wildlife Refuge. It is subject to frequent flooding. The surface layer is very dark grayish-brown, very dark gray, or dark-gray clay about 9 inches thick. It is mottled in the lower part. The subsoil is gray or dark-gray, mottled clay. Below this is gray, mottled clay.

Included with this soil in mapping are a few spots of Acadia soils.

This soil is slightly acid to mildly alkaline in the surface layer and neutral or mildly alkaline below. Natural fertility is high, and the organic-matter content is medium to high. The soil contracts and cracks when dry and expands and seals over when wet. Water moves into this soil rapidly until the cracks seal over, and then it enters very slowly. The available water capacity is high. Runoff is slow to ponded, and excess water is a very severe hazard.

This soil is flooded so frequently that it is not suitable for any regular use except timber production and wildlife habitat. It is difficult to till and can be cultivated only within a narrow range of moisture content. Most of the acreage is woodland. (Capability unit Vw-1; woodland group 3w6)

Stuttgart Series

The Stuttgart series consists of somewhat poorly drained to moderately well drained, slowly permeable soils on broad flats. The slope gradient ranges from 0 to 8 percent.

In most cultivated areas the upper part of the surface layer is dark grayish-brown, mottled silt loam, and the lower part is dark yellowish-brown silt loam. The subsurface layer is brown and yellowish-brown, mottled silt loam. The upper part of the subsoil is mottled red, brown, and gray silty clay loam, and the lower part is mottled brown and gray silty clay loam. The lower part of the subsoil has a moderately high sodium content.

The Stuttgart soils are associated with the poorly drained Amagon, Calhoun, and Crowley soils and the moderately well drained Grenada soils. Stuttgart soils are better drained and browner throughout than the Amagon, Calhoun, and Crowley soils. They have a claypan instead of the fragipan that is typical of Grenada soils. They differ from all of the associated soils in having a moderately high content of sodium in the lower part of the subsoil.

Representative profile of Stuttgart silt loam, 0 to 1 percent slopes, in a moist, cultivated area in the SW1/4 SE1/4 SE1/4 sec. 5, T. 2 S., R. 5 W.:

Ap--0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, faint mottles of grayish brown (10YR 5/2); weak, medium, granular structure; friable; many fine roots; few, fine, dark-colored concretions; neutral; gradual, smooth boundary.

A12--5 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; few, fine, faint mottles of dark brown; weak, medium, subangular blocky structure; friable; many fine roots; many fine pores; few, fine, dark-colored concretions; medium acid; gradual, smooth boundary.

A21--10 to 16 inches, brown (10YR 5/3) silt loam; common, medium, faint mottles of dark brown (10YR 4/3); weak, medium, subangular blocky structure; friable; common fine roots; many fine pores; strongly acid; gradual, smooth boundary.

A22--16 to 23 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint mottles of grayish brown (10YR 5/2); moderate, medium, subangular blocky structure; friable; common fine roots; common fine pores; common, fine, dark-colored concretions; medium acid; abrupt, smooth boundary.

B21t--23 to 31 inches, mottled, reddish-brown (2.5YR 4/4) and grayish-brown (10YR 5/2) silty clay loam; moderate, medium, subangular blocky structure; very firm; continuous clay films in pores and on peds; few fine roots; few fine pores; common, fine, dark-colored concretions; medium acid; gradual, smooth boundary.

B22t--31 to 38 inches, mottled grayish-brown (10YR 5/2), pale-brown (10YR 6/3), and strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; common, medium, patchy clay films in pores and on peds; few roots; few fine pores; many, fine, dark-colored concretions; medium acid; gradual, smooth boundary.

B23t--38 to 45 inches, mottled, light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm; common, thin, patchy clay films on peds and in pores; few fine pores; common, medium, dark-colored concretions; slightly acid; gradual, wavy boundary.

B24t--45 to 60 inches, mottled, gray (10YR 5/1), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/6) silty clay loam; weak, fine, subangular blocky structure; firm; common, thin, patchy clay films on peds; many, fine and medium, dark-colored concretions; slightly acid.

The Ap horizon is dark grayish brown, grayish brown, or dark gray, and the A12 horizon is dark yellowish brown or yellowish brown. The A21 horizon is brown, yellowish brown, or light yellowish brown. The A22 horizon has common, medium, prominent mottles of yellowish red in some profiles. The B21t and B22t horizons are silty clay loam or silty clay, the B23t is silt loam or silty clay loam, and the B24t is silt loam or silty clay loam. The reaction is strongly acid to neutral in the A horizon and is medium acid or slightly acid in the B horizon.

Stuttgart silt loam, 0 to 1 percent slopes (StA).--This level, somewhat poorly drained soil is on broad flats. It has the profile described as representative of the series. The surface layer is about 5 inches of dark grayish-brown, grayish-brown, or dark-gray silt loam over about 5 inches of dark yellowish-brown or yellowish-brown silt loam. The subsurface layer, about 13 inches thick, is brown to light yellowish-brown, mottled silt loam. The upper part of the subsoil is mottled red and gray silty clay loam or silty clay, and the lower part is mottled brown and gray silt loam or silty clay loam.

Included with this soil in mapping are a few spots of Crowley and Amagon soils.

This soil is strongly acid to neutral in the surface and subsurface layers and medium acid or slightly acid in the subsoil. Natural fertility is moderate, and the organic-matter content is medium. The lower layers have a moderately high content of sodium. The surface layer is readily permeable to roots and water, but the firm, clayey subsoil restricts the growth of roots and the movement of water. The available water capacity is moderate. Runoff is slow, and excess water is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. Farm work commonly has to be delayed after a rain unless surface drains have been provided. The response to lime and fertilizer is good. If leveling is necessary, the depth to the concentration of sodium should be determined before cuts are made. Productivity is impaired if sodium is too near the surface. Land smoothing facilitates management of irrigation water. The main crops are rice and soybeans. Cotton and lespedeza are grown in some areas. (Capability unit IIw-1; woodland group 3w8)

Stuttgart silt loam, 1 to 3 percent slopes (StB).--This moderately well drained soil is on low ridges on the broad flats in the Grand Prairie area of the county. The surface layer is dark grayish-brown, grayish-brown, or dark-gray silt loam about 5 inches thick over about 5 inches of dark yellowish-brown or yellowish-brown silt loam. The subsurface layer, about 13 inches thick, is brown to light yellowish-brown, mottled silt loam. The upper part of the subsoil is mottled red and gray silty clay loam or silty clay. The lower part is mottled brown and gray silt loam or silty clay loam.

Included with this soil in mapping are a few spots of Crowley soils and of other Stuttgart soils.

This soil is strongly acid to neutral in the surface and subsurface layers and medium acid or slightly acid in the subsoil. Natural fertility is moderate, and the organic-matter content is medium. The lower layers have a moderately high content of sodium. The surface layer is readily permeable to roots and water, but the firm, clayey subsoil restricts the growth of roots and the movement of water. The available water capacity is moderate. Runoff is slow to medium, and erosion is a moderate hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. If leveling is necessary, the depth to the concentration of sodium should be determined before cuts are made; productivity will be impaired if sodium is too near the surface. The main crops are soybeans and rice. Cotton, lespedeza, and winter small grain are grown in some areas. (Capability unit IIe-1; woodland group 3o7)

Stuttgart silt loam, 3 to 8 percent slopes (StC).--This moderately well drained soil occurs mainly as small strips on breaks between the broad, level Grand Prairie area and the lower-lying alluvial soils. In many areas the slope is no more than 6 percent. The surface layer is dark grayish-brown or grayish-brown silt loam about 5 inches thick. The subsurface layer is about 12 inches thick and is brown to light yellowish-brown, mottled silt loam. The upper part of the subsoil is mottled red and gray silty clay loam or silty clay. The lower part is mottled brown and gray silt loam or silty clay loam.

Included with this soil in mapping are a few spots of Grenada soils and of other Stuttgart soils.

This soil is strongly acid or medium acid in the surface and subsurface layers and is medium acid or slightly acid in the subsoil. Natural fertility is moderate, and the organic-matter content is medium to low. The lower layers have a moderately high content of sodium. The surface layer is readily permeable to roots and water, but the firm, clayey subsoil restricts the growth of roots and the movement of water. The available water capacity is moderate. Runoff is medium to rapid, and erosion is a severe hazard.

This soil is easy to keep in good tilth and can be tilled throughout a wide range of moisture content. The response to lime and fertilizer is good. Winter small grain and pasture are the main crops. (Capability unit IIIe-1; woodland group 3o7)

Tichnor Series

The Tichnor series consists of level, poorly drained, slowly permeable soils, mainly along drainageways in the Grand Prairie area of the county. These soils developed in loamy, local alluvium.

In most cultivated areas the surface layer is dark grayish-brown, mottled silt loam, and the subsurface layer is gray, mottled silt loam. The upper part of the subsoil is light-gray, mottled silty clay loam, and the lower part is gray, mottled silt loam.

The Tichnor soils are associated with the somewhat poorly drained Falaya soils. They are more poorly drained and grayer than Falaya soils and are more clayey in the lower horizons. They have an accumulation of translocated clay in the subsoil that the Falaya soils do not have.

Representative profile of Tichnor silt loam in a moist, cultivated area in the NW1/4 NW1/4 SW1/4 sec. 28, T. 4 S., R. 3 W.:

Ap--0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, distinct mottles of yellowish brown (10YR 5/4); weak, fine, granular structure; friable; common roots; few, fine, dark-colored concretions; strongly acid; abrupt, smooth boundary.

A2g--5 to 36 inches, gray (10YR 6/1) silt loam; common, medium, distinct mottles of brown (10YR 5/3) and yellowish brown (10YR 5/6); weak, fine, subangular blocky structure; friable; common roots; common, fine, dark-colored concretions; strongly acid; clear, smooth boundary.

B2tg--36 to 50 inches, light-gray (10YR 7/1) silty clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; firm; common, thin, patchy clay films; few roots; few pores; few, fine, dark-colored concretions; strongly acid; gradual, smooth boundary.

B3g--50 to 72 inches, gray (10YR 5/1) silt loam; few, medium, distinct mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure; friable; few, thin, patchy clay films; common pores; common, fine, dark-colored concretions; strongly acid.

The A horizon is gray, grayish brown to dark gray, or dark grayish brown. The B2tg horizon is light-gray or gray silt loam or silty clay loam. The B3g horizon is silt loam or silty clay loam. The reaction is very strongly acid or strongly acid throughout the profile.

Tichnor silt loam (Tc).--Most areas of this level soil are along local streams and are frequently flooded. The surface layer is gray to dark grayish-brown, mottled silt loam about 5 inches thick. The subsurface layer is gray, mottled silt loam, and the subsoil is gray or light-gray silt loam or silty clay loam.

Included with this soil in mapping are a few small areas of Falaya soils.

This soil is strongly acid or very strongly acid. Natural fertility is moderate to high, and the content of organic matter is medium. Roots and water readily penetrate the soil. The available water capacity is high. Runoff is slow or ponded, and excess water is a severe or very severe hazard.

This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Farm work is usually delayed unless surface drainage is provided. The response to lime and fertilizer is good. Most areas are wooded, but some have been cleared and are used for rice and soybeans. A number of reservoirs have been built. The hazard of frequent flooding in some areas severely limits use of the soils for crops. (Capability unit IIIw-3, Vw-1 if frequently flooded; woodland group 2w6)

The principal crops grown in Arkansas County are soybeans and rice, but other important crops are cotton, annual lespedeza for seed, oats, wheat, and forage crops.

The response to lime and fertilizer is good on almost all except calcareous soils, for example, Miller and Norwood soils. On these soils there probably would be no response to applications of lime. The amount and kind of fertilizer to be applied should be based on the results of soil tests and the needs of the crop to be grown.

The system of capability grouping used by the Soil Conservation Service is explained in this section. The management of the soils of Arkansas County by capability units is also described. Table 2 gives predicted yields of the major crops and pasture plants grown in the county.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are 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 forest trees, or for engineering.

In the capability system, all kinds of soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed 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, defined as follows:

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat. (No class VI soils in Arkansas County.)

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat. (No class VII soils in Arkansas County.)

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

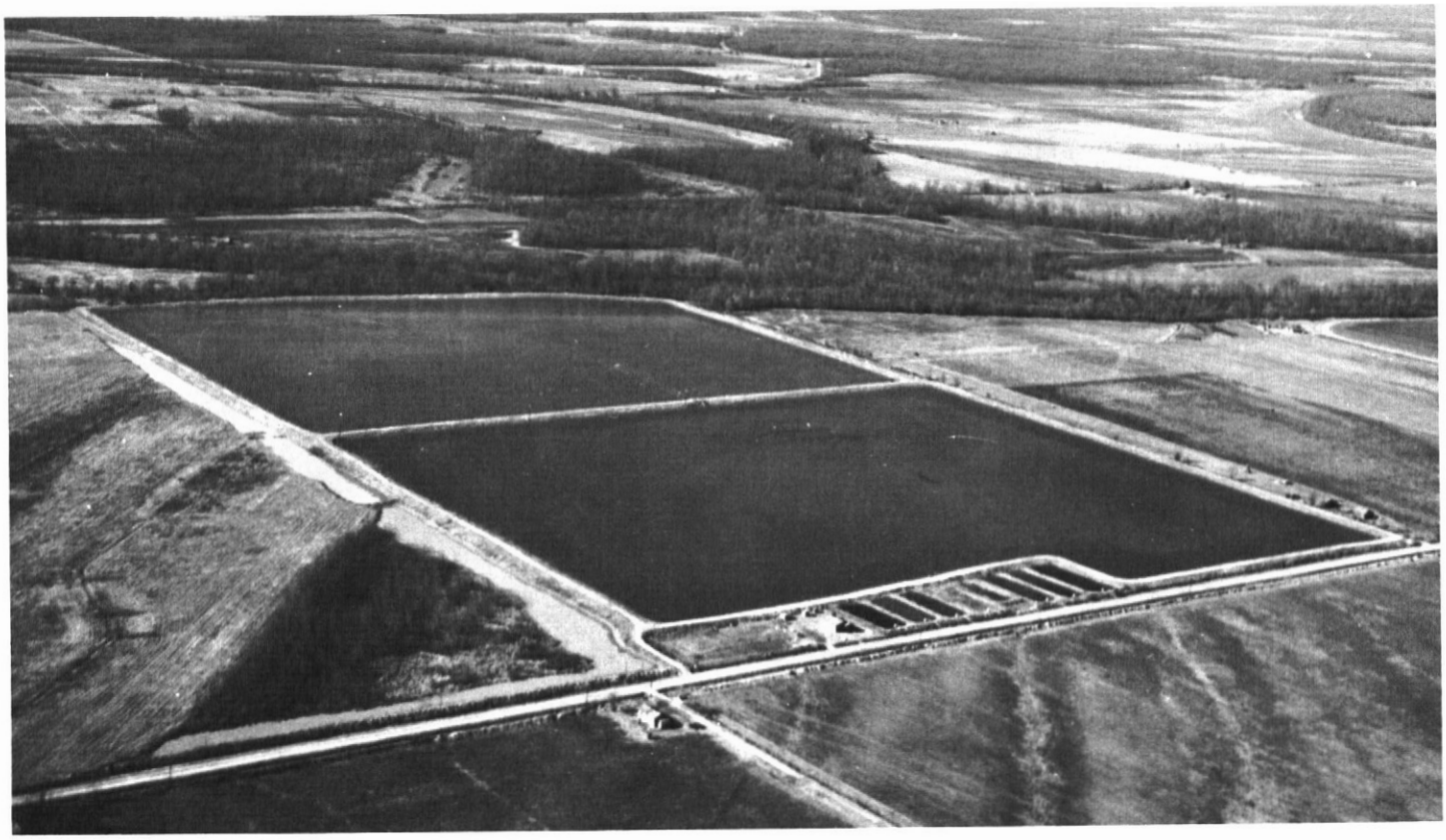
CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil 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 habitat, 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 Arkansas County are described and suggestions for the use and management of the soils are given.

Oats on Calhoun silt loam.



Fish ponds and reservoirs in Perry silty clay.

Management by Capability Units[1/]

In the following pages each of the capability units in Arkansas County is described, and suggestions for the use and management of the soils in each unit are given. The capability unit designation for each soil in the county is given in the "Guide to Mapping Units" at the back of this survey.

Capability Unit I-1

This unit consists of well-drained soils on bottom land. These soils have a surface layer of silt loam. Below this the soil material is predominantly silt loam or silty clay loam.

Permeability is moderately slow or moderate, and the available water capacity is high. The content of organic matter is medium to low. Natural fertility is moderate to high. Reaction ranges from very strongly acid to moderately alkaline in the root zone.

These soils are suited to okra, green beans, lima beans, tomatoes, strawberries, and other truck crops. They are suited also to cotton, soybeans, corn, oats, and wheat. Dallisgrass, bahiagrass, bermudagrass, and tall fescue are suitable grasses. Vetch, crimson clover, white clover, lespedeza, and Austrian winter peas are suitable legumes.

If properly fertilized and tilled, these soils can be used year after year for cultivated crops that leave large amounts of residue. They are suitable for irrigation.

Capability Unit IIe-1

This unit consists of moderately well drained, nearly level, upland soils. The surface layer and the subsurface layer are silt loam. Below this is silty clay loam to silty clay over silty clay loam to silt loam. Some of the soils in this unit have a firm, brittle fragipan in the subsoil, and others have a claypan.

Permeability is moderately slow or slow, and the available water capacity is moderate. The organic-matter content is low to medium. Natural fertility is moderate. Reaction is neutral to very strongly acid in the surface layer and very strongly acid to slightly acid below.

These soils are suited to green beans, lima beans, okra, and tomatoes. They are suited also to cotton, soybeans, and small grain and in some areas are fairly well suited to rice. Vetch, Austrian winter peas, white clover, sericea lespedeza, annual lespedeza, and crimson clover are suitable legumes. Bermudagrass, bahiagrass, dallisgrass, and tall fescue are the most suitable grasses.

Erosion is a moderate hazard. Clean-tilled crops that leave large amounts of residue can be grown year after year if terracing and contour cultivation are practiced. Row crops can be grown in a cropping system that includes grasses and legumes regularly if contour cultivation alone is practiced. No terraces or special row direction is needed for crops that are grown year after year and that leave a large amount of residue.

Sprinkler irrigation is suitable. Some areas can be leveled and then irrigated by a row or border system. Rice can be grown if levees are closely spaced. No deep cuts should be made in leveling areas where there are concentrations of sodium. Crops are adversely affected if sodium is brought too near the surface.

Capability Unit IIw-1

This unit consists of level, somewhat poorly drained and moderately well drained soils. These soils have a surface layer and a subsurface layer of silt loam. The upper part of the subsoil is silt loam to silty clay, and the lower part is silty clay loam or silt loam. Some of the soils in this unit have a firm, brittle fragipan in the subsoil, and others have a claypan.

Permeability is slow, and the available water capacity is moderate. The organic-matter content is low to medium. Natural fertility is moderate. Reaction ranges from very strongly acid to neutral.

These soils are suited to rice, soybeans, cotton, grain sorghum, and small grain. Bermudagrass, dallisgrass, bahiagrass, tall fescue, white clover, and lespedeza are suitable pasture plants.

Excess water is a moderate hazard. These soils are easy to till. If properly fertilized, tilled, and drained, they can be used year after year for clean-tilled crops that leave large amounts of residue. Most areas can be leveled or smoothed to permit efficient management of irrigation water.

Capability Unit IIw-2

This unit consists of level, somewhat poorly drained soils on bottom land. These soils have a surface layer of silt loam. Below this is silt loam, silty clay loam, or clay loam.

Permeability is moderate or moderately slow, and the available water capacity is high. The organic-matter content is medium to high. Natural fertility is moderate to high. Reaction is very strongly acid or medium acid in the root zone.

These soils are suited to cotton, soybeans, corn, small grain, and grain sorghum. They are well suited to rice, but the water level is difficult to maintain in some areas. Lespedeza, white clover, crimson clover, vetch, and Austrian winter peas are suitable legumes. Bermudagrass, bahiagrass, dallisgrass, and tall fescue are suitable grasses.

Excess water is a moderate hazard. These soils are easy to till. Clean-tilled crops that leave large amounts of residue can be grown year after year if the soils are properly fertilized, tilled,

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[1/] W. W. FERGUSON, conservation agronomist, Soil Conservation Service, helped prepare this section.

and adequately drained. Most areas can be leveled so as to improve drainage and permit efficient management of irrigation water.

Capability Unit IIw-3

The one soil in this unit, Miller silty clay, is a moderately well drained to well drained soil on bottom land. The subsoil is clay or silty clay underlain by silty clay loam to fine sandy loam.

Permeability is very slow, and the available water capacity is high. The organic-matter content is medium to high. Natural fertility is high. Reaction is mildly alkaline or moderately alkaline.

This soil is well suited to soybeans, cotton, rice, small grain, and grain sorghum. Lespedeza, white clover, crimson clover, vetch, and Austrian winter peas are suitable legumes. Bermudagrass, bahiagrass, dallisgrass, and tall fescue are suitable grasses.

Excess surface water is a moderate hazard. This soil is difficult to till, but if properly fertilized and tilled and adequately drained, it can be used year after year for cultivated crops that leave large amounts of residue. Row or border irrigation is suitable. Most areas can be leveled or smoothed so as to improve drainage and permit efficient use of irrigation water.

Capability Unit IIs-1

The one soil in this unit, Norwood silty clay loam, gently undulating, is a well-drained, gently undulating soil on bottom land. This soil has a surface layer of silty clay loam. Below this is thinly stratified silt loam and silty clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is medium to low. Natural fertility is high. Reaction is moderately alkaline or mildly alkaline.

This soil is well suited to soybeans, cotton, corn, small grain, and grain sorghum. Vetch, white clover, and Austrian winter peas are suitable winter legumes. Bermudagrass, bahiagrass, dallisgrass, tall fescue, and lespedeza are suitable pasture plants.

The undulating surface and the sticky surface layer are moderate limitations. This soil is somewhat difficult to till, but if properly tilled and fertilized, it can be used year after year for cultivated crops that leave large amounts of residue. Most areas can be leveled or smoothed so as to permit efficient use of irrigation water. Water accumulates in the swales after a rain and delays farming operations in areas that are not leveled or smoothed.

Capability Unit IIIe-1

This unit consists of moderately well drained, gently sloping soils on uplands. The surface layer and the subsurface layer are silt loam. Below this is silty clay loam to silty clay over silty clay loam to silt loam. Some of the soils in this unit have a firm, brittle fragipan in the subsoil, and others have a claypan.

Permeability is moderately slow to slow, and the available water capacity is moderate. The organic-matter content is low to medium. Natural fertility is moderate. Reaction is neutral to very strongly acid in the surface layer and very strongly acid to slightly acid below.

These soils are suited to cotton, soybeans, and small grain. Vetch, Austrian winter peas, white clover, sericea lespedeza, annual lespedeza, and crimson clover are suitable legumes. Bermudagrass, bahiagrass, dallisgrass, and tall fescue are suitable pasture grasses.

Runoff is medium to rapid, and the erosion hazard is severe. The soils in this unit can be used for cultivated crops, but conservation practices need to be intensified as the gradient and length of slope and the erosion hazard increase. If terracing, contour farming, adequate fertilization, and proper tillage are practiced, clean-tilled crops that produce large amounts of residue can be grown year after year on the lower slopes. On the steeper slopes and in areas where crops leave small amounts of residue, soil improving grasses, legumes, or cover crops should be included regularly in the cropping system.

Capability Unit IIIe-2

The one soil in this unit, McKamie silt loam, 1 to 3 percent slopes, is well drained and has a thin surface layer of silt loam and a subsoil of silty clay or clay.

Permeability is very slow. The available water capacity is moderate to high. The organic-matter content is medium, and natural fertility is moderate. Reaction is strongly acid or very strongly acid in the root zone.

This soil should be used for winter small grain or for pasture or bermudagrass, dallisgrass, or tall fescue. Lespedeza and white clover are suitable legumes.

Erosion is a severe hazard. This soil is not well suited to clean-tilled crops because the thin, loamy surface layer is highly erodible and the short irregular slopes make the establishment of terraces or other water-control structures very difficult. Contour cultivation is difficult in many areas.

Capability Unit IIIw-1

This unit consists of level, poorly drained soils. The surface layer is silt loam. Many areas have a subsurface layer of silt loam. The subsoil is silty clay loam, silty clay, or clay.

Permeability is slow to very slow. The available water capacity is moderate to high. The organic-matter content is low to medium, and natural fertility is moderate to high. Reaction is mildly alkaline to very strongly acid in the surface layer and medium acid to very strongly acid below.

The soils in this unit are suited to rice, soybeans, cotton, and grain sorghum. Bermudagrass, dallisgrass, and tall fescue are suitable pasture grasses. White clover and lespedeza are suitable legumes.

Excess water is a severe hazard. The soils are easy to till. If properly fertilized, tilled, and drained, they can be used year after year for tilled crops that leave large amounts of residue. They are well suited to row and border irrigation.

Capability Unit IIIw-2

This unit consists of well-drained to poorly drained soils. These soils have a surface layer of silt loam, silty clay loam, or silty clay and a subsoil of silty clay or clay.

Permeability is very slow, and the available water capacity is moderate to high. The organic-matter content is medium. Natural fertility is moderate to high. Reaction ranges from very strongly acid to neutral in the root zone.

These soils are suited to rice, cotton, soybeans, and grain sorghum. Bermudagrass, dallisgrass, and tall fescue are suitable grasses, and white clover, lespedeza, and Austrian winter peas are suitable legumes. Some areas are used for fish farming (pl. I) either continuously, or in rotation with other crops.

Excess water is a severe hazard. In most areas the soils are difficult to till. If properly fertilized, tilled, and drained, they can be used year after year for clean-tilled crops that leave large amounts of residue.

Capability Unit IIIw-3

The one soil in this unit, Tichnor silt loam, is level and poorly drained. The surface layer and the subsurface layer are silt loam, and the subsoil is silt loam or silty clay loam.

Permeability is slow, and the available water capacity is high. The organic-matter content is medium, and natural fertility is moderate to high. Reaction is strongly acid or very strongly acid.

This soil is suited to soybeans, cotton, rice, and grain sorghum. Bermudagrass, dallisgrass, and tall fescue are suitable grasses. White clover is a suitable legume.

Excess water is a severe hazard. This soil is easy to till. If properly fertilized, tilled, and drained, it can be used year after year for clean-tilled crops that leave large amounts of residue. It is suited to irrigation.

Capability Unit IVe-1

The one soil in this unit, Loring silt loam, 8 to 12 percent slopes, is moderately sloping and well drained. It has a surface layer of silt loam. The upper part of the subsoil is silty clay loam and silt loam. The lower part is a fragipan.

Permeability is moderately slow, and the available water capacity is moderate. The organic-matter content is medium, and natural fertility is moderate. The reaction is medium acid to strongly acid.

This soil is of limited suitability for row crops. It is more suitable for pasture, woodland, and wildlife habitat. Suitable row crops include cotton, soybeans, and grain sorghum. Sown small grain is suitable if management is good. Bermudagrass, bahiagrass, weeping lovegrass, crimson clover, white clover, annual lespedeza, and sericea lespedeza are suitable pasture plants.

Runoff is rapid, and the erosion hazard is very severe. Contour stripcropping makes it possible to grow a row crop occasionally in a cropping system that includes grasses and legumes. Sown crops can be grown in a cropping system that is mainly one of soil-improving grasses and legumes.

Capability Unit Vw-1

This unit consists of level, somewhat poorly drained and poorly drained, frequently flooded soils. These soils are chiefly along rivers and bayous. The surface layer is clay, silty clay loam, silty clay, or silt loam. The subsoil generally is silty clay or clay but is silty clay loam in some areas.

These soils range from very strongly acid to mildly alkaline. Natural fertility is moderate to high. Permeability is very slow to slow, and the available water capacity is high. The organic-matter content is medium to high.

The very severe hazard of frequent overflow is the main limitation. Cultivated crops cannot be grown unless major flood-control structures and drainage systems are installed. A few areas are used for catch crops of soybeans or grain sorghum, but it is not uncommon for these crops to be drowned out. These soils should be used for woodland and wildlife habitat. Most areas are within the White River National Wildlife Refuge or the State-owned Bayou Meto Game Management Area, or are used by private hunting clubs.

Predicted Yields

Yields predicted for the principal crops grown in Arkansas County, under improved management, are shown in table 2. The predictions are based mainly on data obtained from farmers and those who work with farmers. Improved management includes (1) using the proper equipment at the right time for preparing the seedbed, planting and harvesting crops, and controlling weeds; (2) following a systematic program for controlling insects and plant diseases; (3) applying fertilizer according to the results of soil tests; (4) choosing crop varieties that are well suited to the soils and to the kind of farming operations; (5) irrigating crops during dry periods; and (6) draining wet soils.

TABLE 2.--PREDICTED AVERAGE YIELDS PER ACRE OF PRINCIPAL CROPS

[Figures indicate yields obtained under improved management. Absence of figure indicates the crop is not suited to or is not commonly grown on the soil. Acadia silty clay loam and Sharkey clay are not used for crops and are not listed in the table]

Soil	Rice	Soybeans	Cotton (lint)	Oats	Wheat	Lespedeza (hay)	Common bermudagrass	Fescue
	Bu.	Bu.	Lb.	Bu.	Bu.	Tons	A.U.M. 1/	A.U.M. 1/
Amagon silt loam	95	30	---	---	---	1.8	7.5	8.5
Amagon silt loam, heavy substratum	95	30	---	---	---	1.2	7.5	8.0
Calhoun silt loam	95	30	---	---	---	1.0	6.5	7.5
Calloway silt loam	100	30	---	70	34	1.8	7.0	8.0
Crowley silt loam	105	30	---	75	35	1.8	7.0	8.0
Crowley and Stuttgart silt loams	105	30	---	75	35	1.8	7.0	8.0
Falaya silt loam	---	35	---	---	---	2.0	7.5	8.5
Grenada silt loam, 0 to 1 percent slopes	95	30	600	75	36	2.0	7.0	8.0
Grenada silt loam, 1 to 3 percent slopes	90	30	600	75	36	2.0	7.0	8.0
Grenada silt loam, 3 to 8 percent slopes	---	---	---	75	30	2.0	7.0	8.0
Hebert silt loam	90	35	700	---	---	2.0	8.0	9.0
Loring silt loam, 1 to 3 percent slopes	---	30	630	75	40	1.8	7.0	8.0
Loring silt loam, 3 to 8 percent slopes	---	---	---	75	36	1.6	7.0	8.0
Loring silt loam, 8 to 12 percent slopes	---	---	---	---	---	1.0	6.0	7.0
McKamie silt loam, 0 to 1 percent slopes	100	25	---	---	---	2.0	7.0	8.0
McKamie silt loam, 1 to 3 percent slopes	---	---	---	---	---	2.0	7.0	8.0
Miller silty clay	---	38	---	---	---	---	---	---
Norwood silt loam	---	40	825	---	---	---	---	---
Norwood silty clay loam, gently undulating	---	40	825	---	---	---	---	---
Perry silty clay	100	30	500	---	---	1.5	---	---
Portland silty clay loam	100	35	525	---	---	1.5	---	---
Rilla silt loam	---	40	800	75	40	2.0	---	---
Stuttgart silt loam, 0 to 1 percent slopes	105	35	525	75	35	1.8	7.0	9.0
Stuttgart silt loam, 1 to 3 percent slopes	90	32	500	75	34	1.7	7.0	9.0
Stuttgart silt loam, 3 to 8 percent slopes	---	---	---	70	30	1.6	7.0	8.0
Tichnor silt loam 2/	95	30	---	---	---	1.8	6.0	7.0

1/ Animal-unit-months. The figures represent the number of months that 1 acre will provide grazing for 1 animal unit (1,000 pounds live weight), or the number of months the pasture can be grazed multiplied by the number of animal units an acre will support. For example, 1 acre of Crowley silt loam in an improved pasture of fescue will provide grazing for 4 animals for 2 months, so it has a rating of 8 animal-unit-months.

2/ Yields are predicted for areas that are protected from flooding.

Use of Soils as Woodland [2/]

Virgin forests covered most of Arkansas County at one time. The principal species of commercial value were bottom-land oaks, sweetgum, water tupelo, baldcypress, ash, sycamore, and pecan.

Woodland now covers about 41 percent, or about 271,700 acres, of the county. A few large areas in the uplands were once prairies, but these areas have been cultivated for such a long time that their exact location and extent are not now known. About 59,000 acres of woodland is in the White River National Wildlife Refuge, about 28,000 acres is in the State-owned Bayou Meto Game Management Area, and the rest is privately owned. Several thousand acres of woodland is cleared each year for farming, primarily for growing soybeans.

Nearly all of the woodland in this county is either unmanaged or receives a low level of management. The major factors impeding progress toward better management are high cost of land, suitability of much of the wooded area for more intensive uses, lack of owner interest in management, and lack of markets. The major physical problems in increasing production are the need to eliminate, cull, and weed trees and the need for planting, seeding, or encouraging the natural regeneration of trees suitable for commercial use.

Production of Wood Crops

Management of woodland can be planned more effectively if the soils are grouped according to those characteristics that affect the growth of trees and management of the stand. The soils in Arkansas County have been placed in 10 woodland groups, each consisting of soils that are about the same in suitability for wood crops, require about the same management, and have about the same potential productivity. These factors depend mainly on the depth and texture of the soil material; the arrangement of the layers in the profile; drainage, reaction, and consistence of each layer; and the content of humus and minerals.

Listed in table 3 are the woodland suitability groups into which most of the soils in the county have been placed. The soils in each woodland group are designated by map symbols, and each group is briefly described. The description of a woodland group includes the ratings of the soils for equipment limitations and seedling mortality. Also given for each group are the kinds of trees to favor in managing existing stands, the site index for specified trees, and the trees preferred for planting. This information is based on detailed plot studies, measurements of different kinds of trees on different kinds of soils, published and unpublished records, and the experience and judgment of technicians who work with tree crops.

The site indexes given are adapted from data obtained from soil-site studies made by the Soil Conservation Service and the U.S. Forest Service (13, 14, 16, 17) [3/]. The woodland group assigned to any soil is listed in the "Guide to Mapping Units" at the back of this soil survey and also at the end of the description of that soil in the section "Descriptions of the Soils."

The symbol for a woodland suitability group indicates suitability class, subclass, and group. For example, in a woodland group that has the symbol 1o4, the first number in this symbol indicates relative potential productivity of the soils for wood crops. It expresses the site quality, which is based on the site index of one or more species. The numeral 1 indicates very high potential productivity, the numeral 2 indicates high, and 3 indicates moderately high.

The second part of the symbol identifying a woodland group is a small letter. Except for the letter o, this letter indicates an important soil property that imposes a moderate or severe hazard or limitation that affects management of the soils in the group for trees. The letter o shows that the soils have few limitations that restrict their use for trees. The letter c indicates that the main limitation is the kind or amount of clay in the upper part of the soils; and w means that water in or on the soils, either seasonally or year round, is the chief limitation.

The last part of the symbol, another number, differentiates one woodland group from another that has an identical first and second part in its identifying symbol. This number indicates the degree of limitation and the suitability of the soils for different kinds of trees. Number 4 indicates the soils have no significant limitation and are suited to broadleaf trees; 5 indicates the soils have a slight or moderate limitation and are suited to broadleaf trees; 6 indicates the soils have a moderate or severe limitation and are suited to broadleaf trees; 7 means that the soils have no significant limitation and are suited to needleleaf and broadleaf trees; 8 indicates the soils have a slight or moderate limitation and are suited to needleleaf and broadleaf trees; and 9 means the soils have a slight or moderate limitation and are suited to needleleaf or broadleaf trees.

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of conventional equipment needed for planting trees, constructing roads, controlling unwanted vegetation, harvesting trees, and controlling fires. The limitations in Arkansas County are caused mainly by wetness and the frequency and duration of flooding. The limitation is slight if the soils are loamy and at least moderately well drained, are not subject to frequent flooding or excessive surface water, and if the use of equipment is restricted for only a short period after a heavy rain. The limitation is moderate if the soils are not subject to

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2/ MAX D. BOLAR, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

3/ Underscored numbers in parentheses refer to Literature Cited, page 71.

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TABLE 3.--WOODLAND SUITABILITY GROUPS, SITE INDEXES, PREFERRED SPECIES

Woodland group, descriptions of soils, and map symbols	Species to favor in existing stands	Site index 1/	Species preferred for planting
Group 1o4: Well-drained, loamy soils that have very high potential productivity and no serious limitation; suited to southern hardwoods. (No, NrU)	Cottonwood Sweetgum 2/ Water oak Nuttall oak Other trees to favor are cherrybark oak, green ash, Shumard oak, silver maple, hackberry, persimmon, elm, and sycamore.	106-115+ 96+ 96-116 86-95	Nuttall oak, water oak, green ash, cottonwood, sycamore, cherrybark oak, and Shumard oak.
Group 1w5: Somewhat poorly drained, loamy soils that have very high potential productivity and moderate equipment limitations, primarily because of excess water; suited to southern hardwoods. (Fa)	Cottonwood Sweetgum 2/ Water oak Nuttall oak Other trees to favor are cherrybark oak, green ash, Shumard oak, silver maple, hackberry, persimmon, elm, sycamore, and baldcypress.	106-115+ 96+ 96-116 86-95	Nuttall oak, water oak, green ash, cottonwood, sycamore, cherrybark oak, and Shumard oak.
Group 2o4: Well-drained, loamy soils that have high potential productivity and no serious limitation; suited to southern hardwoods. (Rs)	Cottonwood Water oak 2/ Nuttall oak Willow oak Cherrybark oak Sweetgum Other trees to favor are sycamore, hackberry, green ash, Shumard oak, swamp chestnut oak, and elm.	96-105 86-95 86-95 86-95 86-95 86-95	Cherrybark oak, Nuttall oak, water oak, Shumard oak, swamp chestnut oak, willow oak, sweetgum, cottonwood, yellow-poplar, sycamore, and green ash.
Group 2w5: Somewhat poorly drained to well-drained, loamy and clayey soils that have high potential productivity, moderate equipment limitations, and slight to moderate seedling mortality, primarily because of excess water; suited to southern hardwoods. (Hb, Mr)	Water oak 2/ Cherrybark oak Nuttall oak Sweetgum Cottonwood Other trees to favor are sycamore, swamp chestnut oak, green ash, willow oak, hackberry, overcup oak, elm, and pecan.	86-95 86-95 86-95 86-95 96-105	Cherrybark oak, water oak, Nuttall oak, sweetgum, cottonwood, sycamore, swamp chestnut oak, and Shumard oak.

TABLE 3.--WOODLAND SUITABILITY GROUPS, SITE INDEXES, PREFERRED SPECIES--Continued

Woodland group, descriptions of soils, and map symbols	Species to favor in existing stands	Site index 1/	Species preferred for planting
Group 2w6: Poorly drained and somewhat poorly drained, clayey and loamy soils that have high potential productivity, severe equipment limitations, and moderate seedling mortality, primarily because of excess water; suited to southern hardwoods. (Am, An, Tc; part of Pe and of Po in areas not frequently flooded)	Water oak---------- Sweetgum 2/---------- Nuttall oak---------- Cherrybark oak---------- Other trees to favor are cottonwood, elm, green ash, hackberry, overcup oak, pecan, swamp chestnut oak, sycamore, and willow oak.	86-95 86-95 86-95 76-85	Cherrybark oak, cottonwood, green ash, Nuttall oak, sycamore, water oak, sweetgum, and swamp chestnut oak.
Group 3o7: Moderately well drained, loamy soils that have moderately high productivity and no serious limitation; suited to southern hardwoods and southern pines. (GrA, GrB, GrC, LoB, LoC, LoD, StB, StC)	Loblolly pine 2/--------- Shortleaf pine---------- Sweetgum---------- Cherrybark oak---------- Other trees to favor are white oak, black oak, water oak, and swamp chestnut oak.	76-85 76-85 76-85 66-75	Cherrybark oak, Shumard oak, loblolly pine, and sweetgum.
Group 3w6: Poorly drained and somewhat poorly drained, predominantly clayey soils that are subject to frequent flooding, have moderately high potential productivity, severe equipment limitations, and severe seedling mortality, primarily because of excess water; suited to southern hardwoods. (Ac, Sh; part of Pe and Po in frequently flooded areas)	Water oak 2/---------- Cherrybark oak---------- Nuttall oak---------- Sweetgum---------- Other trees to favor are cottonwood, sycamore, swamp chestnut oak, green ash, hackberry, sugarberry, and overcup oak.	76-85 76-85 76-85 76-85	Water oak, Nuttall oak, sweetgum, cottonwood, sycamore, swamp chestnut oak, and Shumard oak.
Group 3w8: Predominantly somewhat poorly drained, loamy soils that have moderately high potential productivity and moderate equipment limitations, primarily because of excess water; suited to southern hardwoods and southern pines. (Cb, StA; Stuttgart part of Cs)	Loblolly pine 2/--------- Shortleaf pine---------- Cherrybark oak---------- Sweetgum---------- Other trees to favor are black oak, water oak, Nuttall oak, Shumard oak, southern red oak, swamp chestnut oak, willow oak, sycamore, and green ash.	76-85 66-75 66-75 76-85	Loblolly pine, cherrybark oak, black oak, southern red oak, water oak, Shumard oak, Nuttall oak, willow oak, sweetgum, and yellow-poplar.
Group 3w9: Poorly drained, loamy soils that have moderately high potential productivity, severe equipment limitations, and severe seedling mortality, primarily because of excess water; suited to southern hardwoods and loblolly pine. (Ca, Cr; Crowley part of Cs)	Loblolly pine 2/--------- Sweetgum---------- Water oak---------- Cherrybark oak---------- Other trees to favor are Shumard oak and southern red oak.	66-75 66-75 66-75 66-75	Loblolly pine, Shumard oak, cherrybark oak, water oak, and sweetgum.

TABLE 3.--WOODLAND SUITABILITY GROUPS, SITE INDEXES, PREFERRED SPECIES--Continued

Woodland group, descriptions of soils, and map symbols	Species to favor in existing stands	Site index 1/	Species preferred for planting
Group 3c8: Well-drained, predominantly clayey soils that have moderately high potential productivity, moderate equipment limitations, and moderate seedling mortality; suited to southern hardwoods and southern pines. (MkA, MkB)	Sweetgum	76-85	Loblolly pine, sweetgum, cherrybark oak, Shumard oak, cottonwood, and sycamore.
	Green ash	-----	
	Cherrybark oak	66-75	
	Southern red oak	66-75	
	Water oak 2/	76-85	
	Willow oak	76-85	
	Shumard oak	66-75	
	Nuttall oak	76-85	
	Cottonwood	86-95	
	Sycamore	86-95	

1/ Site index ratings are adapted from data obtained from soil-site studies made by the Soil Conservation Service and the Forest Service (13, 14, 16, 17).

2/ Indicator species for this woodland group.

frequent flooding or excessive surface water for extended periods, and if conventional equipment can be used from March to December. The limitation is severe if the use of equipment is limited to the driest months or to the periods between extended floods.

Seedling mortality refers to the expected losses of seedlings during the first two growing seasons after planting. Seedling losses in this county are caused mainly by excess water. Mortality is slight if less than 25 percent of the planted seedlings die and natural regeneration ordinarily occurs. It is moderate if between 25 and 50 percent of planted seedlings die, if natural regeneration cannot be relied upon without site preparation, and if replanting is necessary. Mortality is severe if the loss of planted seedlings is more than 50 percent, if natural regeneration cannot be relied upon, and if special site preparation and replanting are necessary.

Species to favor in existing stands and an indicator species are listed for each woodland group in table 3. These are the commercially important kinds of trees to be favored in managing the existing stands. Some of the species listed in the table may not be so fast-growing or so valuable commercially as other trees, but managing them where they occur generally is more economical.

Site index for a given soil is the average height of the dominant trees in a stand. For cottonwood, it is the average at 30 years of age; for sycamore, the average at 35 years of age; and for other species, the average at 50 years of age. The higher the site index range, the higher the potential productivity of the soils for wood crops. The site indexes are adapted from data obtained from soil-site studies made by the Soil Conservation Service and the U.S. Forest Service.

Species preferred for planting are the kinds of trees to be chosen in establishing a stand. The trees listed in table 3 were selected on the basis of their growth, their commercial value, and the quality and marketability of their wood products. Except for cottonwood and sycamore trees, the species listed in the column headed "Species preferred for planting" may be interplanted, underplanted, or planted in open fields. The underplanting should be done only after overtopping vegetation is deadened or removed. Cottonwood and sycamore trees should be planted only in open fields and cultivated during the first growing season.

Use of Soils for Wildlife [4/]

Soils are related to the kinds and abundance of wildlife through the vegetation they support and the habitat the vegetation provides. Desirable wildlife habitat depends on vegetation and water. The kind and amount of vegetation are closely related to soil characteristics and land use. The soils of Arkansas County have been rated according to their relative suitability for elements of wildlife habitat and for kinds of wildlife. These ratings are given in table 4.

Wildlife responds to the basic characteristics of soils. This response is affected by fertility, slope, structure, wetness, degree of erosion, and other characteristics of soils. The ability of soils to hold water determines whether or not they are suitable for ponds and reservoirs. The fertility of impounded water is directly related to the fertility of the soil.

The extensive wooded areas in this county, such as those along the lower part of the White River, provide excellent habitat for deer, wild turkey, bear, squirrel, waterfowl, and many songbirds because these areas furnish suitable food, water, and cover. Few people live in these areas, and wildlife is not unduly disturbed.

Wildlife habitat can be managed by planting choice food plants, by managing existing vegetation, and by locating water developments where water is scarce or needed. Information about soils is useful for these purposes, and it also helps to determine specific sites for developing, maintaining, or improving a specific element of wildlife habitat. The present vegetation reflects past land use, and it may be a false criterion in judging potential for developing wildlife habitat.

The ratings given in table 4 refer only to the suitability of the soil. Not considered in the ratings are the present land use or the distribution of wildlife and people. The suitability of individual sites must be determined by onsite inspection or intimate knowledge of the specific area. The ratings given in the table are well suited, suited, poorly suited, and unsuited. Well suited indicates that the habitat generally is easily created, improved, or maintained, that the soil has few or no limitations that affect management, and that the limitations are easily overcome. Suited means that the habitat can be created, improved, or maintained in most places, that the soil has moderate limitations affecting management, and that moderately intensive measures generally are required to overcome the limitations. Poorly suited indicates that the habitat can be created, improved, or maintained in most places if difficult and expensive measures are used, and that the limitations are severe enough to make establishment of wildlife habitat questionable. Unsuited indicates that managing the soil for the habitat element is impractical, or impossible.

The habitat elements shown in table 4 are defined in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. Examples are wheat, corn, sorghums, oats, millets, soybeans, and sunflowers.

Grasses and legumes are domestic grasses and legumes that are established by planting and that furnish wildlife food and cover. They include fescue, bermudagrass, bahiagrass, panicgrass, bristlegrass, clover and alfalfa.

Wild herbaceous upland plants are native or introduced perennial grasses and forbs that generally are established naturally. Examples are croton, pokeweed, tickclover, wild beans, wild peas, partridgepeas, bluestem grasses, indiangrass, wild strawberry, and wild lespedeza.

Hardwood woody plants are nonconiferous trees, shrubs, and woody vines that are used by wildlife. Examples are oak, cherry, mulberry, dogwood, viburnum, maple, blueberry, honeysuckle, blackberry, greenbrier, wild grape, and rose.

Wetland food and cover plants include rice, smartweed, wild millet, rice cutgrass, cattails, naiads, pondweeds, water lilies, and Sesbania.

Shallow water developments are impoundments, excavations, or other structures for control of water. They generally are not more than 6 feet deep and are used mainly by waterfowl. These areas may be permanent impoundments, or drained and planted to crops.

Ponds and reservoirs are areas suitable for impounded, leveed, or dug-out areas that have water of suitable depth and quality and in ample supply to support fish and wildlife.

The three types of wildlife listed in table 4 are defined in the following paragraphs.

Openland wildlife includes quail, dove, cottontail rabbit, fox, meadowlark, field sparrow, and other birds and mammals that normally live on cropland, in pastures and meadows, on lawns, and in other openland areas where grasses, herbs and shrubby plants grow.

Woodland wildlife are birds and mammals that normally live in wooded areas consisting of hardwood trees and shrubs and coniferous trees. Examples are woodcock, thrush, viero, squirrel, deer, raccoon, and wild turkey.

Wetland wildlife are birds and mammals that normally live in marshes, swamps, and other wet areas. Examples are duck, geese, rail, heron, shore birds, mink, and muskrat.

4/ ROY A. GRIZZELL, JR., biologist, Soil Conservation Service, helped prepare this section.

TABLE 4.--SUITABILITY OF SOILS FOR ELEMENTS

Soils	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Acadia silty clay loam	Poorly suited	Suited	Suited	Well suited
Amagon silt loam	Suited	Suited	Suited	Well suited
Amagon silt loam, heavy substratum	Suited	Suited	Suited	Well suited
Calhoun silt loam	Suited	Suited	Suited	Well suited
Calloway silt loam	Well suited	Well suited	Well suited	Well suited
Crowley silt loam	Well suited	Well suited	Suited	Well suited
Crowley and Stuttgart silt loams	Well suited	Well suited	Well suited	Well suited
Falaya silt loam	Suited	Suited	Well suited	Well suited
Grenada silt loam, 0 to 1 percent slopes.	Well suited	Well suited	Well suited	Well suited
Grenada silt loam, 1 to 3 percent slopes.	Well suited	Well suited	Well suited	Well suited
Grenada silt loam, 3 to 8 percent slopes.	Suited	Well suited	Well suited	Well suited
Hebert silt loam	Well suited	Well suited	Well suited	Well suited
Loring silt loam, 1 to 3 percent slopes.	Well suited	Well suited	Well suited	Well suited
Loring silt loam, 3 to 8 percent slopes.	Suited	Well suited	Well suited	Well suited
Loring silt loam, 8 to 12 percent slopes.	Suited	Well suited	Well suited	Well suited
McKamie silt loam, 0 to 1 percent slopes.	Suited	Well suited	Well suited	Well suited
McKamie silt loam, 1 to 3 percent slopes.	Suited	Well suited	Well suited	Well suited
Miller silty clay	Suited	Suited	Suited	Well suited
Norwood silt loam	Well suited	Well suited	Well suited	Well suited
Norwood silty clay loam, gently undulating.	Well suited	Well suited	Well suited	Well suited
Perry silty clay	Suited to poorly suited. 1/	Suited	Suited	Well suited
Portland silty clay loam	Suited to poorly suited. 1/	Suited	Well suited	Well suited
Rilla silt loam	Well suited	Well suited	Well suited	Well suited
Sharkey clay	Poorly suited	Suited	Suited	Well suited
Stuttgart silt loam, 0 to 1 percent slopes.	Well suited	Well suited	Well suited	Well suited
Stuttgart silt loam, 1 to 3 percent slopes.	Well suited	Well suited	Well suited	Well suited
Stuttgart silt loam, 3 to 8 percent slopes.	Suited	Well suited	Well suited	Well suited
Tichnor silt loam	Suited to poorly suited. 1/	Suited	Suited	Well suited

1/ Onsite investigation is needed to determine the degree and the frequency of flooding.

OF WILDLIFE HABITAT AND KINDS OF WILDLIFE

Elements of wildlife habitat--Continued			Kinds of wildlife		
Wetland food and cover plants	Shallow water developments	Ponds and reservoirs	Openland wildlife	Woodland wildlife	Wetland wildlife
Well suited-----	Poorly suited----	Poorly suited----	Suited----------	Well suited ------	Well suited.
Well suited-----	Well suited------	Well suited------	Suited----------	Well suited------	Well suited.
Well suited-----	Well suited------	Well suited------	Suited----------	Well suited------	Well suited.
Well suited-----	Well suited------	Well suited------	Suited----------	Well suited------	Well suited.
Suited----------	Well suited------	Well suited------	Well suited------	Well suited------	Well suited.
Well suited-----	Well suited------	Well suited------	Well suited------	Well suited------	Well suited.
Suited----------	Suited----------	Suited----------	Suited----------	Well suited------	Suited.
Poorly suited---	Well suited------	Well suited------	Well suited------	Well suited------	Suited.
Unsuited--------	Suited to poorly suited.	Well suited------	Well suited------	Well suited------	Poorly suited.
Unsuited--------	Unsuited---------	Suited----------	Well suited------	Well suited------	Unsuited.
Suited----------	Suited----------	Suited----------	Well suited------	Well suited------	Suited.
Unsuited--------	Suited to poorly suited.	Well suited------	Well suited------	Well suited------	Poorly suited.
Unsuited--------	Unsuited---------	Suited----------	Well suited------	Well suited------	Unsuited.
Unsuited--------	Unsuited---------	Suited----------	Well suited------	Well suited------	Unsuited.
Suited----------	Well suited------	Well suited------	Well suited------	Well suited------	Well suited.
Unsuited--------	Suited to poorly suited.	Well suited------	Well suited------	Well suited------	Poorly suited.
Suited----------	Well suited------	Well suited------	Suited----------	Well suited------	Well suited.
Unsuited--------	Unsuited---------	Poorly suited----	Well suited------	Well suited------	Unsuited.
Unsuited--------	Unsuited---------	Poorly suited----	Well suited------	Well suited------	Unsuited.
Well suited-----	Well suited------	Well suited or poorly suited. 1/	Suited----------	Well suited------	Well suited.
Well suited-----	Well suited------	Well suited or poorly suited. 1/	Suited----------	Well suited------	Well suited.
Unsuited--------	Poorly suited----	Poorly suited----	Well suited------	Well suited------	Unsuited.
Well suited-----	Poorly suited----	Poorly suited----	Suited----------	Well suited------	Well suited.
Suited----------	Well suited------	Well suited------	Well suited------	Well suited------	Well suited.
Poorly suited---	Suited to poorly suited.	Well suited------	Well suited------	Well suited------	Poorly suited.
Unsuited--------	Unsuited---------	Suited----------	Well suited------	Well suited------	Unsuited.
Well suited-----	Well suited or poorly suited. 1/	Well suited or poorly suited. 1/	Suited----------	Well suited------	Well suited.

Engineering Uses of Soils[5/]

Estimated properties of the soils in Arkansas County, interpretations of soil characteristics that affect suitability of the soils for specific engineering purposes, and engineering test data for selected soils are given in the following pages.

This information is helpful to engineers, contractors, farmers, and others who use the soils as structural material or as foundation material on which structures are built. Some soil properties are of special interest because they affect the construction and maintenance of roads, airports, pipelines, building foundations, storage facilities for water, structures for erosion control, drainage systems, and sewage disposal systems. Among the soil properties most important to engineers are permeability, shear strength, compaction characteristics, density, shrink-swell potential, available water capacity, grain-size distribution, plasticity, and reaction. Depth to the water table is also important.

Information concerning these and related soil properties is furnished in tables 5, 6, and 7. In these tables are estimates, interpretations, and test data that can be used in--

1. Planning and designing dikes and levees, agricultural drainage systems, farm ponds, irrigation systems, and other structures for controlling and utilizing water and conserving soil.
2. Selecting locations for highways, airports, pipelines, and underground cables and in planning detailed investigations at the selected location.
3. Selecting and developing industrial, commercial, residential, and recreational areas.

With the use of the soil map for identification, the engineering interpretations can be useful for many purposes. It should be emphasized, however, that they do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or where the excavations are deeper than the depths of layers here reported.

The soils on the higher elevations in Arkansas County are mainly silt loams. They have a high percentage of silt in the upper layers and, consequently, are extremely erodible on slopes. The amount of clay increases with increasing depth. These soils have low shear strength and are unstable. Many have poor internal drainage and a seasonal high water table.

The low-lying soils on bottom land along the White River and the Arkansas River have high percentages of clay. These are clayey soils of the Sharkey, Miller, Portland, and Perry series. They are very plastic, have a high shrink-swell potential, and have low strength and stability. They are subject to flooding in some areas.

Bedrock is very deep in Arkansas County and is not a factor in construction work. There is no suitable source of sand or gravel underlying the soils in the county.

All of the soils in this county have some limitations for use as construction and foundation material, but many of these limitations can be overcome.

Some of the terms used by the soil scientist may not be familiar to the engineer, and some terms may have a special meaning in soil science. These and other special terms are defined in the Glossary at the back of this survey or in the "Soil Survey Manual" (12).

Most of the information in this section is in the tables, but additional information useful to engineers can be found in other sections of this soil survey, particularly under the headings "Descriptions of the Soils" and "Town and Country Planning."

Engineering Classification Systems

The two systems most commonly used in classifying soils for engineering purposes are the system adopted by the American Association of State Highway Officials (AASHO) (1), and the Unified system (19) used by the Soil Conservation Service, the Department of Defense, and others.

The AASHO system is used to classify soils according to those properties that affect their use in highway construction. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation) and at the other extreme are clay soils that have low strength when wet. The best soils for subgrade are therefore classified as A-1, the next best A-2, and so on to class A-7, 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. Within each group, the relative engineering value of a soil material can be indicated by a group index number. There is no upper limit of group index values obtained by the formula used in AASHO Designation: M 145-66 I. Under average conditions of good drainage and through compaction, the supporting value of a material as subgrade may be assumed as an inverse ratio to its group index. A group index of 0 indicates good subgrade material and a group index of 20 or more indicates very poor subgrade material. The AASHO classification for tested soils, with index numbers in parentheses, is shown in table 7. The estimated classification for all soils mapped in the county is given in table 5.

In the Unified system, soils are classified according to particle size distribution, plasticity,

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5/ ROBERT P. CANTRELL, civil engineer, Soil Conservation Service, assisted in preparing this section.

liquid limit and organic-matter content. 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.

Estimated Engineering Properties of Soils

Table 5 lists the soil series and map symbols for each mapping unit and gives estimates of soil properties important in engineering. The estimates are based on field classification and descriptions, on test data shown in table 7, on test data from comparable soils in adjacent areas, and on field experience with similar soils in the county.

The dominant USDA texture and the estimated Unified and AASHO classifications for each major horizon in a typical profile are listed in table 5. USDA texture is determined by the relative proportion of sand, silt, and clay in soil material less than 2.0 millimeters in diameter. The terms "sand," "silt," and "clay" are defined in the Glossary at the back of this publication.

The columns headed "Percentage passing sieve" show the percentage of soil material that passes the openings of Nos. 40 and 200 sieves.

Permeability refers only to the movement of water downward through undisturbed and uncompacted soil. It does not include lateral seepage. The estimates, in inches per hour, are based on structure and porosity of the soil. Not considered in the table are plowpans, crusts on the surface, and other properties that result from use of the soils.

Available water capacity, expressed as inches of water per inch of soil, is the capacity of soils to hold water available for use by most plants. It is the difference between the amount of soil water at field capacity and the amount at wilting point.

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

Shrink-swell potential indicates the volume change to be expected in the soil material as a result of change in moisture content. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates hazards to the maintenance of structures constructed in, on, or with such material.

Engineering Interpretations of Soils

Table 6 gives information useful to engineers and others who plan to use soil material for building highways, and it also gives the soil features that affect other kinds of engineering work. Most of the features shown are unfavorable, but some important favorable features are also listed. The ratings and other interpretations in this table are based on the engineering properties estimated in table 5; on available test data, including those in table 7; and on field experiences. Although the information pertains only to the soil depths given in table 5, it is reasonably reliable to a depth of about 6 feet for most soils, and several more feet for some soils.

The soils in this county are not suitable sources of sand and gravel.

Topsoil is fertile material, ordinarily rich in organic matter, that is used as topdressing for lawns, gardens, roadbanks, and the like. Suitability of soils for topsoil is expressed as good, fair, or poor in table 6.

Road fill is material used to build embankments. The ratings of suitability indicate performance of soil material as road fill that is moved from borrow areas.

Soil features affecting highway location are mainly those of the undisturbed soil material. These features, favorable as well as unfavorable, are chiefly those that affect the geographic location of highways. Among these features are traffic-supporting capacity, shrink-swell potential, and a high water table.

Dikes and levees are low structures for impounding or diverting water. The soil features named are mainly those that affect use of the soil as material for building low dikes and levees.

Where farm ponds are constructed, the soils should be suitable as reservoir areas and for use in embankments. The choice of a site as a reservoir area is affected mainly by the loss of water through seepage. Permeability and other features that influence the amount or rate of seepage are important. Farm pond embankments serve as dams. The subsoil material and the substratum material should be considered in evaluating a soil for farm pond embankments. Susceptibility to piping, stability, and compressibility of the soil material are important features.

Agricultural drainage is essential on many soils that have restricted drainage. The ease or difficulty with which a soil can be drained are determined mainly by natural drainage, the height of the water table, permeability, and susceptibility to flooding.

Irrigation during part of the growing season is beneficial to many of the crops commonly grown in this county, and it is necessary for rice. Some of the features considered in evaluating a soil for irrigation purposes are rate of water intake, natural drainage, layers in the soil that restrict the movement of water, susceptibility to erosion and to flooding, and the degree of the slope.

Land leveling reshapes the land surface by removing knolls, mounds, and ridges and by filling swales, potholes, and gullies. It insures uniform spread of irrigation water and improves surface drainage. Some soil features affecting the reshaping of the land surface are the water table, natural drainage,

TABLE 5.--ESTIMATED

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			Dominant USDA texture	Unified	AASHO
	Ft.	In.			
Acadia: Ac	2/ 0-1	0-4	Silty clay loam	CL or CH	A-6 or A-7
		4-10	Silt loam	ML or CL	A-4
		10-18	Silty clay loam	CL or CH	A-6 or A-7
		18-32	Silty clay	CH	A-7
		32-58	Silty clay loam	CL or CH	A-6 or A-7
		58-72	Loam	ML or CL	A-4
Amagon:					
Am	0-0.5	0-17	Silt loam	ML or CL	A-4
		17-72	Silty clay loam	CL	A-6 or A-7
An	0-0.5	0-4	Silt loam	ML or CL	A-4
		4-26	Silty clay loam	CL	A-6 or A-7
		26-72	Silty clay	CL or CH	A-7
Calhoun: Ca	0-0.5	0-11	Silt loam	ML or CL	A-4
		11-55	Silty clay loam	CL	A-6 or A-7
		55-72	Silt loam	ML or CL	A-4
Calloway: Cb	0.5-1	0-14	Silt loam	ML or CL	A-4
		14-50	Silty clay loam	CL	A-6 or A-7
		50-72	Silt loam	ML or CL	A-4
Crowley: Cr, Cs For properties of Stuttgart soil in Cs, see Stuttgart series.	0-1	0-15	Silt loam	ML, CL or CL-ML	A-4
		15-30	Silty clay	CL or CH	A-7
		30-72	Silty clay loam	CL	A-6 or A-7
Falaya: Fa	2/ 0-1	0-72	Silt loam	ML or CL	A-4
Grenada: GrA, GrB, GrC	2-4	0-13	Silt loam	ML, CL or ML-CL	A-4
		13-20	Silty clay loam	CL	A-6 or A-7
		20-27	Silt loam	ML	A-4
		27-72	Silty clay loam	CL	A-6 or A-7
Hebert: Hb	0.5-2	0-14	Silt loam	ML or CL	A-4
		14-28	Clay loam	CL	A-6 or A-7
		28-41	Loam	ML or CL	A-4
		41-52	Loamy fine sand	SM	A-2 or A-4
		52-72	Fine sand	SM	A-2
Loring: LoB, LoC, LoD	>5	0-4	Silt loam	ML or CL	A-4
		4-21	Silty clay loam	CL	A-6 or A-7
		21-42	Silt loam	ML or CL	A-4 or A-6
		42-72	Silt loam	ML or CL	A-4
McKamie: MkA, MkB	0.5-4	0-7	Silt loam	ML or CL	A-4
		7-25	Clay	CH	A-7
		25-35	Silty clay	CH	A-7
		35-69	Silty clay loam	CL or CH	A-6 or A-7
		69-72	Very fine sandy loam	ML	A-4
Miller: Mr	0.5-1	0-45	Silty clay	CH-MH or CH	A-7
		45-72	Silt loam	ML or CL	A-4 or A-6

See footnotes at end of table.

Percentage passing sieve--		Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 40 1/ (0.42 mm.)	No. 200 (0.074 mm.)				
		In./hr.	In./in. of soil	pH	
95-100	85-95	0.20-0.63	0.19-0.21	5.6-6.5	Moderate.
95-100	85-95	0.20-0.63	0.21-0.23	5.6-6.5	Low.
95-100	85-100	0.20-0.63	0.19-0.21	5.6-6.5	Moderate.
95-100	90-100	<0.06	0.18-0.20	5.6-6.5	High.
95-100	90-100	0.20-0.63	0.19-0.21	5.6-6.5	Moderate.
95-100	55-80	0.63-2.0	0.16-0.18	6.1-7.3	Low.
95-100	85-95	0.2-0.63	0.21-0.23	4.5-6.0	Low.
95-100	85-95	0.06-0.20	0.19-0.21	4.5-6.0	Moderate.
95-100	85-95	0.20-0.63	0.21-0.23	4.5-6.0	Low.
95-100	85-95	0.06-0.20	0.19-0.21	4.5-6.0	Moderate.
95-100	95-100	0.06-0.20	0.18-0.20	4.5-6.0	High.
95-100	95-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	95-100	0.06-0.20	0.19-0.21	4.5-5.5	Low to moderate.
95-100	95-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	95-100	0.20-0.63	0.21-0.23	5.1-6.0	Low.
95-100	95-100	0.06-0.20	0.12-0.15	5.1-6.0	Low to moderate.
95-100	95-100	0.20-0.63	0.21-0.23	5.6-7.3	Low.
95-100	95-100	0.20-0.63	0.21-0.23	6.1-7.8	Low.
95-100	95-100	<0.06	0.18-0.20	5.1-6.0	Moderate to high.
95-100	95-100	0.20-0.63	0.19-0.21	5.1-6.0	Low to moderate.
95-100	90-100	0.63-2.0	0.21-0.23	4.5-6.0	Low.
95-100	90-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	90-100	0.20-0.63	0.19-0.21	4.5-5.5	Low to moderate.
95-100	90-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	85-100	0.06-0.20	0.12-0.15	4.5-5.5	Low to moderate,
95-100	85-95	0.63-2.0	0.21-0.23	5.1-6.0	Low.
95-100	80-95	0.20-0.63	0.16-0.18	5.1-6.0	Moderate.
95-100	70-90	0.63-2.00	0.16-0.18	5.1-6.0	Low.
95-100	30-50	2.0-6.3	0.07-0.09	5.1-7.3	Low.
95-100	20-35	>6.30	0.04-0.07	5.1-7.3	Low.
95-100	95-100	0.20-0.63	0.21-0.23	5.1-6.0	Low.
95-100	95-100	0.20-0.63	0.19-0.21	5.1-6.0	Low to moderate.
95-100	95-100	0.20-0.63	0.14-0.16	5.1-6.0	Low.
95-100	95-100	0.20-0.63	0.21-0.23	5.1-6.0	Low.
95-100	95-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	95-100	<0.06	0.17-0.19	4.5-5.5	High.
95-100	95-100	<0.06	0.18-0.20	4.5-5.5	High.
95-100	90-100	0.06-0.20	0.19-0.21	5.6-7.8	Moderate.
85-95	55-75	0.63-2.0	0.13-0.15	5.6-7.8	Low.
95-100	95-100	<0.06	0.18-0.20	7.4-7.8	High.
95-100	90-100	0.20-0.63	0.21-0.23	7.9-8.4	Low.

TABLE 5.--ESTIMATED ENGINEERING

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			Dominant USDA texture	Unified	AASHO
	Ft.	In.			
Norwood:					
No	2-4	0-8	Silt loam	ML or CL	A-4 or A-6
		8-33	Silty clay loam	CL	A-6 or A-7
		33-72	Silt loam	ML or CL	A-4
NrU	2-4	0-9	Silty clay loam	CL or CH	A-6 or A-7
		9-14	Silt loam	ML or CL	A-4 or A-6
		14-22	Loam	ML or CL	A-4
		22-54	Silt loam	ML or CL	A-4
		54-72	Clay	CH	A-7
Perry: Pe	2/ 0-0.5	0-13	Silty clay	CH	A-7
		13-37	Clay	CH	A-7
		37-50	Silty clay	CH	A-7
		50-72	Silty clay loam	CL or CH	A-6 or A-7
Portland: Po	2/ 0-0.5	0-4	Silty clay loam	CL or CH	A-6 or A-7
		4-60	Clay	CH	A-7
		60-72	Silty clay	CH	A-7
Rilla: Rs	4-6	0-32	Silt loam	ML or CL	A-4
		32-53	Silty clay loam	CL	A-6 or A-7
		53-72	Silt loam	ML or CL	A-4
Sharkey: Sh	2/ 0-0.5	0-72	Clay	CH	A-7
Stuttgart: StA, StB, StC	1-3	0-23	Silt loam	ML or CL	A-4 or A-6
		23-31	Silty clay loam	CL or CH	A-6 or A-7
		31-60	Silty clay loam	CL	A-6 or A-7
Tichnor: Tc	2/ 0-0.5	0-36	Silt loam	ML or CL	A-4 or A-6
		36-50	Silty clay loam	CL	A-6 or A-7
		50-72	Silt loam	ML or CL	A-4 or A-6

1/ 100 percent passes No. 10 sieve.

PROPERTIES OF SOILS--Continued

Percentage passing sieve--		Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 40 1/ (0.42 mm.)	No. 200 (0.074 mm.)	In./hr.	In./in. of soil		
95-100	95-100	0.63-2.0	0.21-0.23	7.4-8.4	Low.
95-100	95-100	0.63-2.0	0.19-0.21	7.4-8.4	Moderate.
95-100	85-100	0.63-2.0	0.21-0.23	7.4-8.4	Low.
95-100	95-100	0.20-0.63	0.19-0.21	7.4-8.4	Moderate.
95-100	95-100	0.63-2.0	0.21-0.23	7.4-8.4	Low.
95-100	70-85	0.63-2.00	0.16-0.18	7.4-8.4	Low.
95-100	85-100	0.63-2.0	0.21-0.23	7.4-8.4	Low.
95-100	95-100	<0.06	0.17-0.19	7.4-8.4	High.
95-100	95-100	0.06-0.20	0.18-0.20	5.1-6.0	High.
95-100	95-100	<0.06	0.17-0.19	5.1-6.0	High.
95-100	95-100	<0.06	0.18-0.20	5.6-7.3	High.
95-100	95-100	0.20-0.63	0.19-0.21	6.1-7.3	Moderate.
95-100	95-100	0.20-0.63	0.19-0.21	5.1-6.5	Moderate.
95-100	95-100	<0.06	0.17-0.19	5.1-7.3	High.
95-100	95-100	<0.06	0.18-0.20	6.1-7.8	High.
95-100	70-90	0.63-2.0	0.21-0.23	4.5-7.3	Low.
95-100	95-100	0.20-0.63	0.19-0.21	4.5-6.0	Moderate.
95-100	90-100	0.63-2.0	0.21-0.23	5.1-7.3	Low.
95-100	95-100	<0.06	0.17-0.19	6.1-7.8	High.
95-100	95-100	0.20-0.63	0.21-0.23	5.1-7.3	Low.
95-100	95-100	0.06-0.20	0.19-0.21	5.6-6.5	Moderate.
95-100	90-100	0.06-0.20	0.12-0.15	5.6-6.5	Moderate.
95-100	90-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.
95-100	95-100	0.06-0.20	0.19-0.21	4.5-5.5	Low to moderate.
95-100	90-100	0.20-0.63	0.21-0.23	4.5-5.5	Low.

2/ Subject to flooding.

Soil series and map symbols	Suitability as source of--		Soil features affecting--		
	Topsoil	Road fill	Highway location	Dikes and levees	Farm ponds: Reservoir area
Acadia: Ac------	Poor: flooding; clayey below depth of 18 inches.	Poor: moderate to high shrink-swell potential; low traffic-supporting capacity.	Seasonal high water table; frequent flooding; moderate to high shrink-swell potential; low traffic-supporting capacity.	Fair stability on slopes; high compressibility.	Moderate permeability below depth of 18 inches in places.
Amagon: Am, An--	Poor: poor drainage; lower subsoil clayey in some areas.	Poor: moderate to high shrink-swell potential; moderate to low traffic-supporting capacity; poor drainage.	Seasonal high water table; moderate to low traffic-supporting capacity; moderate to high shrink-swell potential.	Fair to good stability on slopes; medium to high compressibility; subject to piping in some layers.	Soil features generally favorable.
Calhoun: Ca-----	Poor: poor drainage.	Poor: poor drainage; moderate to low traffic-supporting capacity.	Seasonal high water table; moderate to low traffic-supporting capacity.	Not applicable---	Soil features generally favorable.
Calloway: Cb----	Fair: somewhat poor drainage; moderately high clay content in subsoil.	Fair: moderate traffic-supporting capacity; somewhat poor drainage.	Seasonal high water table; moderate traffic-supporting capacity; fragipan in subsoil.	Not applicable---	Soil features generally favorable.
Crowley: Cr, Cs-- For Stuttgart part of unit Cs, see Stuttgart series.	Poor: poor drainage; clayey material below 15 inches.	Poor: moderate to low traffic-supporting capacity; moderate to high shrink-swell potential in subsoil; poor drainage.	Seasonal high water table; moderate to low traffic-supporting capacity; moderate to high shrink-swell potential in subsoil.	Not applicable---	Soil features generally favorable.
Falaya: Fa------	Fair: somewhat poor drainage.	Fair: moderate traffic-supporting capacity; somewhat poor drainage.	Occasional flooding; seasonal high water table; moderate traffic-supporting capacity.	Subject to piping; fair stability on slopes; medium compressibility.	Moderate permeability.

Soil features affecting--Continued				
Farm ponds--Con. Embankments	Agricultural drainage	Irrigation	Land leveling	Winter grading
Fair stability on slopes; high compressibility.	Seasonal high water table; frequent flooding; very slow permeability; somewhat poor drainage.	Slow to very slow intake; frequent flooding; somewhat poor drainage.	Seasonal high water table; somewhat poor drainage; frequent flooding.	Frequent flooding; seasonal high water table; somewhat poor drainage; plastic, clayey subsoil.
Fair to good stability on slopes; medium to high compressibility; subject to piping in some layers.	Seasonal high water table; poor drainage; slow permeability.	Slow intake; poor drainage; clayey in lower part of subsoil in places.	Seasonal high water table; clayey in lower part of subsoil in places; poor drainage.	Seasonal high water table; poor drainage.
Fair to good stability; medium compressibility; subject to piping.	Seasonal high water table; poor drainage; slow permeability.	Slow intake; poor drainage.	Seasonal high water table; poor drainage.	Seasonal high water table; poor drainage.
Fair to good stability on slopes; medium compressibility; subject to piping.	Seasonal high water table; somewhat poor drainage; slow permeability.	Slow intake; somewhat poor drainage.	Seasonal high water table; somewhat poor drainage; fragipan at depth of about 14 inches.	Seasonal high water table; somewhat poor drainage.
Fair to good stability on slopes; subject to piping in some layers; medium to high compressibility.	Seasonal high water table; poor drainage; very slow permeability.	Slow intake; poor drainage.	Seasonal high water table; poor drainage; claypan at depth of about 15 inches.	Seasonal high water table; poor drainage.
Fair stability on slopes; medium compressibility; subject to piping.	Seasonal high water table; somewhat poor drainage; moderate permeability.	Moderate intake; somewhat poor drainage.	Seasonal high water table; somewhat poor drainage.	Occasional flooding; seasonal high water table; somewhat poor drainage.

TABLE 6.--ENGINEERING INTERPRETATIONS

Soil series and map symbols	Suitability as source of--		Soil features affecting--		
	Topsoil	Road fill	Highway location	Dikes and levees	Farm ponds: Reservoir area
Grenada: GrA, GrB, GrC.	Fair: moderately good drainage; moderately high clay content in subsoil.	Fair: moderate traffic-supporting capacity; moderately good drainage.	Seasonal high water table in level areas; fragipan in subsoil; moderate traffic-supporting capacity.	Not applicable---	Soil features generally favorable.
Hebert: Hb-----	Fair: somewhat poor drainage.	Fair: somewhat poor drainage; moderate traffic-supporting capacity in upper 41 inches.	Seasonal high water table; moderate traffic-supporting capacity.	Fair to good stability on slopes; slight to medium compressibility; subject to piping.	Moderately rapid to rapid permeability below depth of 41 inches in places.
Loring: LoB, LoC, LoD.	Fair: moderately high clay content in subsoil; moderately good drainage.	Fair: moderately good drainage; moderate traffic-supporting capacity.	Fragipan in subsoil; moderate traffic-supporting capacity.	Not applicable---	Soil features generally favorable.
McKamie: MkA, MkB.	Poor: clay within a few inches of surface.	Poor: predominantly clay; high shrink-swell potential; low traffic-supporting capacity.	High shrink-swell potential; low traffic-supporting capacity; seasonal high water table.	Not applicable---	Moderate permeability below depth of 5 or 6 feet.
Miller: Mr------	Poor: clayey material.	Poor: clayey material; high shrink-swell potential; low traffic-supporting capacity.	Low traffic-supporting capacity; high shrink-swell potential.	Fair stability on slopes; high compressibility to depth of 45 inches; medium compressibility below depth of 45 inches.	Soil features generally favorable.
Norwood: No, NrU.	Fair to good: thin strata of clayey material in some areas.	Fair: moderate traffic-supporting capacity; clayey material; high shrink-swell potential below depth of 4 feet in places.	Occasional flooding; seasonal high water table; high shrink-swell potential below depth of 4 feet in places; moderate traffic-supporting capacity.	Subject to piping; fair to good stability on slopes; medium to high compressibility; subject to piping.	Stratified material; moderate permeability in some layers at varying depths.

Soil features affecting--Continued				
Farm ponds--Con. Embankments	Agricultural drainage	Irrigation	Land leveling	Winter grading
Fair to good stability on slopes; medium compressibility.	Seasonal high water table in level areas; slow permeability; moderately good drainage; runoff moderate on slopes of 1 to 8 percent.	Slow intake; erodible in sloping areas.	Fragipan in subsoil; slopes as much as 8 percent.	Seasonal high water table in level areas.
Fair to good stability on slopes; slight to medium compressibility; subject to piping.	Seasonal high water table; moderately slow permeability; somewhat poor drainage.	Moderate intake; somewhat poor drainage.	Seasonal high water table.	Seasonal high water table; somewhat poor drainage.
Fair to good stability on slopes; medium compressibility; subject to piping.	Moderately good drainage; moderate to rapid runoff.	Slow intake; slopes of 1 to 12 percent; erodible.	Slopes of 1 to 12 percent; fragipan in subsoil.	Soil features generally favorable.
Fair to good stability on slopes; medium to high compressibility.	Very slow permeability; seasonal high water table; runoff moderate on slopes of 1 to 3 percent.	Very slow intake below depth of about 6 inches.	Seasonal high water table; plastic clay within a few inches of surface.	Seasonal high water table; plastic, clayey subsoil.
Fair stability on slopes; high compressibility to depth of 45 inches; medium compressibility below depth of 45 inches.	Seasonal high water table; very slow permeability; surface ponding.	Very slow intake----	High content of plastic clay; seasonal high water table.	Seasonal high water table; high content of plastic clay.
Fair to good stability on slopes; medium to high compressibility; subject to piping.	Good drainage--------	Moderate intake-----	Soil features generally favorable.	Occasional flooding in winter.

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TABLE 6.--ENGINEERING INTERPRETATIONS

Soil series and map symbols	Suitability as source of--		Soil features affecting--		
	Topsoil	Road fill	Highway location	Dikes and levees	Farm ponds: Reservoir area
Perry: Pe-------	Poor: clayey material; poor drainage.	Poor: clayey material; high shrink-swell potential; low traffic-supporting capacity; poor drainage.	Occasional to frequent flooding; seasonal high water table; high shrink-swell potential; low traffic-supporting capacity.	Fair stability on slopes; high compressibility.	Soil features generally favorable.
Portland: Po-----	Poor: plastic clay.	Poor: clayey material; high shrink-swell potential; low traffic-supporting capacity.	Occasional to frequent flooding; seasonal high water table; high shrink-swell potential; low traffic-supporting capacity.	Fair stability on slopes; high compressibility.	Soil features generally favorable.
Rilla: Rs--------	Good----------	Fair: moderate traffic-supporting capacity.	Moderate traffic-supporting capacity.	Not applicable--	Moderate permeability below depth of 53 inches.
Sharkey: Sh------	Poor: plastic clay; poor drainage; frequent flooding.	Poor: clayey material; high shrink-swell potential; low traffic-supporting capacity; poor drainage.	Frequent flooding; seasonal high water table; high shrink-swell potential; low traffic-supporting capacity.	Fair stability on slopes; high compressibility.	Soil features generally favorable.
Stuttgart: StA, StB, StC.	Fair: moderately high clay content; moderately high sodium content in subsoil.	Poor: moderate traffic-supporting capacity; moderate shrink-swell potential in subsoil; moderately high sodium content in subsoil.	Seasonal high water table in level areas; moderate traffic-supporting capacity; moderate shrink-swell potential in subsoil.	Not applicable--	Soil features generally favorable.
Tichnor: Tc------	Poor: occasional to frequent flooding; poor drainage; moderately high clay content in subsoil.	Poor: low traffic-supporting capacity; poor drainage.	Occasional to frequent flooding; seasonal high water table; low traffic-supporting capacity.	Fair to good stability on slopes; medium compressibility; subject to piping.	Soil features generally favorable.

Soil features affecting--Continued				
Farm ponds--Con. Embankments	Agricultural drainage	Irrigation	Land leveling	Winter grading
Fair stability on slopes; high compressibility.	Seasonal high water table; poor drainage; very slow permeability; frequent flooding in some areas.	Very slow intake; subject to frequent flooding in some areas; poor drainage.	Seasonal high water table; poor drainage; high content of plastic clay.	Seasonal high water table; poor drainage; plastic clay; occasional to frequent flooding.
Fair stability on slopes; high compressibility.	Seasonal high water table; somewhat poor drainage; very slow permeability; frequent flooding in some areas.	Very slow intake; flooding; somewhat poor drainage.	Seasonal high water table; somewhat poor drainage; high content of plastic clay.	Seasonal high water table; occasional to frequent flooding; somewhat poor drainage; high content of plastic clay.
Fair to good stability on slopes; medium compressibility; subject to piping.	Good drainage--------	Soil features generally favorable.	Soil features generally favorable.	Soil features generally favorable.
Fair stability on slopes; high compressibility.	Frequent flooding; poor drainage; seasonal high water table; very slow permeability.	Very slow intake; frequent flooding; poor drainage.	Frequent flooding; poor drainage; seasonal high water table; high content of plastic clay.	Frequent flooding; seasonal high water table; poor drainage; plastic clay.
Fair to good stability on slopes; medium to high compressibility; subject to piping in some layers; moderately high sodium content in subsoil; disperses in some places.	Seasonal high water table; somewhat poor drainage in level areas; slow permeability; runoff is moderate on slopes of 1 to 8 percent.	Slow intake; somewhat poor drainage in level areas; slopes as much as 8 percent.	High clay content below depth of about 2 feet; seasonal high water table in level areas; moderately high sodium content in subsoil.	Seasonal high water table; somewhat poor drainage in level areas.
Fair to good stability on slopes; medium compressibility; subject to piping.	Occasional to frequent flooding; seasonal high water table; poor drainage; slow permeability.	Slow intake; poor drainage; occasional to frequent flooding.	Occasional to frequent flooding; poor drainage; seasonal high water table.	Occasional to frequent flooding; poor drainage; seasonal high water table.

TABLE 7.--ENGINEERING

Tests performed by the Arkansas State Highway Department, Division of Materials and Tests, in cooperation Association of State Highway

Soil name and location	Parent material	Arkansas SCS report No. S65-Ark.	Depth from surface	Moisture density 1/	
				Maximum dry density	Optimum moisture
			In.	Lbs. per cu. ft.	Pct.
Amagon silt loam:					
NW¼SE¼SW¼ sec. 6, T. 4 S., R. 5 W.	Loess.	1-4-2	6-17	109	16
		1-4-4	30-72	103	20
Crowley silt loam:					
SW¼SW¼SW¼ sec. 4, T. 2 S., R. 5 W.	Loess.	1-5-3	9-15	111	16
		1-5-4	15-30	98	24
		1-5-5	30-72	104	20
Grenada silt loam:					
NW¼NW¼SW¼ sec. 3, T. 2 S., R. 4 W.	Loess.	1-7-2	7-20	106	18
		1-7-5	33-60	113	15
		1-7-6	60-72	111	16
Miller silty clay:					
Approximately 400 feet north of Dumond Lake in Land Grant 2401, the SW part that adjoins sec. 19, T. 8 S., R. 2 W.	Recent alluvium.	1-1-2	7-45	94	26
		1-1-3	45-55	110	16
		1-1-4	55-72	108	17
Norwood silt loam:					
SE¼NE¼SE¼ sec. 30, T. 8 S., R. 2 W.	Recent alluvium.	1-2-2	8-33	104	20
		1-2-3	33-52	110	16
		1-2-4	52-72	108	16
Stuttgart silt loam:					
SE¼SE¼SW¼ sec. 11, T. 2 S., R. 5 W.	Loess.	1-6-1	0-6	104	17
		1-6-4	15-24	95	25
		1-6-6	33-72	114	15

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

2/ Mechanical analyses according to AASHO Designation T-88 (1). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). The mechanical analyses used in this table are not suitable for naming textural classes of soil.

3/ Based on AASHO Designation M 145-66 I (1).

TEST DATA

with U.S. Department of Commerce, Bureau of Public Roads, according to standard procedures of the American Officials (AASHO)

Mechanical analysis 2/			Liquid limit	Plasticity index	Classification	
Percentage passing sieve--						
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)			AASHO 3/	Unified 4/
100	99	88	27	10	A-4(8)	CL
100	99	90	42	20	A-7-6(19)	CL
100	98	96	24	5	A-4(8)	ML-CL
---	100	98	51	24	A-7-6(28)	CH
---	100	98	42	23	A-7-6(24)	CL
100	97	94	34	9	A-4(8)	ML-CL
100	99	92	29	10	A-4(8)	CL
---	100	88	31	15	A-6(12)	CL
---	100	99	58	28	A-7-5(34)	MH-CH
---	100	98	31	9	A-4(8)	ML-CL
---	100	99	--	5/NP	A-4(8)	ML
---	100	99	35	15	A-6(15)	CL
---	100	100	28	5	A-4(8)	ML-CL
---	100	89	--	NP	A-4(8)	ML
100	99	96	28	5	A-4(8)	ML-CL
100	99	97	64	38	A-7-6(43)	CH
100	99	93	28	11	A-6(9)	CL

4/ Based on the Unified Soil Classification System, Technical Memorandum No. 3-357, v. 1, Corps of Engineers (19). SCS and BPR have agreed that all soils having plasticity indexes within two points of the A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are ML-CL and MH-CH.

5/ Nonplastic.

susceptibility to flooding, and restrictive layers in the soil.

Considered in table 6 are the soil features, especially the unfavorable ones, that affect the suitability of soils for winter grading. The features considered were those related to moving, mixing, and compacting the soil material when it is wet.

Engineering Test Data

Soil samples taken from six profiles in the county were tested by the Arkansas State Highway Department in accordance with standard procedures. The results of these tests are given in table 7. This table shows the specific location from which the samples were taken, the depth to which sampling was done, and the results of tests that determine particle-size distribution and other properties significant in soil engineering.

Table 7 gives moisture-density data for the soils tested. Moisture-density data are obtained by compacting soil material at successively higher moisture content. Assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, the density decreases as the moisture content increases. The highest dry density obtained in the compaction test is termed maximum dry density, and the corresponding moisture content is the optimum moisture.

Mechanical analyses show the percentages, by weight, of soil particles that pass sieves of specified sizes. Sand and other coarser materials do not pass through the No. 200 sieve. Silt and clay do pass through this sieve. Silt is that material larger than 0.002 millimeter in diameter that passes through the No. 200 sieve. Clay is that fraction smaller than 0.002 millimeter in diameter that passes through the No. 200 sieve.

The tests for liquid limit and plastic limit measure the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil increases from a dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from plastic to liquid. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material changes 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 engineering classifications given in table 7 are based on data obtained by mechanical analyses and on the results of tests to determine the liquid limit and plasticity index. The mechanical analyses were made by the combined sieve and hydrometer methods.

Table 8 gives the degree and kind of limitations of the soils of Arkansas County for selected nonfarm uses. The degree of limitation reflects all the features of a given soil, to a depth of 5 feet, that affect a particular use. Slight indicates that there is no limitation or that the limitation is not serious and is easily overcome; moderate indicates that the limitation generally can be corrected by practical means; and severe, means that the limitation is difficult or impractical to overcome. The limitation is severe for most nonfarm uses if the soil is subject to frequent flooding.

The properties considered in evaluating the limitations for the uses listed in table 8 are given in the following paragraphs.

Dwellings.--The information in this column refers to the foundation and site requirements for houses of three stories or less without a basement. Sewage disposal is considered separately. The properties considered are natural drainage, depth to water table, flood hazard, shrink-swell potential, bearing strength, slope, and suitability for grasses, shrubs, and trees. The ratings for bearing strength are based on estimates of the maximum load that a soil can support when compacted. Specific values should not be applied to the estimates given for bearing strength in table 8. Shrink-swell potential refers to expansion and contraction of a soil with changes in moisture content.

Septic tank filter fields.--The properties considered are permeability, percolation rate, depth to the water table, slope, and flood hazard. A seasonal water table less than 4 feet below the surface constitutes a moderate to severe limitation for this use. A percolation rate slower than 75 minutes per inch, or permeability slower than 0.63 inch per hour, constitutes a severe limitation; and a percolation rate of between 45 and 75 minutes per inch, or permeability between 0.63 and 1 inch per hour, a moderate limitation. Slopes steeper than 5 percent constitute a moderate limitation.

Sewage lagoons.--The properties considered in the ratings for sewage lagoons are permeability, slope, and the suitability of the soil as embankment material for reservoirs.

Recreation facilities.--The degree of limitation for use as campsites, picnic areas, and intensive play areas depends on trafficability, productivity, natural drainage, flood hazard, permeability, and topography. Trafficability is determined by the ease with which people can move about on foot, on bicycles, or in light vehicles. Trafficability is no more than a slight limitation on loamy soils that are not subject to flooding and that have a water table at a depth of more than 30 inches during periods of heavy use. On clayey soils, trafficability is a severe limitation.

Light industry.--The limitations in this column are for structures of less than three stories. The degree of limitation depends on bearing strength, shrink-swell potential, depth to the water table, flood hazard, natural drainage, and topography.

Trafficways.--The properties important in rating the soils for trafficways are traffic-supporting capacity, topography, shrink-swell potential, flood hazard, and depth to the water table. Traffic-supporting capacity is the ability of the undisturbed soil to support moving loads.

The detailed soil map and the information given in table 8 are as guides for evaluating the soils for use in town and country planning, but detailed onsite investigations are needed for final evaluation, because as much as 15 percent of an area designated on the map as a specific soil may consist of spots of other soils.

TABLE 8.--DEGREE AND KIND OF LIMITATION FOR BUILDING

Series and map symbols	Dwellings 1/	Septic tank filter fields	Sewage lagoons	Recreation
				Campsites
Acadia: Ac----------	Severe: frequent flooding; moderate to high shrink-swell potential; seasonal high water table; low bearing strength.	Severe: frequent flooding; seasonal high water table; slow percolation.	Severe: permeable layer below depth of 58 inches in places; frequent flooding.	Severe: frequent flooding; somewhat poorly drained; very slow permeability; poor trafficability.
Amagon: Am, An------	Severe: low bearing strength; moderate to high shrink-swell potential; seasonal high water table; poorly drained.	Severe: slow percolation; seasonal high water table.	Moderate: features favorable for lagoons. Fair material for reservoir sites.	Severe: poorly drained; seasonal high water table.
Calhoun: Ca---------	Severe: low bearing strength; seasonal high water table; poorly drained.	Severe: seasonal high water table; slow percolation.	Moderate: features favorable for lagoons. Fair material for reservoir sites.	Severe: poorly drained; seasonal high water table.
Calloway: Cb--------	Moderate: seasonal high water table; somewhat poorly drained; moderate bearing strength.	Severe: seasonal high water table; slow percolation.	Moderate: features favorable for lagoons. Fair material for reservoir sites.	Severe: somewhat poorly drained; seasonal high water table.
Crowley: Cr, Cs------ For Stuttgart part of Cs, see Stuttgart series.	Severe: seasonal high water table; poorly drained; moderate to high shrink-swell potential in subsoil; moderate bearing strength.	Severe: seasonal high water table; slow percolation.	Moderate: features favorable for lagoons. Fair material for reservoir sites.	Severe: poorly drained; seasonal high water table.
Falaya: Fa----------	Moderate to severe: seasonal high water table; somewhat poorly drained; moderate bearing strength; occasional flooding.	Severe: seasonal high water table; occasional flooding.	Severe: occasional flooding. Fair material for reservoir sites; moderate permeability.	Moderate: somewhat poorly drained.
Grenada: GrA, GrB, GrC.	Moderate: moderate bearing strength; moderately well drained.	Severe: slow percolation.	Slight to severe: slope is excessive for lagoons in some areas. Fair to good material for reservoir sites.	Moderate: slow permeability.

See footnote at end of table.

Recreation--Continued		Light industry	Trafficways
Picnic areas	Intensive play areas		
Moderate to severe: frequent flooding; somewhat poorly drained; seasonal high water table; poor trafficability.	Severe: frequent flooding; somewhat poorly drained; poor trafficability; seasonal high water table; very slow permeability.	Severe: frequent flooding; moderate to high shrink-swell potential; low bearing strength; seasonal high water table; somewhat poorly drained.	Severe: frequent flooding; moderate to high shrink-swell potential; low traffic-supporting capacity; seasonal high water table.
Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table; low bearing strength.	Severe: seasonal high water table; moderate to low traffic-supporting capacity; moderate to high shrink-swell potential.
Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: seasonal high water table; poorly drained; low bearing strength.	Severe: seasonal high water table; moderate traffic-supporting capacity.
Moderate: somewhat poorly drained; seasonal high water table.	Severe: somewhat poorly drained; seasonal high water table.	Moderate: seasonal high water table; somewhat poorly drained; moderate bearing strength.	Moderate to severe: seasonal high water table; moderate traffic-supporting capacity.
Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table; very slow permeability.	Severe: seasonal high water table; poorly drained; moderate to high shrink-swell potential in subsoil; moderate bearing strength.	Severe: seasonal high water table; moderate to low traffic-supporting capacity; moderate to high shrink-swell potential in subsoil.
Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table; occasional flooding.	Moderate: seasonal high water table; somewhat poorly drained; moderate bearing strength.	Moderate to severe: seasonal high water table; occasional flooding; moderate traffic-supporting capacity.
Slight----------	Moderate if slopes are less than 6 percent; severe if slopes are more than 6 percent.	Moderate: moderate bearing strength; slopes.	Moderate: seasonal high water table in level areas; moderate traffic-supporting capacity.

TABLE 8.--DEGREE AND KIND OF LIMITATION FOR BUILDING

Series and map symbols	Dwellings 1/	Septic tank filter fields	Sewage lagoons	Recreation
				Campsites
Hebert: Hb----------	Moderate: seasonal high water table; somewhat poorly drained; moderate bearing strength.	Severe: slow percolation; seasonal high water table.	Moderate to severe: moderate permeability below a depth of about 40 inches. Fair to good material for reservoir sites.	Moderate: somewhat poorly drained; moderately slow permeability.
Loring: LoB, LoC, LoD.	Moderate: moderate bearing strength; moderately well drained.	Severe: slow percolation.	Slight to severe: slope is excessive for lagoons in most areas. Fair to good material for reservoir sites.	Moderate: moderately slow permeability.
McKamie: MkA, MkB----	Severe: seasonal high water table; low bearing strength; high shrink-swell potential.	Severe: seasonal high water table; slow percolation.	Moderate: moderately slow permeability below depth of 5 or 6 feet. Fair to good material for reservoir sites.	Severe: very slow permeability.
Miller: Mr----------	Severe: seasonal high water table; low bearing strength; high shrink-swell potential.	Severe: seasonal high water table; slow percolation.	Moderate to severe: moderately slow permeability in layer below a depth of about 45 inches. Fair to good material for reservoir sites.	Severe: poor trafficability; very slow permeability.
Norwood: No, NrU-----	Moderate: moderate bearing strength.	Slight to severe: seasonal high water table; occasional flooding.	Severe: occasional flooding; variable soil material and permeable layers at unpredictable depths. Fair material for reservoir sites.	Slight for No. Moderate for NrU; poor trafficability.
Perry: Pe----------	Severe: high shrink-swell potential; seasonal high water table; low bearing strength; poorly drained; frequent flooding in some areas.	Severe: seasonal high water table; slow percolation; frequent flooding in some areas.	Moderate to severe: features favorable for lagoons except in areas subject to flooding. Fair to good material for reservoir sites.	Severe: poor trafficability; poorly drained; frequent flooding in some areas; very slow permeability; seasonal high water table.

See footnote at end of table.

SITES, RECREATIONAL FACILITIES, AND TRAFFICWAYS--Continued

Recreation--Continued		Light industry	Trafficways
Picnic areas	Intensive play areas		
Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; moderately slow permeability.	Moderate: seasonal high water table; moderate bearing strength; somewhat poorly drained.	Moderate to severe: seasonal high water table; moderate traffic-supporting capacity.
Slight for LoB and LoC. Moderate for LoD; slope.	Moderate if slopes are less than 6 percent; severe if slopes are more than 6 percent.	Moderate for LoB and LoC; moderate bearing strength; slope. Severe for LoD; slope.	Moderate: moderate traffic-supporting capacity.
Moderate: seasonal high water table.	Severe: very slow permeability; seasonal high water table.	Severe: low bearing strength; high shrink-swell potential; seasonal high water table.	Severe: low traffic-supporting capacity; high shrink-swell potential; seasonal high water table.
Severe: poor trafficability.	Severe: poor trafficability; very slow permeability.	Severe: low bearing strength; high shrink-swell potential; seasonal high water table.	Severe: low traffic-supporting capacity; high shrink-swell potential; seasonal high water table.
Slight for No. Moderate for NrU; poor trafficability.	Slight for No. Moderate for NrU; poor trafficability.	Moderate to severe: moderate bearing strength; seasonal high water table; occasional flooding.	Moderate: occasional flooding; seasonal high water table; moderate traffic-supporting capacity; high shrink-swell potential below a depth of 4 feet in places.
Severe: poor trafficability; poorly drained; frequent flooding in some areas; seasonal high water table.	Severe: poor trafficability; poorly drained; seasonal high water table; frequent flooding in some areas; very slow permeability.	Severe: high shrink-swell potential; low bearing strength; seasonal high water table; poorly drained; frequent flooding in some areas.	Severe: high shrink-swell potential; low traffic-supporting capacity; seasonal high water table; frequent flooding in some areas.

TABLE 8.--DEGREE AND KIND OF LIMITATION FOR BUILDING

Series and map symbols	Dwellings [1]	Septic tank filter fields	Sewage lagoons	Recreation: Campsites
Portland: Po---------	Severe: high shrink-swell potential; seasonal high water table; low bearing strength; somewhat poorly drained; ponding; frequent flooding in some areas.	Severe: seasonal high water table; slow percolation; frequent flooding in some areas.	Moderate to severe: features favorable for lagoons except in areas subject to flooding. Fair to good material for reservoir sites.	Severe: poor trafficability; somewhat poorly drained; ponding; frequent flooding in some areas; very slow permeability; seasonal high water table.
Rilla: Rs----------	Moderate: moderate bearing strength.	Moderate to severe: moderately slow percolation.	Severe: moderate permeability below depth of 53 inches; subject to piping.	Slight----------
Sharkey: Sh----------	Severe: frequent flooding; low bearing strength; high shrink-swell potential; seasonal high water table; poorly drained.	Severe: frequent flooding; slow percolation; seasonal high water table.	Severe: frequent flooding. Fair material for reservoir sites.	Severe: frequent flooding; poorly drained; poor trafficability; very slow permeability.
Stuttgart: StA, StB, StC.	Moderate: moderate bearing strength; moderate shrink-swell potential in subsoil; seasonal high water table in level areas.	Severe: slow percolation; seasonal high water table in level areas.	Moderate to severe: features favorable for lagoons except slopes are limiting in some areas. Fair to good material for reservoir sites.	Slight for StB and StC. Moderate in level areas; seasonal high water table; slow permeability.
Tichnor: Tc----------	Severe: seasonal high water table; poorly drained; low bearing strength; frequent flooding in most areas.	Severe: seasonal high water table; slow percolation; frequent flooding in most areas.	Severe: occasional to frequent flooding. Fair material for reservoir sites.	Severe: seasonal high water table; poorly drained; frequent flooding in most areas; slow permeability.

[1] Dwellings of three stories or less without a basement. Engineers and others should not assign specific values to the estimates in this table for bearing strength.

SITES, RECREATIONAL FACILITIES, AND TRAFFICWAYS--Continued

Recreation--Continued		Light industry	Trafficways
Picnic areas	Intensive play areas		
Severe: poor trafficability; somewhat poorly drained; ponding; frequent flooding in some areas; seasonal high water table.	Severe: poor trafficability; somewhat poorly drained; ponding in some areas; frequent flooding in some areas; seasonal high water table.	Severe: high shrink-swell potential; low bearing strength; seasonal high water table; somewhat poorly drained; ponding; frequent flooding in some areas.	Severe: high shrink-swell potential; low traffic-supporting capacity; seasonal high water table; frequent flooding in some areas.
Slight----------	Slight----------	Moderate: moderate bearing strength.	Moderate: moderate traffic-supporting capacity.
Severe: frequent flooding; poorly drained; poor trafficability; seasonal high water table.	Severe: frequent flooding; poorly drained; poor trafficability; very slow permeability; seasonal high water table.	Severe: frequent flooding; high shrink-swell potential; low bearing strength; seasonal high water table; poorly drained.	Severe: frequent flooding; seasonal high water table; low traffic-supporting capacity; high shrink-swell potential.
Slight for StB and StC. Moderate in level areas; seasonal high water table; somewhat poorly drained.	Moderate if slopes are less than 6 percent; severe if slopes are more than 6 percent; occasional high water table in level areas.	Moderate: moderate bearing strength; moderate shrink-swell potential; seasonal high water table in level areas.	Moderate to severe: moderate traffic-supporting capacity; moderate shrink-swell potential in subsoil; seasonal high water table in level areas.
Severe: seasonal high water table; poorly drained; frequent flooding in most areas.	Severe: seasonal high water table; poorly drained; frequent flooding in most areas.	Severe: seasonal high water table; poorly drained; low bearing strength; frequent flooding in most areas.	Severe: seasonal high water table; low traffic-supporting capacity; frequent flooding in most areas.

This section describes the major factors of soil formation, explains some of the processes in horizon development, and defines the current system for classifying soils.

Formation of Soils

Soil is formed through the interaction of climate, living organisms, parent material, and relief, over a period of time. Each of these factors modifies the effects of the other four. Significant differences in any one of the factors result in differences in soil characteristics.

Climate and living organisms, especially vegetation, are the active forces in soil formation. Relief, mainly by its influence on runoff and temperature, modifies the effect of climate and living organisms. The parent material also affects the kind of soil that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the changing of the parent material into soil.

The five factors that affect soil formation are discussed in the following paragraphs.

Climate

The climate of Arkansas County is characterized by long hot, humid summers, short mild winters, and abundant rainfall. It probably has not changed much from the climate under which the soils in the county formed. The climate is relatively uniform throughout the county and, consequently, does not account for significant differences among the soils.

The warm, moist climate promotes rapid chemical reaction and rapid soil formation. The large amount of available water favors the rapid leaching of soluble and colloidal materials (11). Plant remains decompose rapidly, and the organic acids thus produced hasten the development of clay minerals and the removal of carbonates. Because the soil freezes for only short periods, soil formation continues almost the year round.

Living Organisms

Higher plants and animals, as well as bacteria, fungi, and insects, are important in the formation of soils. Living organisms help to increase the content of organic matter and the supply of nitrogen in the soil, to decrease or increase the supply of other plant nutrients, and to change the structure and porosity.

Native vegetation had considerable influence on soil development in this county. The native vegetation was dominantly hardwoods. On the somewhat poorly drained to well-drained soils on bottom land, the trees were chiefly hickory, pecan, white oak, red oak, ash, and elm. The Acadia, Falaya, Miller, Norwood, and Rilla soils formed in these areas. In swales and other low and wet areas, where the Amagon, McKamie, Perry, Portland, Sharkey, and Tichnor soils formed, the principal trees were water tupelo, baldcypress, sweetgum, hackberry, cottonwood, black willow, overcup oak, pin oak, willow oak, and the understory was a dense tangle of grapevines and lianas. On uplands in the central and eastern parts of the county, where the loess is thick, the most common trees were oak, hickory, sweetgum, and ash. Calhoun, Calloway, Grenada and Loring soils formed in these places. In the central part of the county, the Grand Prairie area, the vegetation is believed to have been of a prairie or savanna type. Practically all of this area has been cultivated for a long time, but a few scattered, relict areas suggest that the native cover was dominantly big bluestem, indiangrass, wild rye, switchgrass and other tall prairie grasses, and scattered open stands of hardwoods. The Crowley and Stuttgart soils and some of the Amagon soils formed in these areas.

Man is influencing the formation of soils by clearing forests, breaking the sod, raising cultivated crops, introducing new plants, fertilizing, improving drainage, irrigating, leveling the soils, and controlling floods. Only a few results of these activities can be seen now in the soils, for example, changes in structure, color, organic-matter content, nutrient content, and thickness of the surface horizon, or plow layer. Many of the results of man's activities will probably not be evident for several centuries.

Parent Material

The soils of Arkansas County were derived from parent material deposited during two geological ages. Alluvium laid down during the Recent epoch was the parent material of the soils of the lowlands. Many of the soils in the central part of the county were derived from eolian sediments and older alluvium laid down in late Pleistocene or early Recent time.

The parent material of the soils west of and along Bayou Meto and along the Arkansas River was alluvium deposited by the river. This alluvium is a mixture of minerals derived from many kinds of soils, rock, and unconsolidated material. It washed downstream from throughout the Arkansas River basin, which extends from the Rocky Mountains and includes parts of Colorado, New Mexico, Texas, Kansas, Oklahoma, and Arkansas.

The young, loamy sediments that were deposited near the stream channel make up the natural levees on which the Norwood soils formed. Similar, but older, deposits are the parent materials of the Hebert and Rilla soils. The clayey sediments that were deposited some distance away from the channel was the material in which McKamie, Miller, Portland, and Perry soils formed. Parts of former stream channels have filled and now are wide, flat-bottomed depressions in which some of the Amagon soils formed.

The parent material of the soils along the eastern side of the county was alluvium deposited

chiefly by the Mississippi River when it flowed in the channel now occupied by the White River (7). This alluvium is a mixture of material derived from many kinds of soils, rock, and unconsolidated material, including glacial drift and loess. The drift material washed downstream from the upper reaches of the Mississippi River basin, which extends from Montana to Pennsylvania, and has been reworked, in part, by the White River and its tributaries. This alluvium has also been mixed with loess-derived sediments carried downstream by the White River.The Acadia and Sharkey soils formed in this area.

On the plains between the Bayou Meto and the flood plain of the White River, the parent material was loess 1 to 8 feet or more thick over old alluvium. This material was originally part of the alluvium brought into the area during the glacial period. During dry periods, the silt-sized material was blown out of the streambeds (20) and deposited at higher elevations over old alluvium. The Crowley, Stuttgart, and some of the Amagon soils probably formed in the area of the thinner loess deposits, and the Calhoun, Calloway, Grenada, and Loring soils formed in the area of the thicker deposits. Generally, the loess becomes thicker from west to east. Consequently, the Amagon, Crowley, and Stuttgart soils are dominant west of the Lagrue Bayou, and the Calhoun, Calloway, Grenada, and Loring soils are dominant east of the bayou.

In alluvium, textural differences are generally accompanied by some differences in chemical and mineralogical composition. The coarser sediments generally contain more quartz and less feldspar and ferromagnesium minerals than the finer textured sediments, and they commonly, but not always, contain smaller amounts of carbonates. The Acadia and Sharkey soils, on the present flood plain of the White River, are highly charged with cations but are rarely calcareous within 5 feet of the surface although they are high in calcium. The Miller and Norwood soils, on the present flood plain of the Arkansas River, are highly charged with cations and are calcareous.

Generally, soils that formed in coarser textured material have less capacity for holding plant nutrients than those that formed in clay, but they are more productive because they transmit water more readily and contain an abundance of minerals that weather easily and release nutrients for plants.

Relief

The central part of the county is a loessal plain. It is characterized by broad flats that have slopes of less than 1 precent, broken by low, nearly level and gently sloping ridges that rise 1 foot to a few feet above the flats. There are a few escarpments 5 to 20 feet high. The plain makes up about 60 percent of the county.

Along the eastern side of the plain is a narrow area of dissected slopes that are dominantly 3 to 12 percent. Around the edges of the plain are sharp breaks or escarpments 10 to 30 feet high, that separate the plain from the flood plain. The total acreage of these steep slopes and escarpments is negligible.

The flood plain, which makes up almost 40 percent of the county, is one of broad, level areas of slack water clays and low ridges on natural levees that rise 1 to 5 feet above the flats. The slope is generally less than 1 percent. There are a few gently undulating areas of narrow parallel ridges and of swales that have slopes of 3 percent.

The elevation ranges from about 140 feet to 170 feet above sea level on the flood plain and from about 175 feet to 215 feet on the loessal plain.

Time

The length of time required for formation of soil horizons depends largely upon the other factors of soil formation. Less time is generally required if the climate is warm and humid, the vegetation is luxuriant, and the parent material is loamy. It seems probable that the sediments now forming most of the land surface in Arkansas County were deposited during and after the advances of the continental glaciers. The last of these glaciers retreated from the North Central States about 11,000 years ago.

On the loessal plain and on the higher, older parts of the flood plain are soils that have clearly expressed horizons. Moderate intensity of development, evidence of the translocation of considerable clay, and the leaching of most of the free carbonates indicate that weathering has been going on for several thousand years. All of the soils of the loessal plain are of about the same age. Rilla and Hebert soils are among the older ones on the flood plain. In many places on first bottoms along present streams, the soil material is little more than raw alluvium. The parent material has been in place too short a time for genetic horizons to form, and only a moderate content of organic matter has accumulated in the uppermost few inches. These areas receive fresh sediments each year. The Norwood soils are an example of the young soils in these areas.

Processes of Soil Formation

The soils in Arkansas County have horizons that developed through one or more of the following processes: (1) the accumulation of organic matter, (2) the leaching of calcium carbonates and bases, (3) the reduction and transfer of iron, and (4) the translocation of silicate clay minerals. In most of the soils, more than one of these processes was involved.

Accumulation of organic matter in the uppermost part of the profile has been an important process in horizon development. The A1 horizon is darker colored because organic matter has been added, and the A2 horizon is lighter colored because organic matter as well as clay minerals and iron oxides have been

removed. The content of organic matter in the soils of this county ranges from medium or moderately high to low.

Most of the soils in this county are moderately leached to strongly leached. Except for the Miller and Norwood soils, nearly all of them have been leached of carbonates. Generally, the leaching of bases precedes the translocation of silicate clay minerals.

Reduction and transfer of iron are evident in the somewhat poorly drained and poorly drained soils. These processes have been important in the formation of the Acadia, Amagon, Calhoun, Calloway, Crowley, Falaya, Hebert, Perry, Portland, Sharkey, and Tichnor soils. Gray colors are evidence of the reduction of iron. Mottles of red, brown, and yellow in some horizons and iron concretions in other horizons indicate the segregation of iron. The iron concretions are made up of segregated iron compounds in a complex with organic matter and manganese or other oxides.

The translocation, or downward movement, of clay minerals has contributed to horizon development in most of the soils in the county. The eluviated A2 horizon contains less clay and generally is lighter colored than the B horizon. The B horizon generally has an accumulation of clay in the form of clay films in pores and on ped surfaces. The C horizon contains less clay than the B horizon.

The distribution of clay in a profile of a Calloway and a Loring soil, both of which are about the same age, is shown in figure 2. The shape of the curves suggests that the translocation of clay is more advanced in the Calloway soil than in the Loring soil. Both soils formed in loess, but they occur in different topographic positions. Calloway soils are in level areas where runoff is slow and a large amount of water percolating through the soil carries much of the clay downward and deposits it in the lower horizons. Loring soils are in more sloping areas where more water runs off and less water percolates through the soil and less clay is carried downward.

The distribution of clay in a profile of Hebert silt loam and of Norwood silt loam is shown in figure 3. These soils formed in stratified sediments. Stratification rather than translocation of clay minerals dominates horizon differentiation. In the Hebert soil there is evidence of translocation of clay in the form of clay films on peds and in pores, but in the younger Norwood soil there is no visible evidence. Nevertheless, the shape of the clay curves, is essentially the same for both soils.

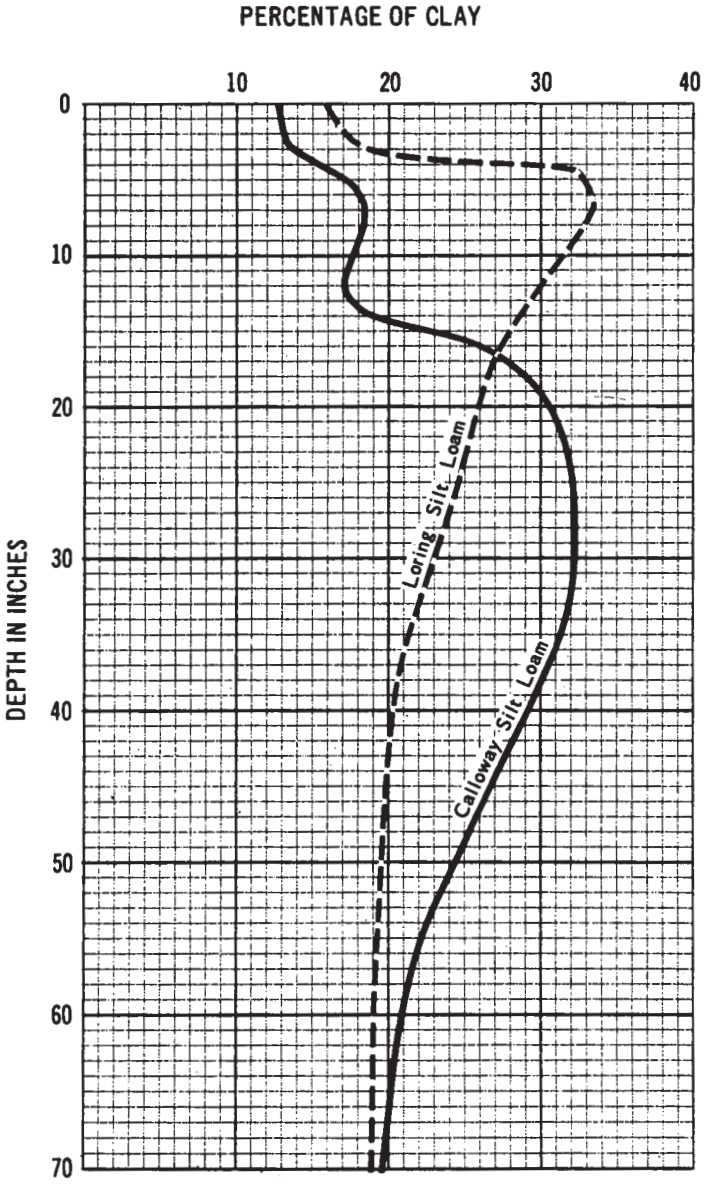

Figure 2.--Distribution of clay in profiles of Calloway silt loam and Loring silt loam. Both soils formed in loess and are about the same age.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in

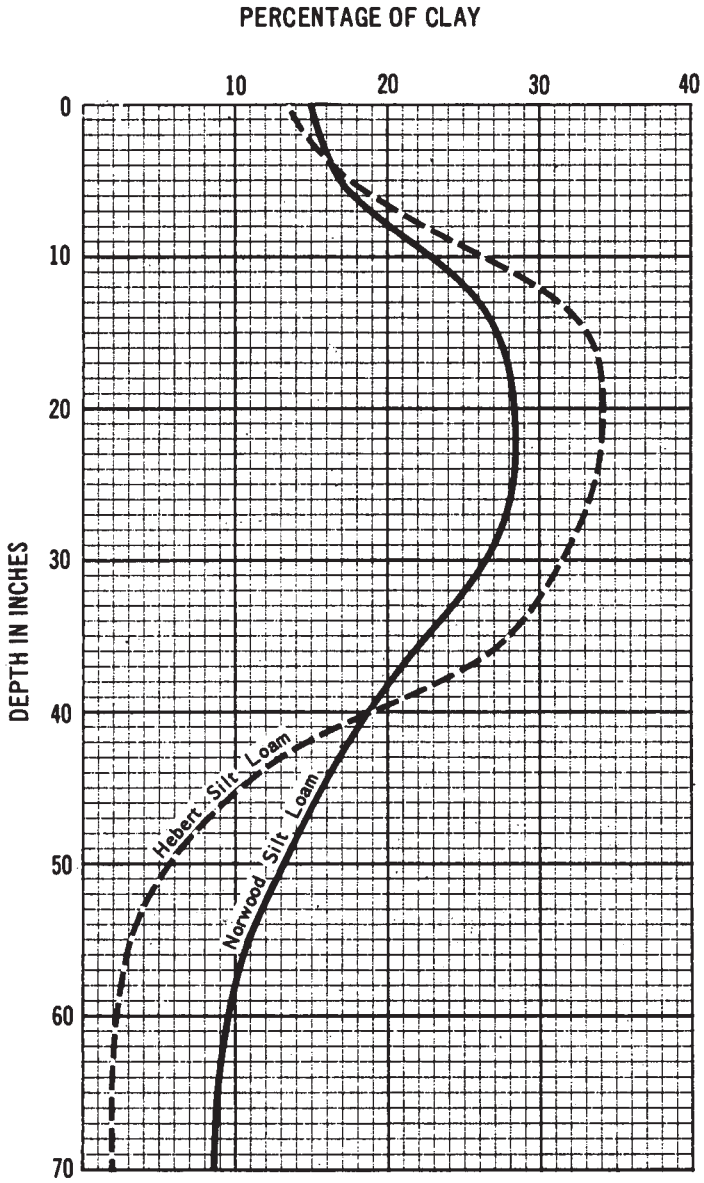

Figure 3.--Distribution of clay in profiles of Hebert silt loam and Norwood silt loam. Both soils formed in stratified alluvium.

detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (3) and revised later (10) The system currently used by the National Cooperative Soil Survey was developed in the early sixties (9) and was adopted in 1965 (15). It is under continual study.

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 9 shows the classification of each soil series of Arkansas County by family, subgroup, and order, according to the current system.

Except for the soil series, the classes that make up the current system are defined briefly in the following paragraphs. Soil series is defined in the section "How This Survey Was Made." A detailed description of each soil series in the county is given in the section "Descriptions of the Soils."

ORDER.--Ten soil orders are recognized in the current system of classification. They are Alfisols, Aridisols, Entisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, and Vertisols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Three exceptions are Entisols, Histosols, and Inceptisols, which occur in many climates.

Four of the soil orders are represented in Arkansas County. They are Alfisols, Entisols, Inceptisols, and Mollisols.

Alfisols have an accumulation of aluminum and iron, argillic or natric horizons, and a base saturation of more than 35 percent.

Entisols are recent mineral soils that have little, if any, horizon development.

Inceptisols are mineral soils that formed mostly in young but not recent material.

Mollisols are mineral soils that have a thick, dark-colored surface layer, moderate or strong structure, and a base saturation of more than 50 percent.

SUBORDER.--Each order is divided into suborders, primarily on the basis of soil characteristics that produce classes having genetic similarity. A suborder has a narrower climatic range than an order.

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TABLE 9.--SOIL SERIES CLASSIFIED INTO HIGHER CATEGORIES

Series 1/	Family	Subgroup	Order
Acadia 2/	Fine, montmorillonitic, thermic	Aeric Ochraqualfs	Alfisols.
Amagon	Fine-silty, mixed, thermic	Typic Ochraqualfs	Alfisols.
Calhoun	Fine-silty, mixed, thermic	Typic Glossaqualfs	Alfisols.
Calloway 3/	Fine-silty, mixed, thermic	Glossaquic Fragiudalfs	Alfisols.
Crowley 4/	Fine, montmorillonitic, thermic	Typic Albaqualfs	Alfisols.
Falaya	Coarse-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Grenada	Fine-silty, mixed, thermic	Glossic Fragiudalfs	Alfisols.
Hebert	Fine-silty, mixed, thermic	Aeric Ochraqualfs	Alfisols.
Loring	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
McKamie 5/	Fine, mixed, thermic	Vertic Hapludalfs	Alfisols.
Miller	Fine, mixed, thermic	Vertic Haplustolls	Mollisols.
Norwood	Fine-silty, mixed (calcareous), thermic	Typic Udifluvents	Entisols.
Perry 6/	Very-fine, montmorillonitic, nonacid, thermic.	Vertic Haplaquepts	Inceptisols.
Portland 7/	Very-fine, mixed, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Rilla	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols.
Sharkey	Very-fine, montmorillonitic, nonacid, thermic.	Vertic Haplaquepts	Inceptisols.
Stuttgart	Fine, montmorillonitic, thermic	Typic Natrudalfs	Alfisols.
Tichnor	Fine-silty, mixed, thermic	Typic Ochraqualfs	Alfisols.

1/ The Acadia, Calloway, Crowley, McKamie, Perry, and Portland soils in this county are taxadjuncts to their respective series. A taxadjunct is a soil named for the series it strongly resembles. It differs from that series in ways too small to be of consequence in interpreting usefulness or behavior.

2/ This soil lacks the red mottles and is less acid than is defined in the range for the Acadia series.

3/ The B horizon of this soil has slightly less clay than is defined in the range for the Calloway series.

4/ This soil contains less sand and is thicker than is defined in the range for the Crowley series.

5/ This soil has no cracks within a depth of 20 inches and has no slickensides and is therefore outside the defined range for the McKamie series.

6/ This soil has a noncalcareous C horizon and is therefore outside the defined range for the Perry series.

7/ This soil is not calcareous within a depth of 40 inches and is therefore outside the defined range for the Portland series.

The criteria for suborders reflect either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

GREAT GROUP.--Each suborder is divided into great groups on the basis of uniformity in the kind and sequence of genetic horizons.

SUBGROUP --Each great group is divided into subgroups, one representing the central (typic) concept of the group, and others, called intergrades, made up of soils that have mostly the properties of one great group but also one or more properties of another great group.

FAMILY.--Families are established within subgroups, primarily on the basis of properties important to plant growth. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

Physical and Chemical Analyses

Physical and chemical data resulting from laboratory analyses are useful in classifying soils. These data are helpful in estimating available water capacity, acidity, base-exchange capacity, mineralogical composition, organic-matter content, and other soil characteristics that affect management. The data are also helpful in developing concepts of soil formation. More recently, laboratory data have been helpful in rating soils for residential, industrial, recreational, or transportational use.

The soils that are extensive and most important in the survey area are first considered when selecting soils for laboratory analyses. Generally, priority is given to the soils for which little or no laboratory data are available.

Soils representing nine soil series in Arkansas County were selected for laboratory analyses; then tests were made by the Soils Laboratory, University of Arkansas, in Fayetteville, Ark. Table 10 gives data obtained from the analyses. The data reported in table 10 are for profiles described in the section "Descriptions of the Soils." The textures given in the section "Descriptions of the Soils" are field estimates and do not necessarily agree with those given in table 10. Analyses and profile descriptions for other important soils in the county have been published elsewhere (18).

Particle-size distribution was determined by the hydrometer method (5).

The organic carbon was determined by the Walkley-Black method of digestion with potassium dichromate-sulfuric acid (8). The percentage of organic matter was then calculated, using the equation: Percent organic carbon X 1.72 = percent organic matter.

Soil pH was determined on mixtures of soil and water at a ratio of 1:1, using a Beckman pH meter.

Available phosphorus was extracted by the Bray No. 1 solution (0.03N NH_4F in 0.025 N HCL) and was determined colorimetrically.

Calcium, magnesium, potassium, and sodium were extracted with 1N ammonium acetate buffered at pH 7.0. Magnesium was determined colorimetrically (8). Potassium, calcium, and sodium were determined by a flame photometer. The extractable acidity was determined by the Barium chloride-triethanolamine method (4).

The total of extractable calcium, potassium, magnesium, and sodium is an approximation of the cation exchange capacity of the soil. The base saturation percentage was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium and multiplying by 100.

TABLE 10.--PHYSICAL AND CHEMICAL

[Analyses by Soils Laboratory, University of Arkansas, Fayetteville, Ark.

Soil and sample number	Depth	Horizon	USDA texture	Particle-size distribution		
				Very coarse sand to medium sand (2 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)
	In.			Pct.	Pct.	Pct.
Acadia silty clay loam: S-66-Ark-1-19.	0-4	A1	Silty clay loam--	2.4	6.0	2.6
	4-10	A2	Silt loam--------	1.0	7.5	3.9
	10-18	B21t	Silty clay loam--	3.2	6.9	3.2
	18-32	B22t	Silty clay-------	.4	3.9	2.1
	32-58	B23t	Silty clay loam--	.8	2.8	3.4
	58-72	IIC	Loam-------------	4.4	32.3	13.1
Amagon silt loam: S-65-Ark-1-4.	0-6	Ap	Silt loam--------	2.3	8.4	6.8
	6-17	A2g	Silt loam--------	1.9	7.0	5.0
	17-30	B2tg	Silty clay loam--	.4	5.4	8.6
	30-72	B3g	Silty clay loam--	.9	5.1	3.2
Calloway silt loam: S-66-Ark-1-3.	0-5	Ap	Silt loam--------	.8	.6	.9
	5-9	B2	Silt loam--------	.8	.3	.4
	9-14	B&A	Silt loam--------	.4	.2	.2
	14-19	B'x1	Silty clay loam--	.9	.2	.3
	19-50	B'x2	Silty clay loam--	.8	.6	.4
	50-72	B3g	Silt loam--------	0	.1	.3
Crowley silt loam: S-65-Ark-1-5.	0-5	Ap	Silt-------------	.6	1.4	4.5
	5-9	A12	Silt loam--------	.4	.6	3.5
	9-15	A2g	Silt-------------	.2	.7	4.0
	15-30	B21tg	Silty clay-------	.1	.3	2.5
	30-72	B22tg	Silty clay loam--	.2	.9	3.9
Hebert silt loam: S-66-Ark-1-14.	0-3	A1	Silt loam--------	.9	2.1	17.8
	3-14	A2	Silt loam--------	.4	2.0	13.5
	14-28	B21t	Clay loam--------	.1	2.2	29.1
	28-41	B22t	Loam-------------	0	2.0	35.4
	41-52	IIC1	Loamy fine sand--	0	43.3	38.7
	52-72	IIC2	Fine sand--------	.1	61.9	25.5
Loring silt loam: S-66-Ark-1-1.	0-4	Ap	Silt loam--------	.5	.5	1.5
	4-8	B21t	Silty clay loam--	0	.6	.3
	8-15	B22t	Silty clay loam--	0	.3	.3
	15-21	B23t	Silt loam--------	0	.3	.3
	21-29	Bx1	Silt loam--------	.1	.2	.3
	29-42	Bx2	Silt loam--------	.2	.2	1.9
	42-72	B3	Silt loam--------	.4	.4	3.3
McKamie silt loam: S-66-Ark-1-11.	0-7	A1	Silt loam--------	.6	.4	.8
	7-25	B21t	Clay-------------	.2	.2	.5
	25-35	B22t	Silty clay-------	.2	.2	.2
	35-69	B23t	Silty clay loam--	0	---	6.8
	69-72	IIC	Very fine sandy loam.	0	16.0	53.4

ANALYSES OF SELECTED SOILS

Lack of data indicates analyses were not made or that data are insignificant]

Particle-size distribution--continued			Extractable bases (milliequivalents per 100 grams of soil)				Extractable acidity	Base saturation	Reaction (soil-water ratio of 1:1)	Organic matter	Available phosphorus
Total sand (2.0 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than (0.002 mm.)	Calcium	Magnesium	Sodium	Potassium					
Pct.	Pct.	Pct.						Pct.	pH	Pct.	P.P.M.
11.0	49.6	39.4	8.5	2.7	0.1	0.4	9.9	54	5.8	4.0	11
12.4	64.5	23.1	5.3	2.1	.1	.2	5.1	60	5.8	1.0	5
13.3	55.7	31.0	5.1	2.1	.2	.2	5.6	58	5.9	.9	4
6.4	51.8	41.8	6.6	2.7	.2	.3	6.3	61	6.0	.7	4
7.0	53.7	39.3	8.9	3.4	.2	.4	7.5	63	6.2	.5	4
49.8	30.9	19.3	5.8	2.5	.2	.2	3.2	73	6.4	.4	9
17.5	69.2	13.3	4.0	1.3	.3	.1	6.1	48	5.9	.7	1
13.9	62.2	23.9	3.4	1.6	.6	.2	7.4	44	5.4	.4	4
14.4	57.2	28.4	4.9	2.5	.8	.3	8.9	49	5.4	.3	3
9.2	53.4	37.4	6.5	3.3	1.1	.3	9.6	54	5.3	.4	2
2.3	85.0	12.7	1.6	.6	.2	.2	11.1	19	5.1	2.3	12
1.5	80.2	18.3	.4	.2	.2	.1	9.8	8	5.2	.8	6
.8	81.5	17.7	.6	1.5	1.1	.1	9.1	27	5.7	.3	4
1.4	67.9	30.7	2.6	3.1	2.3	.2	13.8	37	5.8	.2	2
1.8	68.7	29.5	1.1	2.2	1.3	.2	12.4	28	5.3	0	1
.4	79.8	19.8	2.6	3.1	2.3	.2	2.0	80	7.1	.1	13
6.5	82.2	11.3	5.9	1.1	.5	.2	2.0	79	7.4	1.1	2
4.5	81.5	14.0	4.4	.8	.6	.1	2.2	73	7.5	.4	3
4.9	83.8	11.3	3.6	.7	.7	.1	3.1	62	6.8	.4	3
2.9	55.4	41.7	2.9	.9	1.7	.2	16.2	26	5.2	.7	6
5.0	64.1	30.9	7.5	3.0	2.6	.3	5.6	71	5.6	.2	9
20.8	65.3	13.9	13.3	1.3	.1	.2	14.8	50	5.8	3.5	56
15.9	61.6	22.5	1.3	1.6	.2	.2	7.1	32	5.5	.2	30
31.4	35.5	33.1	.4	3.2	.2	.4	16.7	20	5.1	.3	19
37.4	38.6	24.0	.4	2.7	.2	.3	9.7	27	5.1	1.6	20
82.0	15.0	3.0	.4	.8	.1	.1	2.5	36	5.5	.5	11
87.5	10.5	2.0	.6	1.2	.1	.2	2.5	46	6.0	1.5	13
2.5	81.7	15.8	1.1	.3	.2	.1	7.2	19	5.6	1.6	2
.9	65.9	33.2	1.0	.6	.2	.2	13.0	13	5.6	.5	2
.6	70.9	28.5	.8	.6	.2	.2	11.7	13	5.5	.3	1
.6	73.6	25.8	.9	.8	.4	.2	12.0	16	5.6	.2	3
.6	74.9	24.5	1.3	1.1	.5	.2	12.3	20	5.7	.1	2
2.3	76.5	21.2	1.5	.9	.6	.1	9.2	25	5.6	.1	2
4.1	77.4	18.5	1.9	.9	.7	.1	6.3	36	5.5	0	4
1.8	75.6	22.6	1.4	1.1	.1	.2	14.2	16	5.5	1.8	11
.9	38.1	61.0	1.8	6.3	.9	.6	17.7	35	5.2	0	7
.6	44.9	54.5	2.6	7.4	1.3	.6	10.4	53	5.1	.1	13
6.8	66.7	26.5	2.0	5.3	1.2	.3	2.0	81	6.8	0	18
69.4	23.8	6.8	1.2	2.4	.5	.1	1.0	81	7.6	.1	13

TABLE 10.--PHYSICAL AND CHEMICAL

Soil and sample number	Depth	Horizon	USDA texture	Particle-size distribution		
				Very coarse sand to medium sand (2 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)
	In.			Pct.	Pct.	Pct.
Miller silty clay: S-65-Ark-1-1	0-7	Ap	Silty clay-------	---	0.2	0.2
	7-45	B2	Silty clay-------	---	.2	.6
	45-55	IIC1	Silt loam--------	---	.3	9.0
	55-72	IIC2	Silt loam--------	---	.2	12.7
Norwood silt loam: S-65-Ark-1-2	0-8	A1	Silt loam--------	---	.2	1.5
	8-33	C1	Silt loam--------	---	.2	3.8
	33-52	C2	Silt loam--------	---	.1	7.7
	52-72	C3	Silt loam--------	---	.1	26.4

ANALYSES OF SELECTED SOILS--Continued

Particle-size distribution--continued			Extractable bases (milliequivalents per 100 grams of soil)				Extractable acidity	Base saturation	Reaction (soil-water ratio of 1:1)	Organic matter	Available phosphorus
Total sand (2.0 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (less than 0.002 mm.)	Calcium	Magnesium	Sodium	Potassium					
Pct.	Pct.	Pct.						Pct.	pH	Pct.	P.P.M.
0.4	50.3	49.3	---	3.2	0.2	0.8	2.4	---	7.6	2.2	27
.8	47.2	52.0	---	3.6	.2	.7	3.7	---	7.7	1.3	13
9.3	73.4	17.3	---	1.6	.2	.2	1.4	---	7.9	.3	8
12.9	76.4	10.7	---	1.3	.2	.2	.9	---	8.1	.1	5
1.7	83.1	15.2	---	.9	.1	.3	1.4	---	8.1	.4	10
4.0	71.9	24.1	---	1.5	.2	.3	2.5	---	7.4	.8	11
7.8	73.9	18.3	---	1.4	.2	.2	2.1	---	7.8	.3	12
26.5	64.8	8.7	---	1.0	.1	.2	1.6	---	7.5	.2	9

This section tells something about the farming in Arkansas County; the physiography, relief, and drainage; the water supply; and the climate.

Farming

The early economy of Arkansas County was based on general farming and logging. The main cash crops were cotton, corn, oats, wheat, and cattle. The county is still mainly a farming area, but farming has become more specialized. Rice is now the main crop. Other crops, such as soybeans and cotton, are grown in rotation with rice and benefit from the irrigation system that rice culture requires. Fish for food or bait is grown in shallow reservoirs in rotation with rice.

About 64 percent of the county is in farms. Between 1959 and 1964, the number of farms in the county decreased from 1,213 to 951, but the average size of farms increased from 371 acres to 444 acres. The greatest reduction in number was in farms less than 100 acres in size. In 1964 there were 642 farms less than 500 acres in size and 309 farms 500 acres or more. Of the farm operators, 298 were full owners, 323 were part owners, 7 were managers, and 323 were tenants. Most of the farms are small enough that the family, with occasional outside help, can do most of the work. The larger farms are operated by tenants or day laborers under the supervision of the owner or manager. Some tenants pay a fixed rent, but most pay a share of the crop.

Most of the farms are general farms. Soybeans, rice, winter small grain, cotton, and lespedeza, for seed, are the main crops. A small acreage is used for corn, sorghum, vegetables, fruit, and nuts.

According to the U.S. Census of Agriculture, the acreage of principal crops and pasture in 1964 was as follows:

Crops	Acres
Soybeans (harvested for beans)	172,350
Rice	73,071
Oats (for grain)	27,323
Cotton	7,541
Lespedeza (for seed)	6,932
Hay	2,459
Wheat	1,350
Pasture (cropland pastured and improved pasture)	16,528

The number of cattle and calves in the county was 13,741, the number of hogs and pigs 1,222, and the number of chickens, 4 months old and over, was 12,974.

Most of the farms are highly mechanized; all are mechanized to some extent. The equipment reported on the farms in 1964 was as follows:

Equipment	Number
Automobiles	1,099
Motortrucks (including pickups)	2,211
Tractors (other than garden)	2,723
Grain and bean combines	926

Most farmers use chemicals for insect or weed control. In 1964, 863 farms had 26,155 tons of fertilizer applied on 249,135 acres, and 78 farms had 7,979 tons of lime applied on 4,759 acres. Nitrogen is the most needed fertilizer for locally grown crops. Phosphate and potash are needed for most crops.

Among the industrial enterprises related to farming are rice milling, soybean processing, grain storage, lumber milling, well drilling for irrigation, manufacture of specialized farm implements, land clearing, earth moving for land grading, drainage, reservoir construction, and aerial crop dusting.

Physiography, Relief, and Drainage

Arkansas County is made up of two main areas, the loess plain and the bottom land along the Arkansas River and the White River.

The bottom land consists of wide flats broken by low ridges and swales. Bayous and oxbow lakes are common. Most are former river channels or cutoff meanders. The loess plain is one of dominantly wide flats broken by low, gently sloping ridges. The bottom land is separated from the loessal plain by an escarpment that is 10 to 30 feet high in most places.

The overall slope of the county is to the south. The elevation ranges from about 140 to 170 feet above sea level on the bottom land, and from about 175 to 215 feet on the plain.

The natural drainage of the county is by the Arkansas River on the south, the White River on the east, and their tributary bayous. Among the largest are Bayou Meto along the western side, Little Lagrue Bayou and Lagrue Bayou in the central part, and Wells Bayou in the southern part. These natural drainageways are outlets for the complex of drainage ditches constructed in the county.

Water Supply

There is a good supply of surface water in the county. Among the principal streams and bayous are the Arkansas River, the White River, Lagrue Bayou, Little Lagrue Bayou, Mill Bayou, Cypress Bayou, and Bayou Meto. Among the main lakes are Moody Old River, Flag Lake, Dumond Lake, Garland Lake, Cox Cypress Lake, Big Cypress Lake, Jim Smith Lake, Lower White Lake and H Lake. There are many other lakes; many are oxbows of the Arkansas and White Rivers.

Many farmers have constructed reservoirs 20 to 1,600 acres in size. According to the 1964 Census of Agriculture, 447 reservoirs, covering 13,614 acres, had been constructed.

The supply of ground water generally is abundant. Wells 6 to 12 inches in diameter have been drilled to a depth of 110 to 120 feet. Depending on the diameter of the well and the yield of the aquifer, they furnish 500 to 3,000 gallons of water a minute. The water is generally of good quality and is used for irrigation. The water level in these wells has been lowered as much as 10 feet during the period 1938 to 1953 (2). In parts of the county the water table has been lowered about 1 foot per year during the time that records have been kept. In much of the Grand Prairie area the water table in the quaternary aquifer has been lowered more than 20 feet (6).

Climate [6/]

Arkansas County has hot humid summers, mild winters, and generally abundant rainfall. Table 11 shows data on precipitation and temperature from the U. S. Weather Bureau Station at Stuttgart. These data are representative of Arkansas County.

Summer is characterized by bright sunshine and high temperatures, broken by short periods of thunderstorms that may be followed by either clear, cooler weather or several days of cloudy, rainy, and cooler weather. Below-freezing periods are brief, and subzero temperatures are rare. In most years snowfall is negligible. The normal annual snowfall is less than 4 inches, and the snow usually melts within 24 hours. Sleet or freezing rain and drizzle occur less frequently than once a year.

Precipitation generally is adequate for farm crops. It averages about 53 inches a year. Roughly 60 percent of the annual precipitation falls in winter and in spring; heavy rain is most likely in spring. Table 11 shows that there is a 90 percent chance that precipitation in spring will exceed 2 inches per month, and a 10 percent chance of 7.5 inches or more per month from November through May. January and March are the wettest months; the average rainfall is more than 5.5 inches.

Summer rainfall from thunderheads is erratic and unpredictable. Short periods of drought that affect parts of the county are frequent, and summer drought of a month of more has occurred. Droughts in 1930 and in 1954 caused severe and widespread crop damage ranging from sharply reduced yields to crop failure. In some years droughts severe enough to injure seedlings and shallow-rooted crops occur in April, May, and June. In most years at least one drought that lasts 15 days or more occurs in the period June through September. Such droughts damage but do not kill the crops. Drought days, that is, days on which well-drained soils have little or no available water in the upper 12 inches, are most common in August, September, and October. During the hottest part of the summer, evaporation of water from the soil averages a third of an inch a day.

Thunderstorms occur on about 50 to 55 days a year, but they are not ordinarily accompanied by damaging winds. Thirty-five tornadoes have been observed in the area from 1916 through 1961.

In spring, wetness is common. In most years it interferes with spring planting. In low-lying areas planting may have to be delayed several weeks in a wet season. Occasionally, crops planted early in spring are damaged by a late frost and have to be replanted. The normally dry weather in late summer and fall is favorable for harvesting, but it is not favorable for fall seeding, or for the growth of pasture plants. Only occasionally is frost early enough in fall to damage the quality or yield of summer crops. Fall-sown small grain remains vigorous enough for grazing throughout the winter.

The growing season is long; more than 60 percent of the year is frost-free. Records from the U. S. Weather Bureau station at Stuttgart show that the average length of the growing season is about 228 days. The average date of the last 32° temperature in spring is March 23, and the average date of the first in fall is November 6. The latest that a temperature of 32° has been recorded is April 15 and the earliest is October 15. The average date of the latest 28° reading in spring is March 5, and that of the first in fall is November 15. The latest that a temperature of 28° has been recorded is April 3 and the earliest is October 23.

6/ ROBERT O. REINHOLD, meteorologist, National Weather Service, Little Rock, Ark., helped prepare this section.

TABLE 11.--TEMPERATURE AND PRECIPITATION DATA

[All data from Stuttgart for the period 1931 through 1960]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with--		Average 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----	53.6	33.9	77	10	5.86	1.71	10.75
February---	56.6	36.3	79	14	4.93	2.05	9.24
March------	65.6	42.3	84	21	5.56	2.93	7.89
April------	74.5	51.5	89	32	5.02	2.30	7.49
May--------	82.1	60.0	94	43	4.84	2.23	8.57
June-------	90.0	68.2	102	54	3.91	.84	7.06
July-------	93.4	71.4	103	60	4.16	1.03	7.29
August-----	93.4	70.3	105	57	3.05	.56	6.08
September--	87.7	63.2	102	43	3.23	1.10	5.28
October----	77.8	51.9	94	30	2.99	.86	5.12
November---	64.0	40.6	83	19	4.43	1.77	8.57
December---	55.1	35.3	79	15	4.73	1.76	9.48
Year-----	74.5	52.1	1/103	2/12	52.71	39.91	66.84

1/ Average annual maximum.

2/ Average annual minimum.

LITERATURE CITED

(1) American Association of State Highway Officials.
1961. Standard Specifications for Highway Materials and Methods of Sampling and Testing. Ed. 8, 2 v., illus.

(2) Baker, R. C.
1955. Arkansas' Ground Water Resources. Ark. Geol. and Conserv. Comm. Water Resources Circ. No. 1. 16 pp., illus.

(3) Baldwin, Mark, Kellogg, Charles E., and Thorp, James.
1938. Soil Classification. U.S. Dept. Agr. Ybk.: 978-1001, illus.

(4) Chapman, Homer D., and Pratt, Parker F.
1961. Methods of Analysis for Soils, Plants, and Waters. Div. Agr. Sci., Univ. Calif. 309 pp., illus.

(5) Day, Paul R., et al.
1956. Report of the Committee on Physical Analyses, 1954-55. Soil Sci. Soc. Amer. Proc. 20: 167-169.

(6) Engler, Kyle, Bayley, F.H. 3d., and Sniegocki, R.T.
1963. Studies of Artificial Recharge in the Grand Prairie Region, Arkansas, Environment and History. U.S. Dept. Int., Geol. Surv. Water Supply Paper 1615-A, 32 pp., illus.

(7) Fisk, Harold N.
1944. Geological Investigation of the Alluvial Valley of the Lower Mississippi River. U.S. Army, Corps of Engineers, 78 pp., illus.

(8) Jackson, M. L.
1958. Soil Chemical Analysis. 498 pp., illus. Prentiss-Hall, Inc., Englewood Cliffs, N. J.

(9) Simonson, Roy W.
1962. Soil Classification in the United States. Sci. 137: 1027-1034, illus.

(10) Thorp, James, and Smith, Guy D.
1949. Higher Categories of Soil Classification: Order, Suborder, and Great Soil Groups. Soil Sci. 67: 117-122.

(11) United States Department of Agriculture.
1938. Soils and Men. U.S. Dept. Agr. Ybk., 1232 pp., illus.

(12) _____
1951. Soil Survey Manual. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.

(13) _____
1959. Guide for Evaluating Sweetgum Sites. U.S. Forest Serv. Occasional Paper 176, 8 pp., illus.

(14) _____
1959. Field Guide for Evaluating Cottonwood Sites. U.S. Forest Serv. Occasional Paper 178, 6 pp., illus.

(15) _____
1960. Soil Classification, a Comprehensive System, 7th Approximation. 265 pp., illus. [Supplements issued in March 1967 and in September 1968]

(16) _____
1961. Guide for Evaluating Cherrybark Oak Sites. U.S. Forest Serv. Occasional Paper 190, 8 pp., illus.

(17) _____
1963. Guide for Evaluating Water Oak Sites. U.S. Forest Serv. Res. Paper SO-1, 8 pp., illus.

(18) _____
1966. Soil Survey Laboratory Data and Descriptions for Some Soils of Arkansas, Louisiana, Mississippi. Soil Survey Investigations Report No. 6, 137 pp.

(19) United States Department of Defense.
1968. Unified Soil Classification System for Roads, Airfields, Embankments, and Foundations. MIL STD-619B, 30 pp., illus.

(20) Wascher, H. L., Humbert, R. P., and Cady, J. G.
1947. Loess in the Southern Mississippi Valley: Identification and Distribution of the Loess Sheets. Soil Sci. Soc. Amer. Proc. 12: 389-399 illus.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field 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.

Bedding planes.--Fine stratifications, less than 5 millimeters thick, of unconsolidated alluvial, eolian, lacustrine, or marine sediments.

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.

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.

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 thump 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.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter 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.

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.

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 material 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.

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.

Natural soil drainage. Refers to the conditions 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 in Podzolic soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

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.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil, and carbon, hydrogen, and oxygen obtained largely from the air and water, are plant nutrients.

Parent material. The disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: very slow, slow, moderately slow, moderate, moderately rapid, rapid, and very rapid.

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

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

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

Sand. Individual rock or mineral fragments in soils having diameters ranging 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.

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.

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.

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.

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 (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

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.

Taxadjunct. A soil named for the series it strongly resembles. It differs from that series in ways too small to be of consequence in interpreting usefulness or behavior.

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.

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.

GUIDE TO MAPPING UNITS

For complete information about a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. For complete information about a capability unit, read the introduction "Use of Soils for Crops and Pasture," which gives general information about management. For information about the suitability of the soils for woodland and as wildlife habitat, read the introduction to these sections and refer to the tables in each section. Other information is given in tables as follows:

Acreage and extent, table 1, page 6.
Predicted yields, table 2, page 28.
Woodland suitability groups, table 3, page 30.
Engineering uses of soils, tables 5, 6, and 7, pages 38 through 49.
Uses of soils in town and country planning, table 8, page 52.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Symbol
Ac	Acadia silty clay loam	7	Vw-1	27	3w6
Am	Amagon silt loam	8	IIIw-1	26	2w6
An	Amagon silt loam, heavy substratum	8	IIIw-1	26	2w6
Ca	Calhoun silt loam	9	IIIw-1	26	3w9
Cb	Calloway silt loam	10	IIw-1	25	3w8
Cr	Crowley silt loam	11	IIIw-1	26	3w9
Cs	Crowley and Stuttgart silt loams	11			
	Crowley	--	IIIw-1	26	3w9
	Stuttgart	--	IIw-1	25	3w8
Fa	Falaya silt loam	12	IIw-2	25	1w5
GrA	Grenada silt loam, 0 to 1 percent slopes	13	IIw-1	25	3o7
GrB	Grenada silt loam, 1 to 3 percent slopes	13	IIe-1	25	3o7
GrC	Grenada silt loam, 3 to 8 percent slopes	13	IIIe-1	26	3o7
Hb	Hebert silt loam	14	IIw-2	25	2w5
LoB	Loring silt loam, 1 to 3 percent slopes	15	IIe-1	25	3o7
LoC	Loring silt loam, 3 to 8 percent slopes	15	IIIe-1	26	3o7
LoD	Loring silt loam, 8 to 12 percent slopes	15	IVe-1	27	3o7
MkA	McKamie silt loam, 0 to 1 percent slopes	16	IIIw-2	27	3c8
MkB	McKamie silt loam, 1 to 3 percent slopes	16	IIIe-2	26	3c8
Mr	Miller silty clay	17	IIw-3	26	2w5
No	Norwood silt loam	18	I-1	25	1o4
NrU	Norwood silty clay loam, gently undulating	18	IIs-1	26	1o4
Pe	Perry silty clay	18	IIIw-2	27	2w6
	(If frequently flooded)	--	Vw-1	27	3w6
Po	Portland silty clay loam	19	IIIw-2	27	2w6
	(If frequently flooded)	--	Vw-1	27	3w6
Rs	Rilla silt loam	20	I-1	25	2o4
Sh	Sharkey clay	21	Vw-1	27	3w6
StA	Stuttgart silt loam, 0 to 1 percent slopes	22	IIw-1	25	3w8
StB	Stuttgart silt loam, 1 to 3 percent slopes	22	IIe-1	25	3o7
StC	Stuttgart silt loam, 3 to 8 percent slopes	22	IIIe-1	26	3o7
Tc	Tichnor silt loam	23	IIIw-3	27	2w6
	(If frequently flooded)	--	Vw-1	27	2w6

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