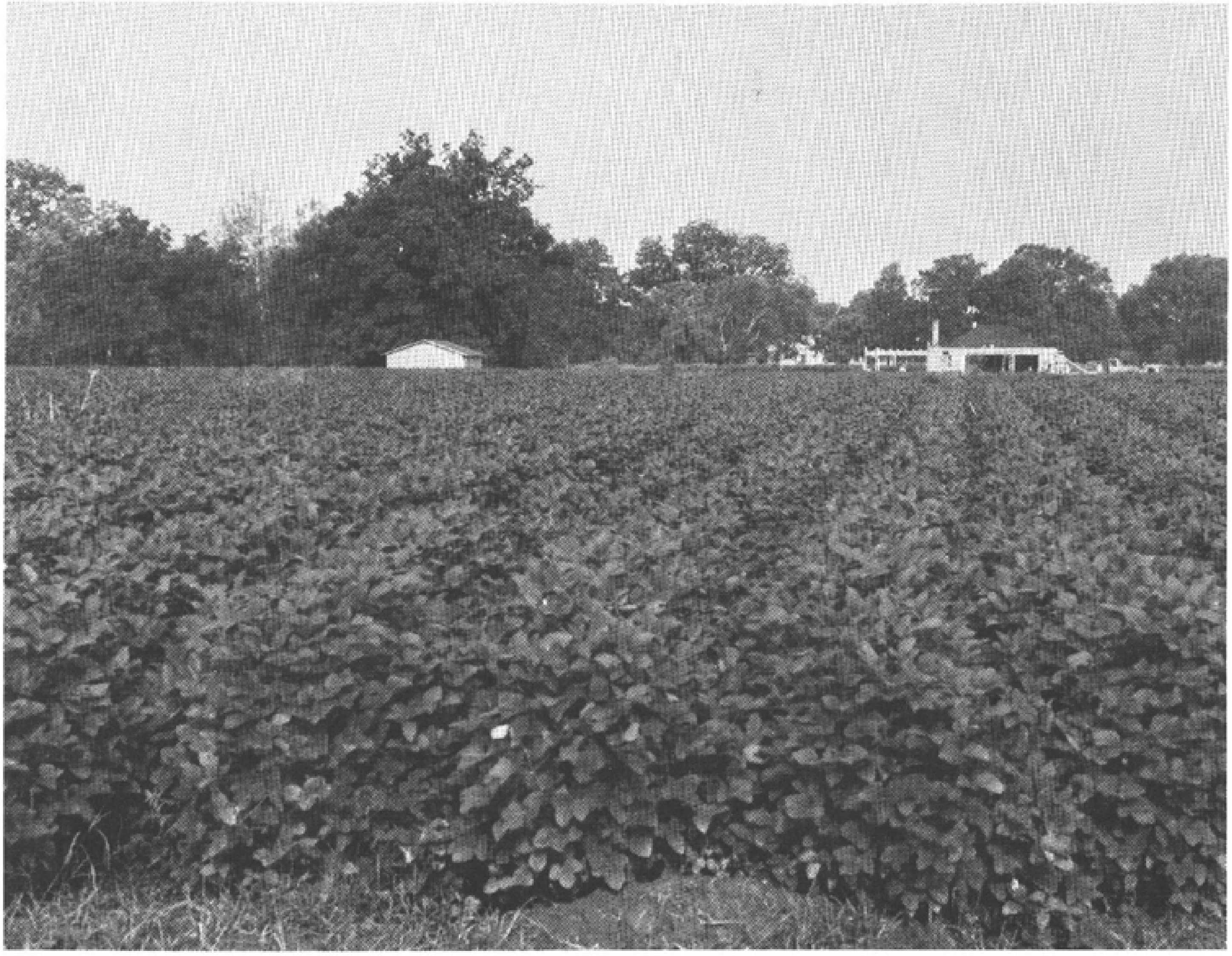
SOIL SURVEY OF
West Carroll Parish, Louisiana



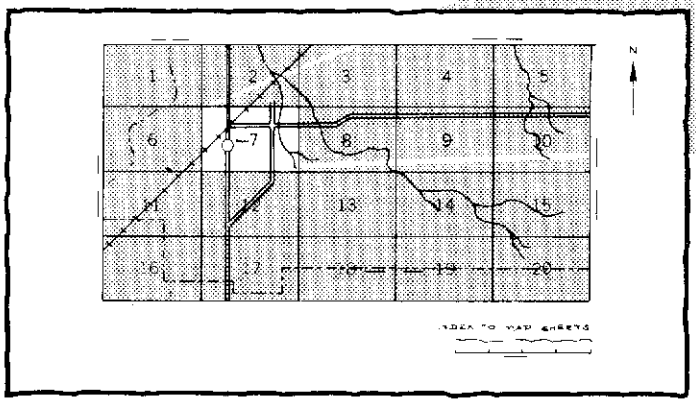
United States Department of Agriculture
Soil Conservation Service

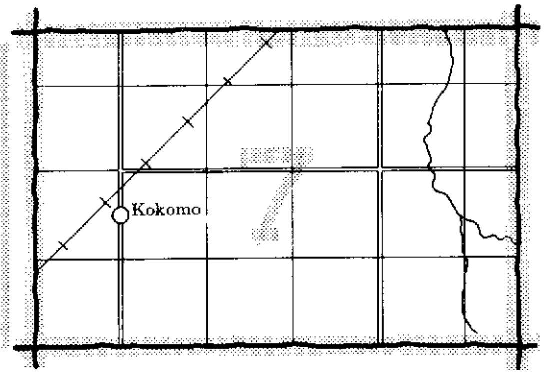
In cooperation with

Louisiana Agricultural Experiment Station

HOW TO USE

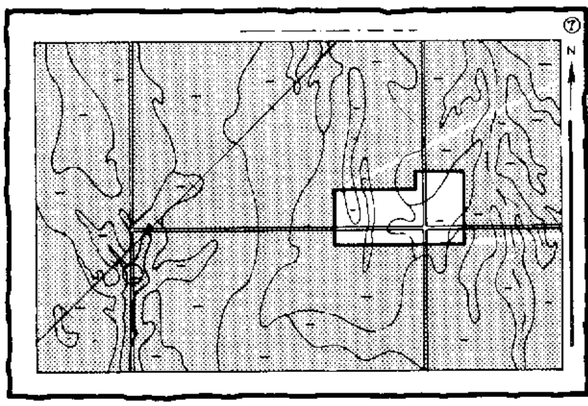
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

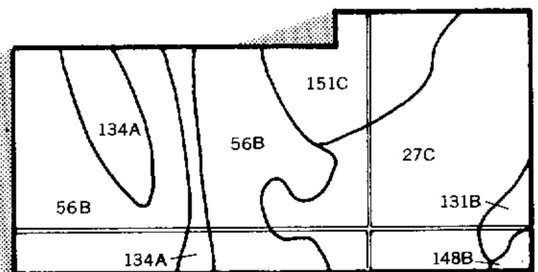




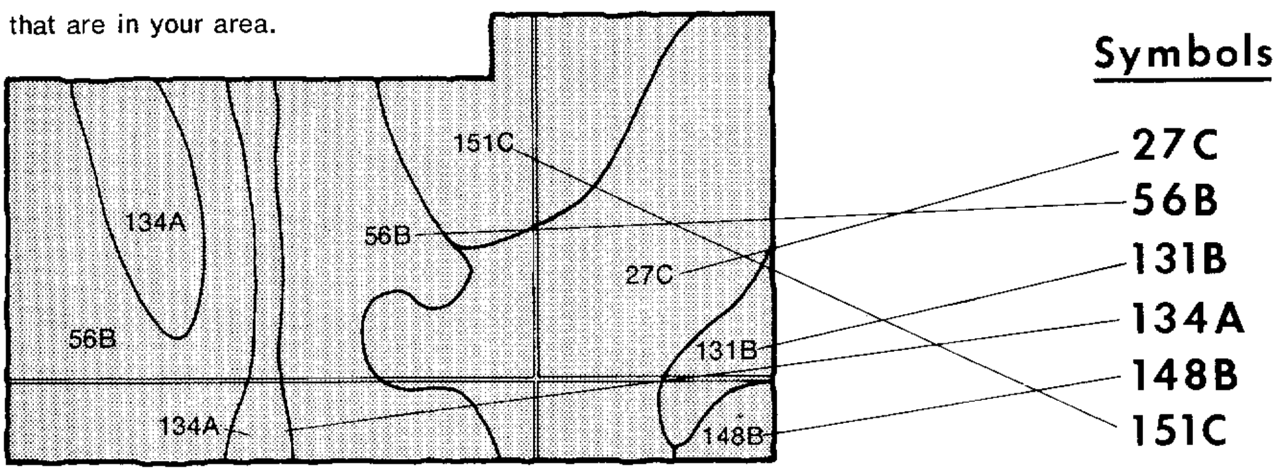
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



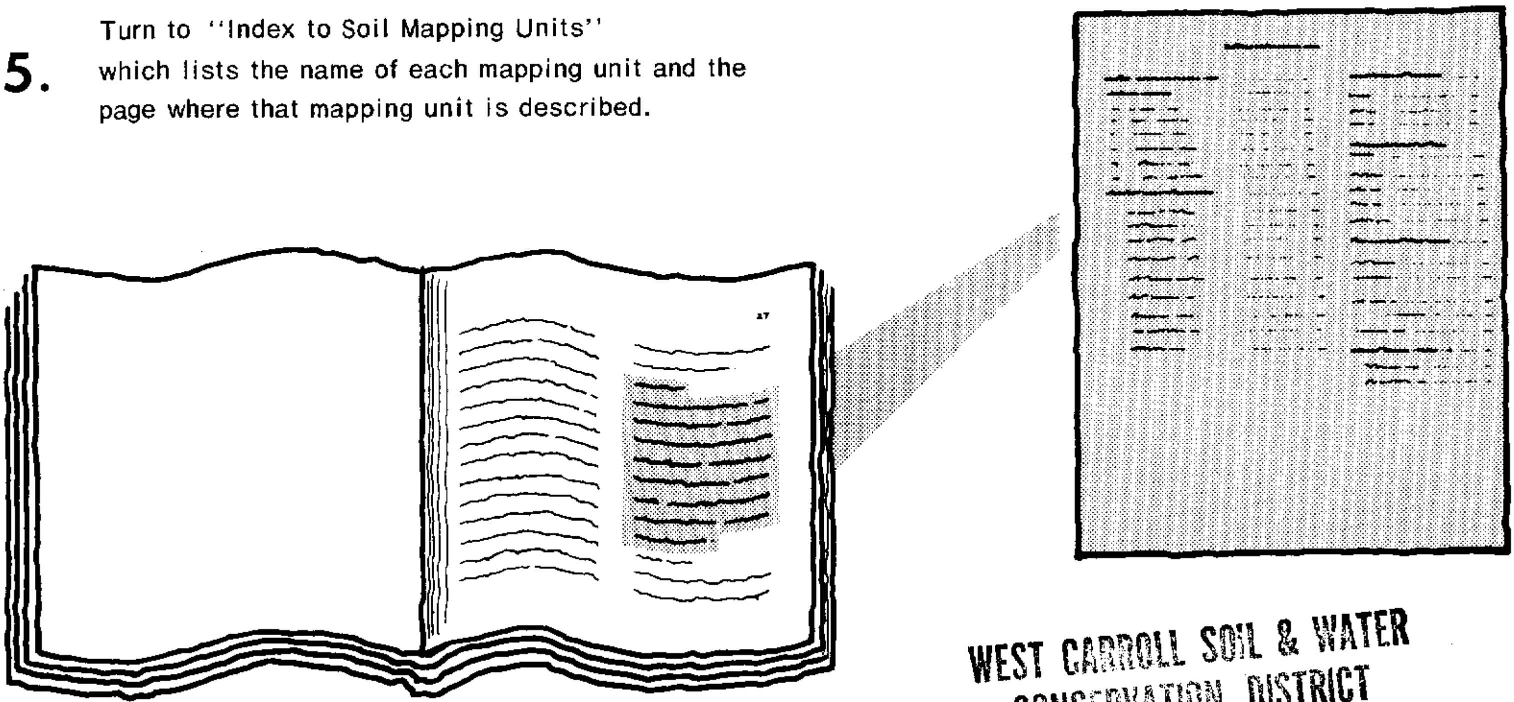


4. List the mapping unit symbols that are in your area.

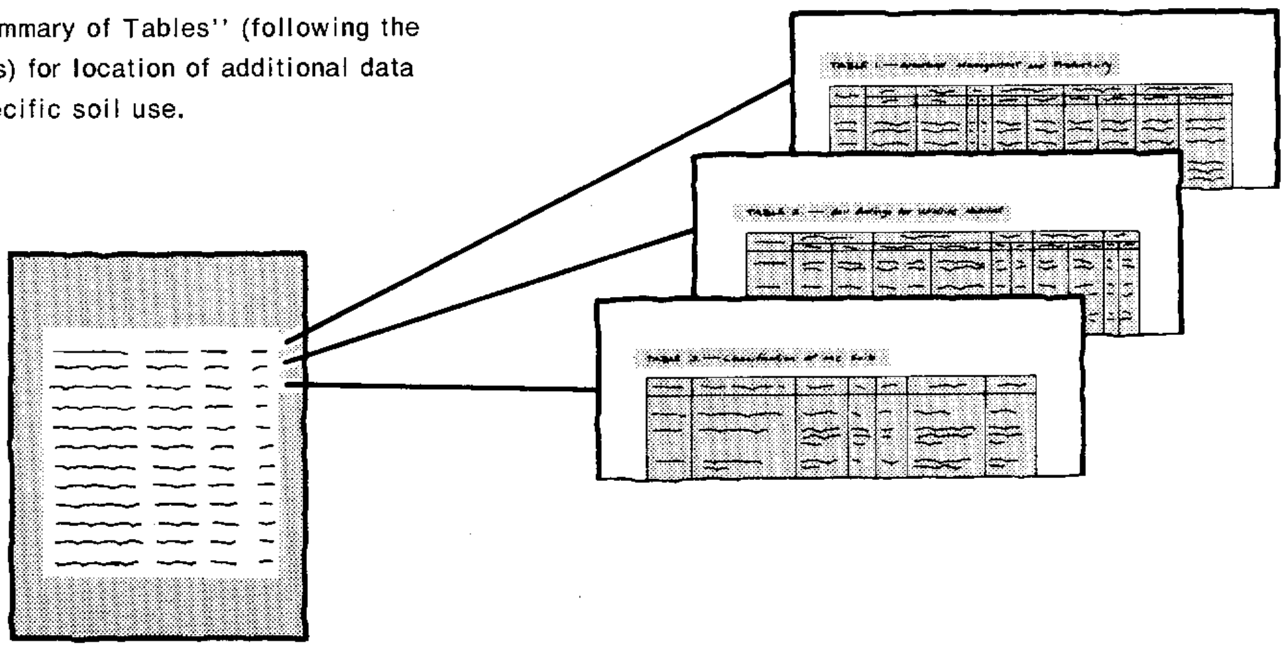


THIS SOIL SURVEY

5. Turn to "Index to Soil Mapping Units" which lists the name of each mapping unit and the page where that mapping unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

Issued May 1977

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

Major fieldwork for this soil survey was completed in the period 1972 to 1975. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service and the Louisiana Agricultural Experiment Station. It is part of the technical assistance furnished to the West Carroll Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Soybeans on Grenada silt loam, 1 to 3 percent slopes.

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Foreword

The Soil Survey of West Carroll Parish contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

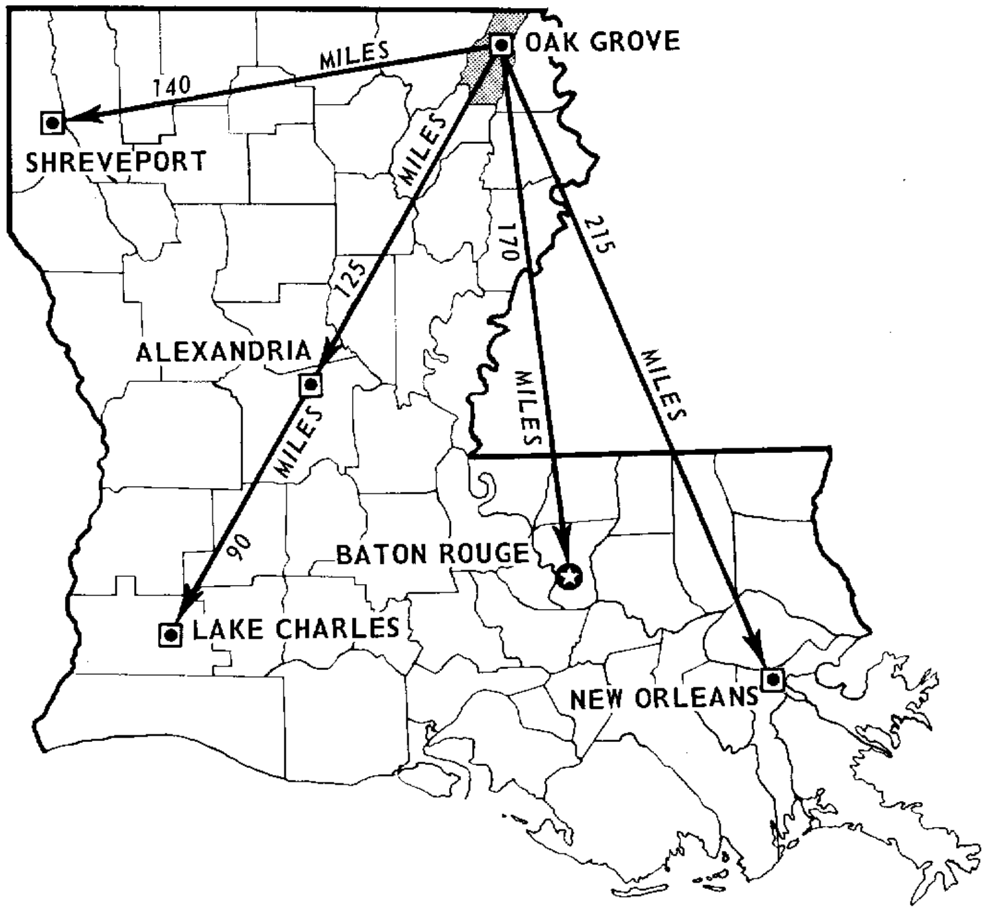
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption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

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Alton Mangum

State Conservationist
Soil Conservation Service



Location of West Carroll Parish in Louisiana. The State Agricultural Experiment Station is at Baton Rouge.

SOIL SURVEY OF WEST CARROLL PARISH, LOUISIANA

By Tracey A. Weems, Emmett E. Reynolds, E. Thurman Allen, Charles E. Martin and Ronnie L. Venson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Louisiana Agricultural Experiment Station

WEST CARROLL PARISH is in the northeastern part of Louisiana, about 55 miles northeast of Monroe. The parish has a total area of 227,840 acres, or 356 square miles. In 1974 the population of the parish was 13,000. The parish is primarily an agricultural area. About 70 percent of the acreage is cropland.

Two major physiographic areas make up the parish: the nearly level to gently undulating upland terrace extending north and south through the central part of the parish and the level to nearly level alluvial plains along the eastern and western edges of the parish.

The nearly level to gently undulating upland terrace makes up about 75 percent of the parish. Most of the soils are in areas that have patterns of low ridges and swales with short irregular slopes. The soils formed in loess. These soils are loamy throughout and have a low sand content.

The level to nearly level alluvial plains make up about 25 percent of the parish. The soils formed in major river alluvium deposited in three main areas: along the eastern edge, along the southwestern edge, and along the northwestern edge of the parish.

Mississippi River alluvium is along the eastern edge of the parish. The soils in this area are loamy or clayey. The loamy soils are on the natural levees of Bayou Macon. The clayey soils are in broad, level areas adjacent to the natural levees.

Old river alluvium is along the southwestern edge of the parish. Most of the soils in this area are loamy; however, clayey soils are in many of the low areas.

Mississippi River and Arkansas River alluvium is along the northwestern edge of the parish. Most of the soils in this area are clayey.

General Nature of the Parish

This section gives general information concerning the parish. It discusses history and development, agriculture, water resources, climate, and landforms and surface geology.

History and Development

West Carroll Parish was made up from parts of Ouachita and Concordia Parishes in 1877. It is named in honor of Charles Carroll, one of the signers of the Declaration of Independence.

The early settlers of West Carroll Parish were primarily English, Scotch, and Scotch-Irish. The town of Floyd was the parish seat until 1915 when the parish government was moved to the town of Oak Grove. Agriculture has always been a major enterprise in the parish, and most of the working population is employed in some form of agricultural work. The number of people employed in industry, however, has increased in recent years.

The population of the parish decreased from 19,252 in 1940 to 13,000 in 1974. Oak Grove is the largest town; it has a population of 2,000.

Agriculture

West Carroll Parish in primarily an agricultural area. The principal crop is soybeans.

According to the U.S. Census of Agriculture, in 1969 there were 1,163 farms in the parish, and they comprised 196,855 acres. Most farms range from 30 to 200 acres in size. In 1969, soybeans were grown on 90,827 acres, cotton on 25,651 acres, and rice on 4,141 acres. Sweet potatoes and tomatoes are the principal truck crops; however, the acreage planted is small. There were 17,632 cattle in the parish in 1969. Coastal bermudagrass, Alicia bermudagrass, and common bermudagrass are the principal hay crops.

The present trend is toward a larger acreage of soybeans and a smaller acreage of cotton to be planted each year. Agriculture has been helped in recent years by the construction of good farm-to-market roads, the construction of modern grain elevators and cotton gins, and the improvement of drainage systems throughout the parish.

Water Resources

Data from the UNITED STATES GEOLOGICAL SURVEY, WATER RESOURCES DIVISION, ALEXANDRIA, LOUISIANA, were used in preparing this section.

West Carroll Parish has about 1,500 acres of surface water, including Bayou Macon and Boeuf River. In 1970, about 1.5 million gallons of water per day were pumped from these streams mainly to irrigate rice.

Pleistocene age sand and gravel deposits are a potential source of large quantities of ground water. They now yield about 5 million gallons of water per day for domestic, livestock, and irrigation uses. About 90 percent of the ground water used in the parish comes from these deposits. Water in this aquifer is generally moderately hard to very hard. Some treatment is essential for domestic use and most domestic water systems are equipped with water softeners. The iron content is high, ranging from about 9.5 parts per million to about 15 parts per million. The chloride content is low and is acceptable for most uses. In most parts of the parish, irrigation wells that are screened in Pleistocene age sand and gravel can yield as much as 2,000 gallons or more per minute.

The Cockfield Formation, which is below the Pleistocene age deposits, is a potential source of moderate quantities of ground water. This formation contains fresh water to a depth of about 250 feet below sea level in the western part of the parish and about 400 feet in the southeastern part of the parish. Salt water is below these depths. Water from the upper part of the Cockfield Formation is soft and low in iron and chlorides. This water is suitable for public and domestic supplies. A water company at the town of Oak Grove provides about 2,000 persons with water from wells in sands of this formation that are 272 and 286 feet deep. Public water supplies for the towns of Forest and Epps are also obtained from this formation.

Climate

By DR. ROBERT A. MULLER, Department of Geography and Anthropology, Louisiana State University.

West Carroll Parish is part of a broad region of the southeastern United States that has a humid subtropical climate. The parish is dominated by warm, moist, maritime tropical air from the Gulf of Mexico. This air is displaced frequently during winter and spring by incursions of continental polar air from Canada that usually last no longer than 3 to 4 days. These incursions of cold air occur less frequently in autumn and only rarely in summer.

Usually there is a sharp contrast in the weather on either side of the frontal boundary separating polar and tropical air. After passage of a cold front during winter, the sky is typically covered by low clouds driven by strong, gusty northerly winds, temperatures fall into the 40's, and there is intermittent drizzle. Within 24 hours the sky generally clears, the winds abate, and overnight temperatures fall low enough to produce freezes. In the tropical air to the south of the cold front, however, January air temperatures may reach 70 degrees F, and cumulus clouds carry moisture northwards from the Gulf of Mexico.

Table 1 shows the annual regime of mean daily maximum and minimum temperatures by months, and the extreme temperatures which can be expected 2 years in 10. These temperature data are based on records kept from 1941 to 1970 at Lake Providence. The data are representative of conditions in West Carroll Parish. Temperatures near the top of a dense stand of crops or vegetation will be somewhat higher during sunny days and colder during clear, calm nights. Other small temperature variations over the parish are associated with slopes, drainage, and proximity to bodies of water.

Table 1 also shows monthly precipitation data for Lake Providence; the winter-spring precipitation maximum and the autumn minimum are representative of climate in West Carroll Parish. Precipitation is usually associated with the passage of warm and cold fronts over the parish. Heavy showers generally last no more than an hour or two and occur within vigorous squall lines that precede cold fronts during winter and spring. General rains of 24-hour duration are relatively uncommon. During summer, precipitation is usually widely scattered local thunderstorms that occur between noon and early evening; each shower normally covers a small area. The result is often a wide range of soil moisture conditions during summer and autumn. Heavy showers and general rains associated with tropical storms from the Gulf of Mexico occasionally occur late in summer and in autumn. During recent decades, snowfalls of an inch or more have recurred every other year on the average; the maximum storm snowfall has been nearly 10 inches (*5*).

The climate of West Carroll Parish is outstanding for crops that are adapted to the subtropical climate and local drainage conditions. On the average, there is ample sunshine, warm but not excessively high temperatures, a relatively long frost-free season, abundant precipitation, no significant snowfall, high atmospheric humidity, and infrequent damaging winds. Climatic hazards that can be especially damaging are mostly infrequent.

Table 2 shows probabilities of dates for the last low temperatures in spring and the first low temperatures in autumn at Lake Providence. The table shows, for example, that the last 32 degree temperature occurs no later than March 9 in about every other year, but in about 1 year in 10 a freezing temperature can be expected as late as April 1. During the 30-year period of record, extremely low temperatures damaging to subtropical crops and vegetation have occurred. At Lake Providence the absolute minimum temperature on record is 5 degrees below zero. Bitter polar outbreaks are relatively rare, and since 1941 extremely low temperatures have occurred mostly during the very cold winters of 1962 through 1966 (*6*).

Rainstorms that produce local flooding and excessive soil moisture conditions occur occasionally. A 24-hour rainfall of 4 to 5 inches can be expected in about every other year in northeastern Louisiana, and 6 to 7 inches can be expected once in 10 years. These rainfalls occur most often along stationary fronts in winter and spring and not very often during summer and fall.

Despite the average high rainfall, monthly and seasonal variations of precipitation are great enough to result in short-term droughts and wet spells which affect agricultural operations and crop yields. The water-budget concept is a useful tool to indicate relationships between climate, land use, and agriculture. Figure 1 is a graphical representation of some of the water-budget components that were calculated on a monthly basis from data recorded at Ryan Airport at Baton Rouge. Although Baton Rouge is located in southeastern Louisiana, these water-budget components are fairly representative of much of Louisiana. The graph for Baton Rouge serves here for illustrative purposes, and specific figures and tables for Lake Providence follow.

Potential evapotranspiration (PE), represented by the upper continuous curve, is defined as the maximum amount of evapotranspiration which would take place with a continuous vegetation cover and no shortage of soil moisture. Monthly PE depends on the amount of energy that is supplied to the interface, particularly solar radiation. The Thornthwaite system utilized in this analysis bases the estimates on air temperature and day length. The seasonal regime of PE is low in winter and high in summer, with relatively little variation from one year to the next.

Actual evapotranspiration (AE), based on rainfall and soil moisture storage during a particular month, is an index of water use and crop production. Monthly AE cannot be greater than monthly PE, but when AE is less than PE, the difference is the moisture deficit (D), which is an index of water shortage or the irrigation needed for maximum crop production. The calculations assume that a 6-inch moisture storage capacity is available to vegetation within the rooting zone; therefore, the deficits would be greater for shallow-rooted young plants and smaller for deeper rooted plants.

Moisture surplus (S) represents precipitation not utilized for evapotranspiration or soil moisture recharge. This surplus becomes either surface runoff or ground water recharge. The surplus is strongly seasonal. It is highest in winter and spring and occurs only occasionally in summer and fall. In addition, very large monthly variations are evident. Figure 1 also illustrates the tendency of wet or dry months, seasons, or years to cluster. The variability and clustering have considerable impact on agricultural activities; for example, large moisture surpluses during 1961 were followed by large deficits during 1962 and the first half of 1963.

Figure 2 shows monthly deficits and surpluses, summed on a seasonal basis, for the period 1941 through 1970 at Lake Providence. Surpluses can be expected each winter and spring, are rare during summer, and occasionally occur during fall. Deficits, on the other hand, should be expected each summer and fall, but they very rarely occur during spring. During dry summers, deficits are large enough to reduce crop yields.

Figure 2 emphasizes the variability by seasons through the years and the tendency for clustering. For example, there were large winter surpluses of moisture during the late 40's, large spring surpluses during the middle 40's, large summer deficits at almost the same times during the late 40's and early 50's, and small summer deficits during the late 50's.

The data from figure 2 are reorganized in table 3 to show the probability of monthly deficits or surpluses that are equal to or greater than selected amounts. Random variation of deficits and surpluses over the decades was assumed (*8*).

Extremely severe weather conditions are associated with thunderstorms and squall lines, but the frequency of serious damage at any one location within the parish is very low. Hail and tornadoes occur infrequently during severe winter and spring thunderstorms and are usually embedded within squall lines. Heavy, wet snow and glaze occasionally do considerable damage to forest vegetation and powerlines.

Landforms and Surface Geology

DR. BOBBY J. MILLER, Department of Agronomy, Louisiana State University, and DR. R. B. DANIELS and WARREN L. COCKERHAM, soil scientists, Soil Conservation Service, prepared this section.

West Carroll Parish has four general areas of soils that formed in a different kind or age of unconsolidated sediment. The areas are narrow, elongated, generally parallel bands that trend in a northeast-southwest direction between the two major streams that drain the parish. Bayou Macon forms the boundary of the parish on the east, and the Boeuf River forms most of the western boundary. These parallel-flowing streams and their tributaries provide the surface drainage for the entire parish. They flow generally from northeast to southwest and are 10 to 15 miles apart.

The land surface features and the nature and distribution of the different sediments in which the soils formed are a result of events that occurred during and after the late Pleistocene Epoch. The major surface features and their geology and age are discussed in the following paragraphs.

Recent Mississippi Valley Alluvium. Recent Mississippi Valley alluvial deposits cover about 8 percent of the parish and correspond to the Sharkey association as it is shown on the General Soil Map. The sediments are on the eastern edge of the parish along a band that lies west of Bayou Macon and east of the escarpment that borders the loess-mantled braided-stream terrace (upland terrace). Elevation in the area ranges from slightly higher than 100 feet above sea level at the northern edge of the parish to slightly lower than 85 feet at the southern edge. The overall slope is about 6 inches per mile to the southwest. Nearly level topography characterizes the entire area, and local relief is generally less than 5 feet. Bayou Macon occupies a channel cut 15 to 20 feet below the adjacent alluvium.

Sediments carried by the Mississippi River are of varied origin and may have originated anywhere within the river's drainage area. Sorting of the sediments during deposition, as well as a diverse mineralogy, resulted in considerable differences in the deposits. Mineralogical studies of the alluvium indicate that smectite minerals are predominant in the clay-size fraction, and secondary amounts of micaceous clays also are present (*11*). Associated with these are lesser amounts of kaolinite, chlorite-vermiculite intergrade, and quartz minerals. The sand and silt-size fractions are mainly quartz, a sizable component of feldspars, and smaller amounts of a variety of other minerals, including the readily weatherable components biotite and hornblende.

Partial sorting of sediments occurs when a stream overflows; its initial decrease in velocity and in transporting capacity results in rapid deposition of sediments. As the velocity of the water decreases, the initial deposits are high in sand content, followed by siltier and then more clayey materials. The clayey backswamp sediments are deposited by still or slowly moving water in low areas behind the natural levees. Characteristically, this deposit pattern results in long, nearly level slopes that extend from natural levees near streams to clayey backswamp deposits.

Surface deposits of Recent Mississippi Valley alluvium have mostly clayey textures and smaller amounts of silt loam and silty clay loam. The deposits are probably less than 3,000 years old and may range up to 70 feet in thickness (*9*). The older underlying sediments are mostly sands and gravels. Commerce soils developed in silt loam and silty clay loam sediments at the higher and intermediate elevations, and Sharkey soils developed in the clayey sediments at lower elevations.

Clayey Mississippi and Arkansas River Deposits. Clayey Mississippi and Arkansas River alluvial deposits occur along the northwestern edge of the parish. The area is characterized by nearly level topography and occupies the lowest elevations in the northwestern part of the parish.

Characteristically, these sediments have upper layers of what appears to be clayey Mississippi River alluvium. In many places, they are underlain at depths of a few feet by redder clays that appear to be Arkansas River deposits. These redder underlying layers are commonly interstratified with layers of gray clayey alluvium. This pattern of sedimentation reflects a past period during which both the Arkansas and Mississippi Rivers contributed the major sediment load at various times; the Mississippi River contributed the clays that form the upper 2 feet or more of sediment.

These clayey sediments occur in the Forestdale-Perry association as it is shown on the General Soil Map. Perry soils have the redder subsoil that Forestdale soils lack. Perry soils formed in material deposited in low-lying areas of the old alluvium in which the Dubbs, Dundee, and Forestdale soils formed. At their margins the clayey Perry soils overlie buried soils that developed in the old alluvium. Dubbs, Dundee, and Forestdale soils occur at the higher elevations in the area, and the nature of the sediments underlying the clay in these soils is discussed in the section "Old Alluvium." Most of these underlying sediments occur in an area of braided-stream terrace composed of Arkansas River alluvium (*9*).

The time of deposition of the clayey sediments has not been established. That they are considerably younger than the underlying deposits is evident, because an unconformity separates them from the underlying materials, and soils had developed in the older deposits before they were buried under the clayey sediments. In addition, the clayey sediments are more leached in upper horizons than similar clays in other areas of Recent Mississippi River alluvium. They were probably deposited 2,000 to 4,000 years ago, near the end of a period during which the Arkansas River meander belt was in a position approximate to that now occupied by the Boeuf River at the southwestern edge of the parish. It also marks the beginning of the Mississippi River's occupation of its present meander belt. Floodwaters from the Mississippi River may have flowed down the Boeuf River, from north of Macon Ridge in Arkansas, along the west side of the ridge in Louisiana. During historical time, parts of the area have been flooded by backwaters from the Mississippi River when levees along the river failed.

Upland Terrace. The upland terrace area consists mainly of loess-covered, braided-stream terrace deposits that lie between Recent Mississippi Valley alluvial deposits to the east and older alluvium to the west. Approximately 75 percent of the parish lies within this general area. Along the eastern edge the area is bounded by an abrupt escarpment that rises 20 to 30 feet or more above the adjoining Recent Mississippi Valley alluvium, and on the western edge it slopes almost imperceptibly into areas of the older alluvium.

Two distinct subareas on the upland terrace can be identified on the basis of topography and elevation, and they divide the area into eastern and western segments of approximately equal size. The eastern segment is the Macon Ridge proper and occupies higher elevations. It is more dissected by drainageways and has more local relief than the western segment. Elevation in the eastern segment ranges from a high of about 135 feet near the northern edge of the parish to a low of about 85 feet at the southern edge. The topography is typically gently sloping to nearly level, with local relief of several feet in some areas. The overall slope is to the southwest at slightly more than 1 1/2 feet per mile. The eastern segment coincides approximately with the Grenada-Calhoun association as it is shown on the General Soil Map.

In the western segment, the elevation ranges from about 105 feet near the northern edge of the parish to about 85 feet near the southern edge. This area is characterized by nearly level topography and very little local relief except adjacent to stream channels. The western segment coincides approximately with the Calhoun-Grenada association as it is shown on the General Soil Map.

Geologic studies of the lower Mississippi Valley indicate that sediments forming the braided-stream terraces under the loess mantle are glacial outwash or valley train deposits laid down by the Arkansas River (*9*). The basal materials are mostly sand or sand and gravel deposited from swiftly flowing, sediment-choked rivers at a time when they drained areas of active glaciation to the west and north. The braided-stream terrace deposits in the eastern part of West Carroll Parish were deposited 30,000 to 40,000 years ago (*9*).

Investigations conducted during the course of the survey indicated that most of the braided-terrace area is mantled by uniform brown- or tan-colored silty deposits that have a very low sand content. On the basis of numerous observations throughout the parish, it was determined that the silty deposits have a maximum thickness of about 14 feet at the eastern edge and become progressively thinner to the west. These silty deposits have texture, color, and distribution characteristics typically associated with loess (*13*).

The braided-stream terrace deposits are the oldest sediments in the parish. Throughout most of the area they are covered by more recent materials, although they also occur as minor areas of exposure in the Dundee-Dubbs association and in the western part of the Calhoun-Grenada association. In these minor areas, they are the parent material of the Dexter soils, and typically occur on narrow elongated ridges that were not covered by more recent sediments or that have been exposed as a result of erosion. The Dexter soils are generally more leached, have thicker and more distinct horizons of clay accumulation, and have redder colors than soils in the parish that developed in more recent alluvial sediments. In addition to the Dexter soils, some of the soils in the Calhoun-Grenada association appear to have developed in the braided-stream terrace deposits with little or no admixture of loess. These soils have morphological characteristics similar to the soils developed in the thick loess deposits, but they have more sand throughout the solum.

Loess deposits are the dominant parent materials for most of the soils that developed on the upland terrace. These silty, wind-blown deposits occur as a relatively thin veneer overlying the braided-stream terrace deposits. They mantle older topographical features, and such terrace deposit features as braided-stream channels and interfluves are preserved in the overlying loess. From the deposition of the braided-stream terrace sediments to the deposition of the overlying loess, much time elapsed, as is indicated by the development of erosional drainage features on the loess-mantled terrace. These features are best expressed in the eastern part of the upland terrace area where loess overlies the most uneven topography in the parish. Also, relict channels on the terrace were partially filled with finer-textured sediments which were later mantled with loess. Finally, almost everywhere are recognizable horizons of soils that developed in the braided-stream terrace deposits and were later buried by the overlying loess.

The characteristics and distribution of loess, its time of deposition, and the source of the loess sediments in the lower Mississippi Valley have been the subject of a number of studies. Generally, the results indicate that loess is a calcareous, tan-colored eolian deposit that is dominantly silt and has a very low sand content (*7, 9, 13*). In an unpublished doctoral dissertation at the University of Missouri, J.O. Snowden, Jr., studied loess deposits at a location approximately 40 miles from the survey area and found a rather uniform mineralogy. The loess is chiefly silt-sized quartz and feldspars and contains about 66 percent quartz, 20 percent carbonates, 5 percent feldspars, 7 percent clay minerals, and 2 percent accessory heavy minerals. The clay mineral assemblage is dominantly smectite, with lesser amounts of illite and kaolinite.

The loess that occurs throughout the southern Mississippi Valley is generally thought to have been deposited on the flood plain of the Mississippi River at a time when the river drained glaciated areas. During dry periods, winds blowing across these flood plains can transport and deposit silty materials over adjacent areas (*7*). Characteristically, the deposits are uniformly thinner as distance from the source increases (*13*). The thickness of loess decreases abruptly from the higher eastern to the lower western part of the upland terrace area.

More than one interval of loess deposition has occurred in some areas of the lower Mississippi Valley, and somewhat different times of deposition have been proposed (*7, 9, 13*). The loess in areas approximately 40 miles east of West Carroll Parish is probably about 20,000 years old (*9*). The loess in West Carroll Parish covers most of the braided-stream terrace that is 30,000 to 40,000 years old, but it apparently does not cover a younger adjacent terrace that is about 9,000 to 13,000 years old (*9*).

The loess deposits in the survey area are leached of carbonates throughout. In the western subarea they typically have a small admixture of the older underlying braided-stream terrace deposits. The area covered by loess corresponds approximately to the Grenada-Calhoun and Calhoun-Grenada associations as they are shown on the General Soil Map.

Old Alluvium. Old alluvium in the southwestern part of the parish comprises about 10 percent of the survey area. It is the parent material of the Dundee, Dubbs, and Forestdale soils. The area is characterized by level and nearly level topography; the elevation ranges from about 85 feet in the southern part of the area to approximately 95 feet in the northern part. The area corresponds approximately to the Dundee-Dubbs association as it is shown on the General Soil Map.

The source and time of deposition of these sediments have not been thoroughly investigated. Typically they occur as a thin layer less than 6 feet thick and occupy a braided-stream terrace that was formed by the Arkansas River 30,000 to 40,000 years ago (*9*). Investigations conducted during the survey indicate they are younger than this, however, and overlie the older braided-stream terrace deposits. Possibly they are an extension of a younger braided-stream terrace, approximately 9,000 to 13,000 years old, that has been identified in the northwest part of the parish (*9*). Soils that formed in the old alluvial sediments are similar to soils that formed along old meander belts of the Mississippi River and some of its tributaries (*11*).

During soil formation, the sediments weathered considerably and distinct horizons of accumulated and translocated clay developed. The soil and sediment colors are dominantly gray. The older underlying sediments have redder colors than those characteristic of Mississippi River alluvium. This suggests that thin Mississippi River deposits may overlie older Arkansas River alluvium.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in parishes nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

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

The areas shown on a soil map are called soil mapping units. Some mapping units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Mapping units are discussed in the section "Soil Maps for Detailed Planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily useful to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

Soil Map for General Planning

The General Soil Map at the back of this soil survey shows, in color, the five soil associations in West Carroll Parish. Each soil association is a unique natural landscape unit that has a distinctive pattern of soils, relief, and drainage features. It normally consists of one or more major soils and some minor ones, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

The map provides a broad perspective of the soils and landscapes in the parish. It provides a basis for comparing the potentials of the five associations in the parish for general kinds of land use. From the map, large areas that are generally suitable for a certain kind of farming or other land use can be identified. Likewise, large areas with soil properties distinctly unfavorable for certain land uses can be identified.

Because of the small scale of the map, the smallest unique soil area that can be delineated is about 1,000 acres in size. The map does not show the kind of soil at a particular place. Thus, it is not a suitable map for planning the management of a farm or field or for selecting the location of a road, building, or similar structure.

Descriptions and Potentials of Soil Associations

In this section, each soil association is described and its limitations and potentials for selected land uses are discussed. The associations are compared with one another in relation to their potential for selected land uses. Table 4 presents a comparative rating of the potential of each soil association as cropland, pastureland, and urban land. The ratings, based on soil properties and landscape features, range from excellent through good, fair, poor, and very poor.

1. Sharkey Association

Nearly level, poorly drained soils that have a clayey subsoil; formed in Mississippi River alluvium

This soil association is on an alluvial plain at the eastern edge of the parish. It is at a lower elevation than the adjacent upland terrace to the west.

This association makes up about 8 percent of the parish. About 90 percent of the association is Sharkey soils, and the rest is minor soils.

The Sharkey soils are at the slightly lower elevations. They are poorly drained and have a clay surface layer. They have a seasonal high water table during the months December through April.

The minor soils in this association are the somewhat poorly drained Commerce soils, and some soils that are similar to the Sharkey soils but have loamy material at a depth of about 27 inches. Also included in this association are soils in small areas at low elevations that are subject to flooding in winter and spring.

This association is used mainly as cropland. A small acreage is used as pastureland. Most of the acreage has been cleared and some surface drainage systems have been installed. Soil wetness and difficulty in working the Sharkey soils are the main limitations to use of the asociation for crops. Wetness also is a major limitation for nonfarm uses. A high shrink-swell potential and low strength are limitations for use of the Sharkey soils.

This association has good potential as cropland and pastureland, but to achieve this potential a good drainage system is required. The potential as urban land is poor because of the difficulty in overcoming wetness, high shrink-swell potential, and low strength of the Sharkey soils. The good potential of this association for woodland and wildlife habitat is overshadowed by its value as cropland and pastureland.

2. Grenada-Calhoun Association

Gently sloping to level, moderately well drained and poorly drained soils that have a loamy subsoil; formed in loess

This soil association is on the terrace uplands in the eastern half of the parish. It occupies some of the highest elevations in the parish.

This association makes up about 35 percent of the parish. About 45 percent of the association is Grenada soils, 35 percent is Calhoun soils, and the rest is minor soils.

The Grenada soils are at slightly higher elevations than the Calhoun soils in most places. Grenada soils are moderately well drained and have a fragipan. The Calhoun soils are poorly drained. Both soils have a silt loam surface layer and a seasonal high water table during the months of January through March.

The minor soils in this association are the well drained Memphis soils and the somewhat poorly drained Calloway soils. Also included are small areas of Calhoun soils that are subject to flooding.

This association is used mainly as cropland. A small acreage is used as pastureland. Most of the acreage has been cleared. Some drainage systems have been installed. Wetness of Calhoun soils is the main limitation to use of this association as cropland and to most other uses. Low strength is a limitation to some nonfarm uses.

This association has a good potential as cropland and pastureland, but to achieve this potential a good drainage system is required in the low areas. The potential as urban land is good, although soil wetness is difficult to overcome on the Calhoun soils. The good potential of this association as woodland and its fair potential for wildlife habitat are overshadowed by its value as cropland and pastureland.

3. Calhoun-Grenada Association

Level to gently sloping, poorly drained and moderately well drained soils that have a loamy subsoil; formed in loess

This soil association is on the terrace uplands in the western half of the parish. It is at a lower elevation than the Grenada-Calhoun association to the east and at a higher elevation than the Dundee-Dubbs association to the west.

This association makes up about 40 percent of the parish. About 50 percent of the association is Calhoun soils, 35 percent is Grenada soils, and the rest is minor soils.

The Calhoun soils are level and poorly drained and are at lower elevations than the Grenada soils. The Grenada soils are nearly level and gently sloping, moderately well drained, and have a fragipan. Both soils have a silt loam surface layer and a seasonal high water table during the months of January through March.

The minor soils in this association are the well drained Dexter soils, the somewhat poorly drained Calloway soils, and the poorly drained Foley soils. Also included are small areas of Calhoun soils that are subject to flooding.

This association is used mainly as cropland. A small acreage is used as pastureland. Most of the acreage has been cleared. Some drainage systems have been installed. Soil wetness is the principal limitation to use of this association for crops and to most other uses. Low strength is a limitation for some nonfarm uses.

This association has a fair potential as cropland and pastureland, but to achieve this potential a good drainage system is required in the low areas.

The potential for urban uses is poor. Soil wetness is difficult to overcome on the Calhoun soils. The potential for woodland is good, but wetness on the Calhoun soils limits equipment use. The potential for wildlife habitat is fair.

4. Dundee-Dubbs Association

Level and nearly level, somewhat poorly drained and well drained soils that have a loamy subsoil; formed in loamy alluvium

This soil association is on an alluvial plain at the southwestern edge of the parish. It is at a lower elevation than the Calhoun-Grenada association to the east.

This association makes up about 10 percent of the parish. About 45 percent of the association is Dundee soils, 40 percent is Dubbs soils, and the rest is minor soils.

The Dundee soils are at a slightly lower elevation than the Dubbs soils. Dundee soils are somewhat poorly drained, and the Dubbs soils are well drained. Both soils have a silty clay loam surface layer. The Dundee soils have a seasonal high water table during the months of December through April.

The minor soils in this association are the well drained Dexter soils, the somewhat poorly drained Deerford soils, and the poorly drained Foley, Forestdale, and Perry soils.

This association is used mainly as cropland. A small acreage is used as pastureland. Most of the acreage has been cleared. Some drainage systems have been installed. Wetness of the Dundee soils is the main limitation to use of the association as cropland and to most other uses.

This association has good potential as cropland and pastureland, but to achieve this potential a good drainage system is required in the low areas. Its potential as urban land is fair.

Wetness is the main limitation of the Dundee soils. The soils in this association have good potential for woodland and fair potential for wildlife habitat, but this is overshadowed by their value as cropland and pastureland.

5. Forestdale-Perry Association

Level and nearly level, poorly drained soils that have a clayey subsoil; formed in clayey Arkansas and Mississippi River alluvium

This soil association is at the northwestern edge of the parish. It occupies some of the lowest elevations in the parish.

This association makes up about 7 percent of the parish. About 45 percent of the association is Forestdale soils, 40 percent is Perry soils, and the rest is minor soils.

In most places the Forestdale soils are at a slightly higher elevation than the Perry soils. Forestdale and Perry soils are poorly drained. The Forestdale soils have a loamy surface layer, and the Perry soils have a clayey surface layer. Both soils have a seasonal high water table during the months of January through April.

The minor soils in this association are the well drained Dubbs soils and the somewhat poorly drained Dundee soils.

This association is used mainly as cropland. A small acreage is used as pastureland. Most of the acreage has been cleared, and some drainage systems have been installed. Wetness and difficulty in working the soil are the main limitations to use of these soils for crops. Wetness and high shrink-swell potential are the main limitations for nonfarm uses.

This association has fair potential as cropland and pastureland, but to achieve this potential a drainage system is required. Its potential as urban land is poor because of the shrink-swell potential and low strength of these soils.

The soils in this association have good potential for woodland and for wetland wildlife habitat, but this is overshadowed by their value for crops and pasture.

Broad Land Use Considerations

The soil associations in the parish vary somewhat widely in their potential as cropland, pastureland, and urban land, as indicated in table 4. For each land use, general ratings of the potential of each soil association are given, and its rank in relation to the other soil associations is indicated. The kinds of soil limitations are also indicated. The ratings of soil potential reflect the relative costs of practices needed to overcome soil limitations, and also the hazard of soil-related problems persisting after such practices are installed. The ratings and rankings do not consider location in relation to transportation systems or other facilities.

The Sharkey, Dundee-Dubbs, and Grenada-Calhoun associations, which are suited to multirow farming equipment, have good potential as cropland, but to achieve maximum production, surface drainage systems are needed to remove excess water from low areas. The Forestdale-Perry and Calhoun-Grenada associations are less favorable as cropland mainly because they include large areas of soils that require surface drainage.

All of the associations, except the Forestdale-Perry and Calhoun-Grenada associations, have good potential for pasture, but to achieve maximum production surface drainage systems are needed to remove excess surface water from low areas. The Forestdale-Perry and Calhoun-Grenada associations are less favorable for pasture, mainly because they contain large areas of soils that require surface drainage, and because grazing may need to be restricted during wet periods in some areas.

The Grenada-Calhoun association is the most favorable association for urban development, mainly because the high elevations preclude any danger of flooding from failure of the levee system on the Mississippi River. A small acreage of the Grenada-Calhoun association is developed for urban use each year, mainly near the towns of Oak Grove and Epps. The Dundee-Dubbs association has fair potential for urban uses, mainly because the soils have only fair engineering qualities and are at lower elevations. The other associations have poor potential for urban uses, mainly because the soils have a seasonal high water table and poor engineering qualities in some large areas. In addition, the soils at lower elevations in the parish have some probability of flooding within 100 years.

All of the associations have good potential for woodland and fair or good potential for wildlife habitat, but because this is overshadowed by their value as cropland and pastureland, only a small acreage is used.

Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil maps at the back of this publication are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each soil is given in the section "Use and Management of the Soils."

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated and the management concerns and practices needed are discussed.

A soil mapping unit represents an area on the landscape and consists mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map at the back of this publication are phases of soil series.

Soils that have profiles that are almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. All the soils in the United States having the same series name have essentially the same properties that affect their use and their response to management practices.

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

Some mapping units are made up of two or more dominant kinds of soil. One such kind of mapping unit, the soil complex, is shown on the soil map of this survey area.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Dundee-Dubbs complex is an example.

Most mapping units include small, scattered areas of soils other than those that appear in the name of the mapping unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the mapping unit. The soils that are included in mapping are recognized in the description of each mapping unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

The acreage and proportionate extent of each mapping unit are given in table 5, and additional information on properties, limitations, capabilities, and potentials for many soil uses are given for each kind of soil in other tables in this survey. (See "Summary of Tables.") Many of the terms used in describing soils are defined in the Glossary.

Soil Descriptions and Potentials

1—Calhoun silt loam. This is a nearly level, loamy soil on broad flats and in narrow depressions throughout the terrace uplands. Areas range from about 10 to 400 acres in size. Natural or manmade drainageways dissect most areas. The soil formed in loess material more than 4 feet thick. Slopes are less than 1 percent. This soil is associated with the better drained Memphis, Grenada, and Calloway soils that are at higher elevations.

Typically, the surface layer is strongly acid, dark grayish brown silt loam about 4 inches thick. The subsurface layer, which extends to a depth of 16 inches, is very strongly acid, light brownish gray silt loam. The subsoil, to a depth of 44 inches, is strongly acid, grayish brown silty clay loam mottled with yellowish brown. Below that, to a depth of 63 inches, the soil material is slightly acid, light brownish gray silty clay loam mottled with yellowish brown.

Included in mapping are a few small areas of Calloway, Foley, and Grenada soils, and other soils that are similar to the Calhoun soil but have a thin silty clay loam or clay surface layer. The Calloway and Grenada soils are on slight ridges, and the Foley soils and the soils that have a silty clay loam or clay surface layer are in depressions. Also included, adjacent to some drainageways, are Calhoun soils that are subject to shallow flooding after heavy rains.

This soil is somewhat low in fertility. Water and air move slowly through the soil. Wetness causes poor aeration and restricts plant root development. Runoff is slow or very slow (fig. 3). The seasonal high water table is perched above a depth of 2.0 feet and at times is at the surface during the months of December through April. The surface layer is wet for long periods in winter and spring. The soil is seldom saturated below a depth of 2.0 feet. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in crops. A small acreage is in pasture and woodland (fig. 4). The potential for crops and pasture is fair. Wetness is the main limitation. The main suitable crops are cotton, corn, soybeans, sweet potatoes, and rice. The main suitable pasture plants are common bermudagrass, southern wild winter pea, tall fescue, dallisgrass, and Pensacola bahiagrass.

This soil is friable but somewhat difficult to keep in good tilth because of surface crusting. Traffic pans develop easily but can be broken up by deep plowing or chiseling. A surface drainage system is generally needed for most cultivated crops and pasture plants. Land grading and smoothing improves drainage and increases the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban use is poor. Wetness limits the use of the soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength limits its use for foundations or as construction material. Capability subclass IIIw.

2—**Calhoun-Calloway complex.** This complex consists of small areas of Calhoun and Calloway soils so intermingled that they could not be mapped separately at the scale selected (fig. 5). These soils are on narrow flats, in swales, and on very low ridges on the terrace uplands, mostly in the western part of the parish. Areas range from 20 to 250 acres in size. These soils formed in loess material more than 4 feet thick. Slopes are 0 to 2 percent. These soils are associated with the better drained Grenada and Memphis soils that occur at slightly higher elevations.

The Calhoun soil is in narrow flats and in swales and makes up about 60 percent of each mapped area. Typically the surface layer is medium acid, grayish brown silt loam about 8 inches thick. The subsurface layer extends to a depth of 16 inches and is very strongly acid, light brownish gray silt loam. The subsoil to a depth of 60 inches is strongly acid, grayish brown silty clay loam with yellowish brown mottles.

The Calhoun soil is somewhat low in fertility. Water and air move slowly through the soil. Wetness causes poor aeration and restricts plant root development. Runoff is slow or very slow. The seasonal high water table is perched above a depth of 2.0 feet and at times is at the surface during the months of December through April. The surface layer is wet for long periods in winter and spring. The soil is seldom saturated below a depth of 2.0 feet. Plants generally lack water during dry periods in summer and fall.

The Calloway soil is on very low ridges and makes up about 25 percent of each mapped area. Typically the surface layer is medium acid, brown silt loam about 8 inches thick. The subsoil, to a depth of 30 inches, is strongly acid, yellowish brown silt loam with gray mottles. Below this, to a depth of 54 inches, it is a slightly brittle and compact fragipan of grayish brown silt loam with yellowish brown mottles. Below this is a compact layer of slightly acid, yellowish brown silt loam.

The Calloway soil is moderately low in fertility. Runoff is moderate to slow. Plant roots easily penetrate the soil to a depth of 30 inches, but are restricted below this depth by the fragipan. Water and air move slowly through the soil. The seasonal high water table is perched above a depth of 2.5 feet during the months of December through April. The surface layer is wet for significant periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

Included with this complex in mapping are a few small areas of Grenada soils at slightly higher elevations and Foley soils in narrow flats and swales. Also included are small areas of soils on narrow flats and in swales that are subject to flooding.

Most of the acreage is in crops. A small acreage is used for pasture, woodland, and homesites.

The potential of this complex for crops and pasture is fair. The uneven surface and excess water in the narrow flats and swales interfere with tillage operations. The main suitable crops are cotton, corn, soybeans, grain sorghum, wheat, oats, sweet potatoes, rice, and truck crops. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, southern wild winter pea, Pensacola bahiagrass, tall fescue, dallisgrass, and ryegrass.

The soils in this complex are friable but are somewhat difficult to keep in good tilth because of surface crusting. Traffic pans develop easily but can be broken up by deep plowing or chiseling. A surface drainage system is needed to remove excess surface water from the narrow flats and swales if this complex is to be used for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment; however, a large amount of soil may have to be moved. Land grading that removes the soil material above the fragipan in the Calloway soil may lower crop yields. Proper managment of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential of this complex for urban use is poor. Wetness is a limitation to its use for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to its use for foundations or as construction material. Capability subclass IIIw.

3—**Calloway silt loam.** This soil is in nearly level areas and on low ridges and knolls throughout the terrace uplands. The areas range from 5 to 40 acres in size. This soil formed in loess or loesslike material more than 4 feet thick. Slopes are 0.5 to 2.0 percent. This soil is associated with better drained Grenada soils at higher elevations and with more poorly drained Calhoun soils at lower elevations.

Typically, the surface layer is medium acid, brown silt loam about 8 inches thick. The subsoil extends to a depth of 70 inches or more. To a depth of 23 inches it is strongly acid, yellowish brown silt loam with light gray mottles. The next layer extends to a depth of 27 inches and is strongly acid, light gray silt loam with yellowish brown mottles. Below this, to a depth of 52 inches, is a strongly acid, slightly brittle, grayish brown silty clay loam fragipan with yellowish brown mottles. Below this is medium acid, slightly brittle and compact yellowish brown silt loam.

Included in mapping are small areas of Calhoun and Grenada soils. Also included are small areas of soils that are similar to the Calloway soil but lack the compact and brittle layers above a depth of 35 inches.

This soil is moderately low in fertility. Runoff is moderate to slow. Plant roots penetrate the soil easily to a depth of 27 inches, but are restricted below this depth by the compact and brittle lower subsoil layers. Water and air move slowly through the soil. The seasonal high water table is perched above a depth of 2.5 feet during the months of December through April. The surface layer is wet for significant periods in winter and spring. Plants generally lack water during dry periods in the summer and fall.

Most of the acreage is in crops. A small acreage is in pasture. The potential for crops and pasture is good; however, wetness is a limitation. The main suitable crops are cotton, grain sorghum, soybeans, corn, sweet potatoes, wheat, oats, and truck crops. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, improved bermudagrasses, southern wild winter pea, tall fescue, dallisgrass, and ryegrass.

This soil is friable but is somewhat difficult to keep in good tilth because of surface crusting. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment; however, in some places, a large amount of soil would have to be moved. Also, removing the material that is above the slightly brittle layers may lower crop yields. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers generally are needed.

The potential for urban use is poor. Wetness is a limitation to use of this soil for septic tank absorption fields, sanitary landfills, homesites, and roads and streets. Low strength is a limitation to its use for foundations or as construction material. Capability subclass IIw.

17—Commerce silty clay loam. This is a nearly level, loamy soil in the higher areas on the alluvial plain at the eastern edge of the parish. Areas range from 10 to 200 acres in size. This soil formed in loamy alluvium deposited by the Mississippi River. Slopes are 0 to 2 percent. This soil is associated with poorly drained Sharkey soils which are at a lower elevation.

Typically, the surface layer is slightly acid, dark grayish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 24 inches. It is slightly acid, grayish brown silty clay loam with dark yellowish brown mottles in the upper 9 inches and is slightly acid, grayish brown silt loam with dark yellowish brown mottles in the lower part. Below this is neutral, grayish brown silt loam and very fine sandy loam with dark yellowish brown mottles.

Included with this soil in mapping are a few small areas of Sharkey clay. Also included are many small areas of Commerce soil that has a silt loam surface layer at slightly higher elevations.

This soil is high in fertility. Plant roots penetrate the soil easily, and water and air move slowly through it. Runoff is moderate to slow. The seasonal high water table is at a depth of 1.5 to 4 feet during the months of December through April. Sufficient water is available for plant growth in most years.

Most of the acreage is in crops. Cotton and soybeans are the main crops. A small acreage is used for pasture and homesites.

The potential for crops and pasture is excellent; however, wetness is a limitation. The high fertility and loamy texture make this one of the choice soils for crops and pasture in the parish. The main suitable crops are cotton, corn, soybeans, wheat, grain sorghum, and oats. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, dallisgrass, tall fescue, white clover, ryegrass, and Pensacola bahiagrass.

This soil can be worked only within a somewhat narrow range of moisture content. A surface drainage system is needed for most cultivated crops. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers generally are not needed.

The potential for urban use is fair. Wetness is a limitation to use of this soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to use for foundations or as construction material. Capability subclass IIw.

19—Deerford silt loam. This soil is in nearly level areas and on low ridges on the terrace uplands in the western part of the parish. This soil formed in loess material, and it has high sodium saturation in the lower part of the subsoil. The areas range from 10 to 40 acres in size. Slopes are less than 1 percent. This soil is closely associated with the more poorly drained Foley soils and the more poorly drained and more clayey Forestdale soils.

Typically, the surface layer is medium acid, dark brown and grayish brown silt loam about 8 inches thick. The subsurface layer is medium acid, grayish brown silt loam 6 inches thick. The subsoil extends to a depth of 54 inches. To a depth of 26 inches it is medium acid, mottled yellowish brown and grayish brown silty clay loam. Below this, it is moderately alkaline, yellowish brown and brown silty clay loam. The underlying material is moderately alkaline, pale brown silt loam with yellowish brown mottles.

Included with this soil in mapping are a few small areas of Foley and Forestdale soils. Also included are a few small areas of Deerford soils that have a silty clay loam surface layer.

This soil is low in fertility. The high sodium saturation in the lower part of the subsoil restricts root development and limits the amount of water available to plants. Water and air move slowly through this layer. Surface runoff is slow. The seasonal high water table is at a depth of 0.5 to 1.5 feet during the months of December through April. The surface layer is wet for significant periods during winter and spring. Plants lack water during the summer and fall of most years.

Most of the acreage is in crops. A small acreage is in pasture.

The potential for crops and pasture is fair. Wetness in winter and spring and droughtiness in summer and fall are the main limitations. The main suitable crops are cotton and soybeans. The main suitable pasture plants are common bermudagrass and Pensacola bahiagrass.

This soil is somewhat easy to work but is difficult to keep in good tilth because of surface crusting. Land leveling and smoothing improve surface drainage; however, if the cuts take off too much of the favorable soil layers overlying the subsoil that is high in sodium content, reduced yields will be the result. Proper management of crop residues improves tilth and reduces soil losses from erosion. Crop response to fertilizer is fair.

The potential for urban use of this soil is poor. Wetness is a limitation to its use for septic tank absorption fields and shallow excavations. Low strength is a limitation to its use for foundations or as construction material. Capability subclass IIw.

4—**Dexter silt loam, 1 to 3 percent slopes.** This very gently sloping, loamy soil is on elongated, narrow, convex ridges in the western part of the parish. Areas range from 10 to 50 acres in size. This soil formed in loamy alluvium. This soil is associated with the moderately well drained Grenada soils at about the same elevation and with the poorly drained Calhoun and Foley soils at slightly lower elevations.

Typically, the surface layer is medium acid, dark brown silt loam about 5 inches thick. The subsoil, to a depth of 11 inches, is medium acid, dark brown silty clay loam. Below this, to a depth of 28 inches, it is strongly acid, reddish brown loam. Next, to a depth of 39 inches, it is strongly acid, reddish brown silty clay loam. Below this, to a depth of 51 inches, the subsoil is strongly acid, dark brown loam. The underlying material is strongly acid, dark brown fine sandy loam.

Included with this soil in mapping are a few small areas of Dubbs and Foley soils at lower elevations. Also included are small areas of Dexter soils that have slopes that exceed 3 percent.

This soil is moderate in fertility. Plant roots penetrate the soil easily. Water and air move at a moderate rate through the soil, and runoff is medium. The seasonal high water table is below a depth of 6 feet. Sufficient water is available for plant growth in most years.

Most of the acreage is in crops. A small acreage is used for pasture, woodland, homesites, and gardens.

The potential for crops and pasture is good; however, erosion is a concern where there is no vegetative cover. The main suitable crops are cotton, corn, soybeans, wheat, sweet potatoes, truck crops, and oats. The main suitable pasture plants are common bermudagrass, ryegrass, improved bermudagrasses, dallisgrass, Pensacola bahiagrass, ball clover, and crimson clover.

The soil is friable and easy to keep in good tilth. It can be worked within a wide range of moisture content. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Conservation practices such as contour farming, minimum tillage, and proper management of crop residues reduce soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban use is excellent; however, the rapid percolation rate is a limitation if this soil is used for sewage lagoons and pond reservoirs. Low strength is a limitation for local roads and streets. Capability subclass IIe.

21—**Dundee-Dubbs complex.** This complex consists of small areas of Dundee and Dubbs soils that are so intermingled that they could not be mapped separately at the scale selected. This complex occurs in slight depressions and on low, nearly level ridges on the alluvial plain at the southwestern edge of the parish. Slopes range from 0 to 2 percent. These soils are associated with the better drained Dexter soils at higher elevations and the more poorly drained, more clayey Forestdale soils at lower elevations.

The Dundee soil is in slight depressions and in level areas and makes up about 45 percent of each mapped area. Typically the surface layer is slightly acid, dark grayish brown silty clay loam about 4 inches thick. The subsoil, to a depth of 23 inches, is strongly acid or medium acid, grayish brown silty clay loam mottled with shades of brown. To a depth of 35 inches it is medium acid, grayish brown silty clay loam with yellowish brown mottles. The underlying material is slightly acid or neutral, brownish gray silt loam or loam mottled in shades of brown.

The Dundee soil is moderate in fertility. Plant roots penetrate the soil easily, and water and air move slowly through it. Runoff is slow to moderate. The seasonal high water table is at a depth of 1.5 to 3.5 feet during the months of December through April. The surface layer is wet for significant periods in winter and spring. Sufficient water is available to plants in most years.

The Dubbs soil is on low, nearly level, rounded or elongated ridges and makes up about 45 percent of each mapped area. Typically the surface layer is strongly acid, brown silty clay loam about 8 inches thick. The subsoil, to a depth of 32 inches, is medium acid, yellowish brown silty clay loam with brown mottles. To a depth of 55 inches it is medium acid, brownish silt loam mottled with shades of brown. The underlying material is medium acid, yellowish brown very fine sandy loam.

The Dubbs soil is moderate in fertility. Plant roots penetrate the soil easily. Water and air move slowly through it. Runoff is medium. The seasonal high water table is below a depth of 6 feet. The surface layer is wet for short periods in winter and spring. Sufficient water is available to plants in most years.

Included with this complex in mapping are a few small areas of Foley, Forestdale, and Deerford soils. Also included are small areas of soils that are similar to the Dundee and Dubbs soils but are alkaline below a depth of 30 inches, and small areas of soils that are similar to the Dundee soils but are brown below a depth of 30 inches.

Most of the acreage is in crops. Cotton and soybeans are the main crops. A small acreage is used for pasture and homesites.

The potential of the complex for crops and pasture is good. The moderate fertility, loamy texture, and nearly level slopes make this complex some of the best cropland in the parish. The main suitable crops are cotton, soybeans, corn, grain sorghum, oats, truck crops, and wheat. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, ryegrass, dallisgrass, southern wild winter pea, tall fescue, and white clover.

The soils in this complex are friable and easy to keep in good tilth. They can be worked within a wide range of moisture content. Traffic pans develop easily but can be broken up by deep plowing or chiseling. A surface drainage system is generally needed to remove excess surface water from low areas. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops respond well to nitrogen and other fertilizers. Lime is generally needed.

The potential for urban use is fair. Wetness limits use of the Dundee soils for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength and shrink-swell potential are limitations if the Dundee and Dubbs soils are used for foundations or as construction material. Capability subclass IIw.

5—Foley silt loam. This is a nearly level soil in the western part of the parish. In places, it is in slight depressions. The areas range from 5 to 30 acres in size. This soil formed in loess material more than 4 feet thick. It has high sodium saturation in the lower part of the subsoil. Slopes are less than 1 percent. This soil is associated with the better drained Dexter soils at higher elevations and with the poorly drained Calhoun soils at about the same elevation.

Typically the surface layer is neutral, grayish brown silt loam about 5 inches thick. The subsurface layer, which extends to a depth of 15 inches, is medium acid, light brownish gray silt loam with yellowish brown mottles. The subsoil, to a depth of 61 inches, is light brownish gray silty clay loam mottled in shades of brown. It is slightly acid and neutral in the upper 12 inches and is strongly alkaline in the next 34 inches. Below this, it is strongly alkaline, light brownish gray silt loam with yellowish brown mottles.

Included in mapping are small areas of Calhoun, Dundee, and Forestdale soils. Also included are small areas of soils that are similar to this soil but lack the high sodium saturation.

This soil is moderate in fertility. Plant roots penetrate it easily. Water and air move slowly through the subsoil, which generally remains dry even in wet periods. A high content of sodium is in the lower part of the subsoil. Runoff is slow to very slow. The seasonal high water table is perched above a depth of 1.5 feet and at times is at the surface during the months of December through April. The surface layer is wet for long periods in winter and spring. Plants lack water during summer and fall of most years.

Most of the acreage is in pasture. A small acreage is in crops.

The potential for crops and pasture is fair. Wetness in winter and spring and droughtiness in summer and fall are the main limitations. The main suitable crops are cotton, oats, rice, soybeans, and wheat. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, dallisgrass, ryegrass, and southern wild winter pea.

This soil is friable but is somewhat difficult to keep in good tilth because of surface crusting. It can be worked within a fairly wide range of moisture content. A surface drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment; however, if cuts reduce the thickness of favorable soil layers overlying lower subsoil layers that have excessive sodium content, reduced yields will result. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is fair. Wetness is a limitation if this soil is used for septic tank absorption fields, sanitary landfills, and local roads and streets. Low strength is a limitation to its use for foundations or as construction material. Capability subclass IIIw.

15—Forestdale silty clay loam. This is a nearly level soil on the alluvial plain at the northwestern edge of the parish. Areas range from 10 to 200 acres in size. Some areas are in depressions. This soil formed in clayey and silty alluvium. Slopes are less than 1 percent. This soil is associated with the better drained Dubbs and Dundee soils at higher elevations and the more clayey Perry soils at lower elevations.

Typically the surface layer is neutral, dark grayish brown silty clay loam 6 inches thick. The subsoil, to a depth of 14 inches, is medium acid, gray silty clay with yellowish brown mottles. To a depth of 36 inches it is medium acid, gray silty clay loam with brown mottles. Below this it is medium acid, light brownish gray silt loam with strong brown mottles.

Included with this soil in mapping are a few small areas of Dundee, Foley, and Perry soils.

This soil is medium to low in fertility. Plant roots penetrate the soil somewhat easily. Water and air move slowly through the soil. Runoff is slow to very slow. The seasonal high water table fluctuates between the surface and a depth of 1.5 feet during the months of December through April. The surface layer is wet for long periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in crops and pasture. Soybeans and cotton are the main crops.

The potential for crops and pasture is fair. Wetness is the main limitation. The main suitable crops are cotton, corn, rice, and soybeans. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, dallisgrass, tall fescue, and white clover.

This soil is somewhat difficult to keep in good tilth. A surface drainage system is generally needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is poor. Wetness is a limitation to use of this soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Shrink-swell potential and low strength are limitations to use for foundations or as construction material. Capability subclass IIIw.

6—Grenada silt loam, 1 to 3 percent slopes. This soil is on ridges on the terrace uplands, mostly in the central and eastern part of the parish. Areas range from 10 to 40 acres in size. This soil formed in silty loess deposits. It is associated with the better drained Dexter and Memphis soils that occur on the higher ridges and with the more poorly drained Calhoun, Calloway, and Foley soils that occur at lower elevations.

Typically the surface layer is slightly acid, dark brown silt loam about 7 inches thick. The subsoil to a depth of 30 inches, is very strongly acid, yellowish brown silt loam. Below this, to a depth of 33 inches, it is strongly acid, light gray silt loam. The next layer extends to a depth of 54 inches and is a compact, brittle, strongly acid, yellowish brown silty clay loam fragipan mottled with shades of brown and gray (fig. 6). Below this is a compact, slightly brittle, strongly acid, yellowish brown silt loam fragipan.

Included with this soil in mapping are a few small areas of Calhoun, Calloway, Dexter, and Memphis soils. Also included are a few small areas of Grenada soils that have slopes of more than 3 percent.

This soil is somewhat low in fertility. Plant roots penetrate the soil easily above the compact and brittle layers in the lower part of the subsoil. These layers somewhat restrict root penetration and the movement of water and air. Runoff is medium. The seasonal high water table is perched above a depth of 2.5 feet during the months of January through March. The surface layer is wet for short periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in crops and pasture. A small acreage is used for truck crops and homesites.

The potential for crops and pasture is good; however, erosion is a concern where there is no vegetative cover on the soils.

The loamy texture, good natural surface drainage, and good response to fertilizer make this soil one of the best in the parish for crops. The main suitable crops are cotton, corn, oats, soybeans, grain sorghum, truck crops, sweet potatoes, and wheat. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, crimson clover, ball clover, ryegrass, dallisgrass, Pensacola bahiagrass, and tall fescue.

This soil is friable and easy to keep in good tilth. It can be worked within a fairly wide range of moisture content. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Natural drainage is good. Conservation practices such as contour farming, minimum tillage, and proper management of crop residues reduce soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is good. Wetness is the principal limitation to use of the soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to its use for foundations or as construction material. Capability subclass IIe.

7—Grenada silt loam, 3 to 5 percent slopes. This loamy soil is on ridges on the terrace uplands mostly in the central and eastern part of the parish. Areas range from about 10 to 30 acres in size. This soil formed in loess material more than 4 feet thick. It is associated with the better drained Memphis soils on the higher parts of the ridges and with the more poorly drained Calhoun soils at lower elevations.

Typically the surface layer is slightly acid, dark brown silt loam about 7 inches thick. The subsoil, to a depth of 29 inches, is very strongly acid, yellowish brown silt loam with dark yellowish brown mottles. The next layer extends to a depth of 33 inches and is very strongly acid, very pale brown silt loam. Below this is a compact, brittle, strongly acid, yellowish brown silt loam fragipan mottled with shades of brown.

Included with this soil in mapping are a few small areas of Calloway and Memphis soils. Also included are small areas of Grenada soils that have slopes of more than 5 percent.

This soil is somewhat low in fertility. Plant roots penetrate the soil easily above the compact and brittle layers in the lower part of the subsoil. These compact and brittle layers restrict root development and the movement of air and water. Runoff is medium to rapid. The seasonal high water table is perched above a depth of 2.5 feet during the months of January through March. The surface layer is wet for short periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in pasture. A small acreage is in crops.

The potential for crops and pasture is good; however, erosion is a concern where the soil is without a vegetative cover. The long, narrow ridges and short slopes make this soil somewhat difficult to cultivate. The main suitable crops are cotton, corn, oats, grain sorghum, sweet potatoes, truck crops, and wheat. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, dallisgrass, crimson clover, Pensacola bahiagrass, ball clover, ryegrass, and tall fescue.

This soil is friable and easy to keep in good tilth. It can be worked within a fairly wide range of moisture content. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Conservation practices such as contour farming, minimum tillage, and proper management of crop residues reduce soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is good. Wetness is the principal limitation to use of this soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to use for foundations or as construction material. Capability subclass IIIe.

8—**Grenada-Calhoun complex, gently undulating.** This complex consists of areas of Grenada and Calhoun soils that are so intermingled that they could not be mapped separately at the scale selected (fig. 7). These soils are on low parallel ridges and in swales on the terrace uplands, mostly in the central part of the parish. They formed in loess material more than 4 feet thick. Slopes range from 0 to 3 percent. These soils are associated with better drained Memphis soils at slightly higher elevations and with somewhat poorly drained Calloway soils on the lower ridges.

The Grenada soil is on low ridges 200 to 300 feet wide and makes up about 45 percent of each mapped area. Typically the surface layer is slightly acid, dark brown silt loam about 8 inches thick. The subsoil, to a depth of 30 inches, is very strongly acid, yellowish brown silt loam mottled in shades of brown. The next layer extends to a depth of 33 inches and is strongly acid, light gray silt loam mottled with yellowish brown. Below this is a compact, brittle, strongly acid, yellowish brown silt loam fragipan with light brownish gray mottles.

This Grenada soil is somewhat low in fertility. Plant roots penetrate it easily above the compact and brittle layers in the lower part of the subsoil. These compact and brittle layers somewhat restrict root penetration and the movement of water and air. Runoff is medium. The seasonal high water table is perched above a depth of 2.5 feet during the months of January through March. The surface layer is wet for short periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

The Calhoun soil is in swales 100 to 200 feet wide and makes up about 40 percent of each mapped area. Typically the surface layer is medium acid, dark brown silt loam about 9 inches thick. The subsurface layer extends to a depth of 21 inches and is very strongly acid, light brownish gray silt loam with yellowish brown mottles. The subsoil to a depth of 30 inches is very strongly acid, light brownish gray silt loam with yellowish brown mottles.

The Calhoun soil is somewhat low in fertility. Water and air move slowly through the soil. Wetness causes poor aeration and restricts plant root development. Runoff is slow to very slow. The seasonal high water table is perched above a depth of 2 feet and at times is at the surface during the months of December through April. The surface is wet for long periods in winter and spring, but the soil is generally not saturated below a depth of 2 feet. Plants generally lack water during dry periods in summer and fall.

Included with this complex in mapping are a few small areas of Calloway, Foley, and Memphis soils. Also included are some small areas of Grenada soils where slopes are greater than 3 percent. Also included in some swales are soils that are similar to the Calhoun soil but have a surface layer of silty clay loam. Some soils in swales are subject to shallow flooding after heavy rains.

Most of the acreage is in crops and pasture. A small acreage is used for homesites.

The potential for crops and pasture is good; however, the uneven surface and wetness in the swales are limitations. The main suitable crops are cotton, corn, oats, sweet potatoes, soybeans, and wheat. The suitable pasture plants are common bermudagrass, improved bermudagrasses, Pensacola bahiagrass, tall fescue, dallisgrass, ryegrass, and southern wild winter pea (fig. 8).

The Grenada soil is friable, easy to keep in good tilth, and can be worked within a fairly wide range of moisture content. The Calhoun soil is friable and somewhat difficult to keep in good tilth because of surface crusting. Traffic pans develop easily in the soils in this complex but can be broken up easily by deep plowing or chiseling. A surface drainage system is needed to remove excess surface water from the swales if they are to be used for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment; however, in most cases a large amount of soil will have to be moved. Also, removing too much of the material from above the compact and brittle lower part of the subsoil of the Grenada soil may affect crop yields. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer.

The potential for urban development is fair. Wetness is the principal limitation to use of these soils for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to use for foundations or as construction material. Capability subclass IIIw.

3—**Memphis silt loam, 0 to 2 percent slopes.** This nearly level soil is on the terrace uplands in areas adjacent to the escarpment between the terrace uplands and the alluvial plain in the eastern part of the parish. Areas range from 10 to 300 acres in size. This soil formed in loess material more than 4 feet thick. It is associated with moderately well drained Grenada soils at about the same elevation and more poorly drained Calhoun soils at lower elevations.

Typically the surface layer is slightly acid, dark brown silt loam about 8 inches thick. The subsoil, to a depth of 47 inches, is medium acid and strongly acid, dark brown silty clay loam. Below this, it is strongly acid, dark brown silt loam.

Included with this soil in mapping are a few small areas of Grenada and Calloway soils at about the same elevation, and Calhoun soils in low areas. Also included are small areas of soils that are similar to this Memphis soil but have darker layers ranging to a depth of 36 inches. The soils that have darker layers are on the old Indian campgrounds at Poverty Point. Also included are small areas of Memphis soils that have slopes of more than 2 percent.

This soil is somewhat low in fertility. Plant roots penetrate it easily. Water and air move through the soil at a moderate rate. Runoff is medium. The seasonal high water table is below a depth of 6 feet. Plants lack water during dry periods in summer and fall of some years.

Most of the acreage is in crops. A small acreage is used for pasture and homesites.

The potential for crops is excellent, and the potential for pasture is good; however, erosion is a concern where the soil is without a vegetative cover. The loamy texture and nearly level slopes make this soil one of the best for crops in the parish. The main suitable crops are cotton, corn, oats, sweet potatoes, soybeans, grain sorghum, wheat, and tomatoes and other truck crops (fig. 9). The main suitable pasture plants are common bermudagrass, improved bermudagrasses, Pensacola bahiagrass, crimson clover, ball clover, dallisgrass, ryegrass, and tall fescue.

This soil is friable and easy to keep in good tilth. It can be worked within a wide range of moisture content. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Conservation practices such as minimum tillage and proper management of crop residues help maintain organic-matter content and reduce soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is good. There are no significant limitations to use of this soil for septic tank absorption fields and sanitary landfills; however, low strength is a limitation to use for foundations or as construction material. Capability subclass I.

14—**Memphis silt loam, 8 to 20 percent slopes.** This strongly sloping and moderately steep, loamy soil is on the escarpment between the alluvial plain and the terrace uplands in the eastern part of the parish (fig. 10). Areas range from 100 feet to 600 feet wide and extend throughout the length of the escarpment. This soil formed in loess material. It is associated with the moderately well drained Grenada soils on the upland terrace adjacent to the escarpment and with the more poorly drained, clayey Sharkey soils on the alluvial plain.

Typically the surface layer is slightly acid, dark brown silt loam about 8 inches thick (fig. 11). The subsoil, to a depth of 33 inches, is strongly acid, dark brown silty clay loam. Below this to a depth of 65 inches is dark brown silt loam that is strongly acid in the upper part and medium acid in the lower part.

Included with this soil in mapping are a few small areas of Grenada soils. Also included are poorly drained, mixed alluvial and colluvial sediments in small, narrow areas between the escarpment and the alluvial plain and small areas where erosion has exposed the subsoil.

This soil is somewhat low in fertility. Plant roots penetrate it easily. Water and air move at a moderate rate through the soil. Runoff is rapid. The seasonal high water table is below a depth of 6 feet. Plants lack water during dry periods in summer and fall of some years.

Most of the acreage is in woodland. A small acreage is in pasture. The potential for crops is poor, and the potential for pasture is fair. Because of the rapid runoff, erosion hazard, and steep slopes, this soil is poorly suited to cultivated crops. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, dallisgrass, crimson clover, ball clover, Pensacola bahiagrass, and tall fescue. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is fair. Slope is a limitation to use of this soil for septic tank absorption fields, area sanitary landfills, homesites, and local roads and streets. Low strength is a limitation to use for foundations or as construction material. Capability subclass VIe.

16—**Perry clay.** This is a nearly level soil on the alluvial plain along Boeuf River at the northwestern edge of the parish. Areas range from 20 to 300 acres in size. Some areas are in slight depressions. This soil formed in clayey alluvium deposited by the Arkansas and Mississippi Rivers. Slopes are 0 to 2 percent. This soil is associated with the somewhat poorly drained Dundee soils at higher elevations and the poorly drained Forestdale soils at about the same elevation.

Typically the surface layer is medium acid, dark grayish brown clay about 5 inches thick. The subsoil, to a depth of 31 inches, is medium acid, gray clay with strong brown mottles. The next layer extends to a depth of 47 inches and is slightly acid, dark brown silty clay with grayish brown mottles. Below this is mildly alkaline, grayish brown silty clay loam with strong brown mottles.

Included with this soil in mapping are a few small areas of Dundee and Forestdale soils. Also included are a few small areas of Perry soil that have slopes of more than 2 percent.

This soil is moderately low in fertility. Plant roots penetrate the soil with difficulty, and water and air move very slowly through it. It has a very high shrink-swell potential. Deep cracks form when the soil is dry and close when it is wet. Runoff is slow to very slow. The seasonal high water table fluctuates between the surface and a depth of 2 feet during the months of December through April. The surface is wet for long periods in winter and spring. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in crops. A small acreage is in woodland and pasture.

The potential for crops and pasture is fair. Wetness and a clayey texture are the main limitations. The main suitable crops are cotton, rice, and soybeans. The main suitable pasture plants are common bermudagrass, tall fescue, dallisgrass, white clover, Pensacola bahiagrass, and ryegrass.

This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if worked when wet. A surface drainage system is generally needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally needed.

The potential for urban development is poor. Wetness is a limitation to use of this soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength and shrink-swell potential are limitations to use for foundations or as construction material. Capability subclass IIIw.

11—Sharkey clay. This is a nearly level soil on the alluvial plain along Bayou Macon at the eastern edge of the parish. Areas range from about 50 to 3,000 acres in size. Some areas are in slight depressions. This soil formed in clayey Mississippi River alluvium. Slopes are less than 1 percent. This soil is associated with better drained and loamy Commerce soils at higher elevations.

Typically the surface layer is neutral, dark grayish brown and dark gray clay about 12 inches thick. The subsoil, which extends to a depth of 52 inches, is neutral, dark gray and gray clay with dark yellowish brown mottles. The underlying material is mildly alkaline, gray clay with yellowish brown mottles.

Included with this soil in mapping are a few small areas of Commerce soils and of Sharkey soils that have slopes of 1 to 3 percent. Also included are soils that are similar to this Sharkey soil but have loamy material about 27 inches below the surface.

This soil is high in natural fertility. Plant roots penetrate the soil with difficulty. Water and air move very slowly through it. Runoff is slow to very slow. The seasonal high water table fluctuates between the surface and a depth of 2 feet during the months of December through April. The surface layer is wet for long periods in the winter and spring. This soil has a very high shrink-swell potential. It cracks when dry and seals over when wet. Plants generally lack water during dry periods in summer and fall.

Most of the acreage is in crops. Soybeans, rice, and cotton are the main crops (fig. 12). The potential for crops and pasture is good; however, wetness and the clayey texture are limitations. The main suitable crops are soybeans, rice, cotton, grain sorghum, wheat, and oats. The main suitable pasture plants are common bermudagrass, improved bermudagrasses, Pensacola bahiagrass, tall fescue, dallisgrass, ryegrass, and white clover.

This soil is sticky when wet, hard when dry, and difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if worked when wet. A surface drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improve surface drainage and increase the effectiveness of farm equipment. Proper management of crop residues improves tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer. Lime and other fertilizers are generally not needed.

The potential for urban development is poor. Wetness limits the use of this soil for septic tank absorption fields, sanitary landfills, homesites, and local roads and streets. Low strength and high shrink-swell potential are limitations to use for foundations or as construction material. Capability subclass IIIw.

Use and Management of the Soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture and woodland, and as sites for buildings, highways and other transportation systems, sanitary facilities, parks and other recreation facilities, and wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of roadfill and topsoil. Other information indicates wetness that causes difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and Pasture

DALE ROCKETT, agronomist, Soil Conservation Service, assisted in the preparation of this section.

The major management concerns in the use of the soils for crops and pasture plants are described in this section. In addition, the system of land capability classification used by the Soil Conservation Service is explained, and the predicted yields of the main crops and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential and needed practices in the survey area for those in the agribusiness sector—equipment dealers, drainage contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section, "Soil Maps for Detailed Planning." When making plans for management systems for individual fields or farms, check the detailed information given in the description of each soil.

Specific recommendations for fertilizers, crop varieties, and seeding mixtures are not given, because these change from time to time as more complete information is obtained. For more detailed information, consult the local staff of the Soil Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

More than 181,446 acres in West Carroll Parish were used for crops and pasture in 1967, according to a conservation needs inventory prepared in 1969. Of this total, about 156,446 acres were used for crops—mainly cotton, soybeans, corn, rice, and truck crops—and more than 25,000 acres were used for pasture. Cotton acreage fluctuates according to government programs and prices, but the overall cropped acreage has increased since 1958 due to an increase in acreage planted to soybeans, rice, and truck crops. The acreage in cotton and pasture has decreased, and this is largely due to the significant increase in acreage planted to soybeans.

General Principles of Management for Crops and Pasture

Differences in crop suitability and management needs result from differences in soil characteristics, such as fertility levels, erodibility, organic-matter content, availability of water for plant growth, drainage, and flooding hazards. Cropping systems and soil tillage are also important. In addition, each farm has a unique soil pattern, and therefore it has unique management problems. However, some principles of farm management apply only to specific soils or to certain crops. This section of the soil survey presents the general principles of management which may be applied widely to the soils of West Carroll Parish.

Fertilizer and lime. The amount of fertilizer needed depends on the crop to be grown, the past cropping history, the level of yield desired, and the kind of soil. Specific recommendations should be based on laboratory analyses of soil samples from each field.

A soil sample for laboratory testing should consist of a single kind of soil and should represent no more than 10 acres. Agricultural agencies in the parish can supply detailed information and instructions regarding the proper method of taking soil samples.

The soils in West Carroll Parish range from strongly acid to moderately alkaline in the upper 20 inches. The more acid soils may require additions of lime.

Organic-matter content. Organic matter is important as a source of nitrogen for crop growth and is also important in increasing water intake rates, reducing surface crusting and soil losses from erosion, and promoting a good condition of the surface soil. Most of the cultivated soils in West Carroll Parish are moderately low in organic-matter content.

To a limited extent, organic matter can be built up and maintained by leaving plant residue on the soil, promoting bigger plant growth, growing plants with extensive root systems, adding barnyard manure, and growing perennial grasses and legumes in rotation with other crops.

Soil tillage. The major purpose of soil tillage is seedbed preparation and weed control. Seedbed preparation, cultivation, and harvesting operations tend to damage soil structure. Excessive cultivation of the soils should be avoided. Some of the clayey soils in the parish become cloddy when cultivated.

A compacted layer develops in the loamy soils if they are plowed at the same depth for long periods or if they are plowed when wet. This compacted layer is generally known as a traffic pan or plowpan, and it develops just below the plow layer. The development of this compacted layer can be reduced by not plowing when the soil is wet, by plowing at variable depths, or by subsoiling or chiseling.

Some tillage implements merely stir the surface and leave crop residues on the soil surface for protection from beating rains. This helps control erosion, reduces runoff, and increases infiltration of moisture.

Drainage needs. Many of the soils in West Carroll Parish need surface drainage to make them more suitable for crops. Early drainage methods in the parish involved construction of a complex pattern of drainage ditches, laterals, and field drains. The more recent approach to drainage in the parish is a combination of land leveling and grading and use of a minimum number of open ditches. These practices create larger, uniformly shaped fields which are better adapted to the use of modern, multirow farm equipment. Deep cutting of soils that have unfavorable subsoil characteristics, for example, a fragipan, should be avoided.

Water for plant growth. The available water-holding capacity of the soils in the parish is moderate to high, but in many years sufficient water is not available at the critical time for optimum plant growth unless irrigation is used. Large amounts of rainfall occur in winter and spring. Sufficient rainfall generally occurs in summer and fall of most years; however, plants lack water on most soils during dry periods in summer and fall. This rainfall pattern favors the growth of early-maturing crops.

Control of erosion. Erosion is a concern on soils on the upland terrace in West Carroll Parish, mainly because particles of the soils that formed in loess are easily detached and moved by water. Erosion is not a serious problem on soils on the alluvial plains, mainly because the topography is level and nearly level. Sheet erosion is moderately severe in all fallow plowed fields and in newly constructed drainage ditches. Some gully erosion occurs, mainly on more sloping land and at overfalls into drainage ditches. Sheet and gully erosion can be reduced by maintaining a cover of vegetation or plant residue on the soil surface as much of the year as possible, farming on the contour or stripcropping where possible, using minimum tillage, and controlling weeds by methods other than fallow plowing. New drainage ditches should be seeded immediately after construction. Water control structures placed at overfalls into drainage ditches will control gully erosion.

Cropping system. A good cropping system includes a legume to provide nitrogen, a cultivated crop to help control weeds, a deep-rooted crop to utilize subsoil fertility and maintain subsoil permeability, and a close-growing crop to help maintain the content of organic matter. In a good cropping system, the sequence of crops should be such that the soil has a cover during as much of the year as possible.

A suitable cropping system varies according to the needs of the farmer and the characteristics of the soil. Producers of livestock, for example, generally use cropping systems that have higher percentages of pasture than farmers growing cash crops. Additional information on cropping systems can be obtained from the Soil Conservation Service, the Cooperative Extension Service, and the Louisiana Agricultural Experiment Station.

Capability Classes and Subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are 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 that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

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; they are defined as follows:

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main 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 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability subclass is identified in the description of each soil mapping unit in the section "Soil Maps for Detailed Planning."

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby parishes were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Pasture yields were estimated for the most productive varieties of grasses and legumes climatically suited to the area and the soil. A few farmers may be obtaining average yields higher than those shown in table 6.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

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

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Woodland Management and Productivity

HENRY F. FALLIN, woodland conservationist, Soil Conservation Service, helped prepare this section.

West Carroll Parish was mostly covered with hardwood forest and a few scattered stands of pine. Most of the acreage has been cleared, and in 1975 woodland covered only 19,000 acres, or 9 percent of the parish.

The woodland is mostly on soils at the lower elevations throughout the parish. A small acreage is on scattered tracts at the higher elevations. The woodland is mostly of poor quality; however, a good stand of commercial timber is on a tract of about 1,200 acres.

Most of the soils in the parish are capable of producing high quality wood crops. Woodlands are also of value for wildlife, recreation, natural beauty, and soil and water conservation.

Table 7 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil, and *o* indicates insignificant limitations or restrictions.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

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

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings when plant competition is not a limiting factor. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this section are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil Properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to: (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of clay and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 8 shows, for each kind of soil, the degree and kind of limitations for building site development; table 9, for sanitary facilities; and table 11, for water management. Table 10 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building Site Development

The degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, and local roads and streets are indicated in table 8. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are used for pipelines, sewerlines, telephone and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by the soil wetness caused by a seasonal high water table, the texture and consistence of soils, and the tendency of soils to cave in or slough. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given.

Dwellings without basements and *small commercial buildings* referred to in table 8 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Ratings are made for small commercial buildings and dwellings without basements. For such structures, soils should be sufficiently stable that cracking or subsidence from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Slope is also an important consideration in the choice of sites for these structures and was considered in determining the ratings.

Local roads and streets referred to in table 8 have an all-weather surface that can carry light to medium traffic all year. They consist of subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, and shrink-swell potential are indicators of the traffic supporting capacity used in making the ratings. Soil wetness and slope affect stability and ease of excavation.

Sanitary Facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 9 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. The terms *good*, *fair*, and *poor* have meanings roughly the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability and depth to seasonal high water table. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope also affects the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soils affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with thin layers of soil. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, and are deep to a seasonal water table. Clayey soils are likely to be sticky and difficult to spread. Soil wetness can be a limitation because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

In the trench type of landfill, ease of excavation also affects the suitability of a soil for this purpose. Where the seasonal water table is high, water seeps into trenches and causes problems in filling.

Unless otherwise stated, the limitations in table 9 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry weather. Soils that are loamy or silty are better than other soils. Clayey soils may be sticky and difficult to spread.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction Materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 10 by ratings of good, fair, poor, or unsuited. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 14 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. Fine-grained soils are not suitable sources of sand and gravel. All the soils of West Carroll Parish are unsuited because they have excess fines.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, and slope. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loamy or clayey soils that have a layer of suitable material only 8 to 16 inches thick or that are moderately sloping.

Soils rated *poor* are clayey soils and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water Management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 11 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics.

Drainage of soil is affected by such soil properties as permeability, texture, depth to layers that affect the rate of water movement, depth to the water table, slope, stability of ditchbanks, and availability of outlets for drainage.

Irrigation is affected by such features as slope, hazard of water erosion, texture, presence of alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, presence of alkali, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent.

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

The information in table 12 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 9, and interpretations for dwellings without basements and for local roads and streets, given in table 8.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry.

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet. The surface is firm after rains and is not dusty when dry.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, and are not dusty when dry. They should have moderate slopes.

Wildlife Habitat

E. RAY SMITH, JR., biologist, Soil Conservation Service, helped prepare this section.

The wildlife population of West Carroll Parish is of medium to low density mainly because a large amount of cleared land is without permanent cover. The present woodland is mostly small tracts and is of poor quality.

The population of openland wildlife is composed of bobwhite quail, cottontail rabbit, and dove. The Louisiana Wildlife and Fisheries Commission rates the parish as one of the higher producers of doves. During the winter, moderate numbers of common snipe feed in fields of wet soils. The nongame bird population is small because of the sparsity of cover and the lack of permanent surface water. Within the woodland areas are small populations of squirrel and swamp rabbit and a few deer. The deer are confined mainly to the Colewa Creek area. American woodcock are also in these woodland areas in varying population levels during the winter.

The waterfowl population of the parish is high. Rice and soybean fields flooded by winter rains provide attractive feeding areas for waterfowl, mainly ducks and a few geese.

The natural water fisheries of the parish are poor, because there is a lack of large areas of permanent surface water, and where surface water is present it is poor in quality. The natural waters contain bowfish, spotted gar, yellow and black bullhead, carp, smallmouth buffalo, warmouth, black and white crappie, and a few largemouth bass, chain pickerel, and bream. The Louisiana Wildlife and Fisheries Commission estimates that the natural water fisheries produce only 20 pounds per acre.

The 350 farm ponds scattered throughout the parish offer better fishing than the natural waters. Largemouth bass and bluegill are the principal species. Forty-seven ponds totaling 323 acres are used for the commercial production of catfish.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, inadequate, or inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. Examples are corn, grain sorghum, wheat, and oats. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, and slope. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Examples are tall fescue, ryegrass, rescuegrass, lovegrass, bromegrass, clover, and vetch. Major soil properties that affect the growth of grasses and legumes are texture of the surface layer, available water capacity, wetness, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, panicgrass, paspalum, goldenrod, beggarweed, and switchgrass. Major soil properties that affect the growth of these plants are texture of the surface layer, available water capacity, and wetness. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Examples of native plants are oak, cottonwood, cherry, sweetgum, wild plum, hawthorn, dogwood, hickory, blackberry, pecan, elm, and greenbrier. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are shrub lespedeza and crabapple. Major soil properties that affect growth of hardwood trees and shrubs are available water capacity and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Examples are pine, baldcypress, and eastern redcedar. Soil properties that have a major effect on the growth of coniferous plants are available water capacity and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and cattail. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, and slope.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control devices in streams. Examples are waterfowl feeding areas and ponds. Major soil properties affecting shallow water areas are wetness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, robin, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, wood ducks, woodcock, thrushes, woodpeckers, squirrels, grey fox, raccoon, and deer.

Wetland habitat consists of open, swampy shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, herons, and mink.

Soil Properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering Properties

EDWARD W. HICKEY, engineer, Soil Conservation Service, assisted in the preparation of this section.

Table 14 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 14 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil Series."

Texture is described in table 14 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified 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. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection. When laboratory data are available, the A-1, A-2, and A-7 groups are further classified 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.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and Chemical Properties

Table 15 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Classification of the Soils

In this section, the soil series recognized in the survey area are described, the current system of classifying soils is defined, and the soils in the area are classified according to the current system.

Soil Series

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual. Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or mapping units, of each soil series are described in the section "Soil Maps for Detailed Planning."

Calhoun Series

The Calhoun series consists of poorly drained, slowly permeable soils. They are loamy throughout and formed in loess more than 4 feet thick. These soils occur on broad flats and in swales and narrow depressions adjacent to drainageways throughout the terrace uplands.

Calhoun soils are associated with Calloway, Foley, Grenada, and Memphis soils. They are grayer in color than the Calloway and Grenada soils, and do not have the fragipan that is characteristic of those soils. Calhoun soils are grayer and more poorly drained than the Memphis soils. They lack horizons with high sodium content that are characteristic of Foley soils.

Most of the acreage is in crops. A small acreage is in pasture and woodland.

Typical pedon of Calhoun silt loam in woodland, 4 miles northwest of Epps, 60 feet west of center of road, 615 feet south of middle of pipeline right-of-way, NE1/4NE1/4 sec. 10, T. 19 N., R. 9 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint grayish brown mottles; weak medium subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

A2g—4 to 16 inches; light brownish gray (10YR 6/2) silt loam; common medium faint brownish yellow (10YR 6/6) and few fine faint yellowish brown mottles; weak medium subangular blocky structure; friable; many fine roots; few fine pores; very strongly acid; abrupt irregular boundary.

B2'tg—16 to 31 inches; grayish brown (2.5YR 5/2) silty clay loam; common medium faint yellowish brown (10YR 5/6) and few fine faint brownish yellow mottles; weak coarse subangular blocky structure; firm; common thick discontinuous clay films; common tongues of light brownish gray silt loam that are 2 to 10 centimeters wide; few fine brown concretions; strongly acid; clear smooth boundary.

B22tg—31 to 44 inches; grayish brown (2.5YR 5/2) silty clay loam; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; hard; thin patchy clay films on faces of peds; common light brownish gray silt loam tongues that are 2 to 5 centimeters wide; strongly acid; clear smooth boundary.

B3g—44 to 63 inches; light brownish gray (2.5YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; hard; common black stains on faces of peds; common fine brown concretions; slightly acid.

The Ap horizon is dark grayish brown, dark brown, or grayish brown. It ranges from medium acid through very strongly acid. The A2 horizon is light brownish gray, grayish brown, or gray. The A2 horizon ranges from medium acid through very strongly acid. The thickness of the A horizon ranges from 11 to 22 inches.

The B horizon is grayish brown, gray, or light brownish gray with brownish mottles. It is silty clay loam or silt loam. Tongues of A2 material extend into the B horizon. The B horizon is typically strongly acid or very strongly acid in the upper part and ranges from strongly acid through neutral in the lower part.

Calloway Series

The Calloway series consists of somewhat poorly drained, slowly permeable soils with a fragipan. These soils are loamy throughout and formed in loess more than 4 feet thick. They occur in nearly level areas and on low ridges and knolls and are mostly adjacent to Grenada and Calhoun soils on the terrace uplands.

Calloway soils are associated with Grenada and Memphis soils. They have mottles nearer the surface than the Grenada soils and are not so brown. Calloway soils are less well drained and are grayer than Memphis soils.

Most of the acreage is in crops. A small acreage is in pasture.

Typical pedon of Calloway silt loam in a cultivated field, 0.5 mile south of Pioneer Elementary School, 180 feet east of middle of gravel road, 159 feet west of property line fence, NE1/4SW1/4 sec. 22, T. 20 N., R. 10 E.

Ap1—0 to 4 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; friable; many fine roots; few fine black concretions; medium acid; abrupt smooth boundary.

Ap2—4 to 8 inches; brown (10YR 5/3) silt loam; common medium faint light gray (10YR 7/2) mottles; weak very coarse subangular blocky structure; friable; common fine roots; few fine black concretions; medium acid; abrupt smooth boundary.

B2—8 to 23 inches; yellowish brown (10YR 5/6) silt loam; many medium faint light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; very friable; few fine roots; few fine black concretions; strongly acid; clear smooth boundary.

A'2—23 to 27 inches; light gray (10YR 7/2) silt loam; common medium faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very friable; few fine roots; few fine black and brown concretions; strongly acid; clear irregular boundary.

B'x1—27 to 52 inches; grayish brown (10YR 5/2) silty clay loam; many medium faint yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic and moderate coarse subangular blocky structure; firm; common fine pores; about 65 percent slightly brittle common fine pores; common patchy clay films; light gray silt coatings on faces of prisms; strongly acid; clear smooth boundary.

B'x2—52 to 70 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; firm; slightly brittle and compact; few thin patchy clay films on some ped faces; black stains in old root channels; medium acid.

The A horizon is brown, dark grayish brown, or pale brown silt loam. It is 4 to 10 inches thick. It is medium acid or strongly acid. Mottles are in shades of gray.

The B horizon is yellowish brown, dark yellowish brown, or light yellowish brown silt loam or silty clay loam. It is 8 to 16 inches thick. It is medium acid or strongly acid. Mottles are in shades of gray.

The A'2 horizon is light gray, light brownish gray, or pale brown silt loam. It is 2 to 12 inches thick. It is medium acid or strongly acid. Mottles are in shades of brown. The depth to the fragipan is 14 to 35 inches.

The B'x horizon is grayish brown, yellowish brown, or light olive brown silty clay loam or silt loam. It is strongly acid or medium acid in the upper part and ranges from slightly acid through strongly acid in the lower part. Mottles are in shades of gray or brown.

Commerce Series

The Commerce series consists of somewhat poorly drained, moderately slowly permeable, loamy soils that formed in alluvium deposited by the Mississippi River. These soils are in higher areas on the alluvial plain at the eastern edge of the parish.

Commerce soils are associated with Sharkey soils. Commerce soils are less clayey and better drained than Sharkey soils.

Most of the acreage is in crops. A small acreage is used for pasture and homesites.

Typical pedon of Commerce silty clay loam in a field, 2 miles east of Kilbourne, 0.5 mile south of Highway 585, 9 feet south of property line, 168 feet west of large canal, NW1/4SE1/4 sec. 18, T. 23 N., R. 12 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; slightly acid; abrupt smooth boundary.

B2—5 to 14 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine pores; slightly acid; clear smooth boundary.

B3—14 to 24 inches; grayish brown (10YR 5/2) silt loam; common medium faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine pores; slightly acid; clear smooth boundary.

C1—24 to 34 inches; grayish brown (10YR 5/2) silt loam; common medium faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine pores; neutral; clear smooth boundary.

C2—34 to 77 inches; grayish brown (10YR 5/2) very fine sandy loam; common medium faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine black concretions in the lower 10 inches; neutral.

The A horizon is dark grayish brown, brown, or grayish brown silty clay loam or silt loam 5 to 10 inches thick. It ranges from medium acid through mildly alkaline. Mottles are in shades of brown.

The B horizon is grayish brown or dark grayish brown stratified silty clay loam and silt loam. It ranges from slightly acid through mildly alkaline. Mottles are in shades of brown.

The C horizon is grayish brown, dark grayish brown, or gray stratified layers of silt loam, silty clay loam, or very fine sandy loam. It ranges from neutral through moderately alkaline.

Deerford Series

The Deerford series consists of somewhat poorly drained, slowly permeable soils that are loamy throughout and have a low sand content. These soils have a high sodium saturation in the lower part of the subsoil. They formed in loess material. These soils are in nearly level areas and on low ridges on the terrace uplands in the western part of the parish.

Deerford soils are associated with Dundee, Dubbs, Foley, and Forestdale soils. They have a B2 horizon that is high in exchangeable sodium, which the B2 horizon in Dundee, Dubbs, and Forestdale soils lacks. They have lighter-colored ped interiors in the subsoil than the Foley soils.

Most of the acreage is in crops. A small acreage is in pasture.

Typical pedon of Deerford silt loam in a field 8 miles northwest of Forest, 33 feet north of center of gravel road, 28 feet east of light pole, SW1/4SW1/4 sec. 19, T. 21 N., R. 9 E.

Ap1—0 to 3 inches; dark brown (10YR 4/3) silt loam; weak fine platy structure; friable; common fine roots; medium acid; abrupt smooth boundary.

Ap2—3 to 8 inches; grayish brown (10YR 4/3) silt loam; weak coarse subangular blocky structure; very firm; common fine roots; medium acid; abrupt smooth boundary.

A2—8 to 14 inches; grayish brown (10YR 5/2) silt loam; common medium faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; few thin black stains on some faces of peds; medium acid; clear irregular boundary.

B21t—14 to 26 inches; mottled yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic and coarse subangular blocky structure; firm; few fine roots; thick discontinuous dark grayish brown clay films; tongues of A2 material up to 3 inches wide extend through this horizon; medium acid; clear irregular boundary.

B22t—26 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint grayish brown (10YR 5/2) mottles; weak very coarse prismatic and weak coarse subangular blocky structure; firm; few fine roots; discontinuous clay films on surface of peds; few fine black concretions; common soft black masses; tongues of A2 material extend in this horizon to a depth of 38 inches; moderately alkaline; clear smooth boundary.

B3—40 to 54 inches; brown (10YR 5/3) silty clay loam; common medium faint yellowish brown (10YR 5/6) and common fine faint grayish brown mottles; weak coarse subangular blocky structure; slightly hard; few fine roots; few fine pores; few patchy clay films on surface of peds; few fine black concretions; few dark stains on surface of peds; moderately alkaline; clear smooth boundary.

C—54 to 88 inches; pale brown (10YR 6/3) silt loam; common medium faint yellowish brown (10YR 5/6) and few fine faint dark yellowish brown mottles; moderate medium subangular blocky structure; friable; common fine black concretions; common soft black masses; moderately alkaline.

The Ap or A1 horizon is dark brown, brown, or grayish brown silt loam 4 to 8 inches thick. It is medium acid or strongly acid except where limed. The A2 horizon is grayish brown, pale brown, or brown silt loam 2 to 6 inches thick. The A2 horizon is medium acid or strongly acid. Mottles are in shades of brown and gray. Tongues of A2 material 1 to 3 inches thick extend to a depth of 25 to 40 inches.

The B2t horizon is yellowish brown, dark yellowish brown, brown, or pale brown silt loam or silty clay loam. It is strongly acid or medium acid in the upper part and ranges from neutral through moderately alkaline in the lower part. Mottles are in shades of gray and brown.

The B3 and C horizons are pale brown, brown, yellowish brown, or olive brown silt loam. They range from neutral through moderately alkaline.

Dexter Series

The Dexter series consists of well drained, moderately permeable, loamy soils that formed in loamy alluvium. These soils are on elongated, narrow, convex ridges that generally are in the western part of the parish.

The Dexter soils are associated with the Calhoun, Calloway, Dundee, Dubbs, Foley, and Grenada soils. Dexter soils have a redder subsoil and are better drained than Calhoun, Calloway, Dundee, Foley, and Grenada soils. They have redder ped exteriors than the Dubbs soils.

Most of the acreage is in crops. A small acreage is used for pasture and homesites.

Typical pedon of Dexter silt loam, 6.5 miles west of Darnell, 240 feet north of field fence, and 15 feet east of pasture fence, NE1/4NE1/4 sec. 29, T. 20 N., R. 9 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B21t—5 to 11 inches; dark brown (7.5YR 4/4) silty clay loam; few fine faint brown mottles; moderate medium subangular blocky structure; firm; discontinuous reddish brown clay films on surface of peds; medium acid; clear smooth boundary.

B22t—11 to 28 inches; reddish brown (5YR 4/4) loam; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; distinct discontinuous clay films on surface of peds; few black stains on some peds; strongly acid; clear smooth boundary.

B23t—28 to 39 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; thin patchy clay films on surface of peds; few fine black stains on some peds; strongly acid; clear smooth boundary.

IIB3—39 to 51 inches; dark brown (7.5YR 4/4) loam; weak medium subangular blocky structure; firm; few fine roots; few thin streaks and coatings of light yellowish brown silt loam between some ped faces; strongly acid; clear smooth boundary.

IIC1—51 to 76 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; strongly acid.

The A horizon is dark brown, brown, or dark yellowish brown silt loam or very fine sandy loam. It ranges from slightly acid through strongly acid.

The B2t horizon has reddish brown or yellowish red ped surfaces and dark brown, reddish brown, or yellowish red ped interiors. It is silt loam, silty clay loam, or clay loam and is medium acid or strongly acid.

The B3 horizon is dark brown or reddish brown loam, clay loam, or sandy loam. It ranges from medium acid through very strongly acid.

The IIC horizon is dark brown or reddish brown fine sandy loam, loam, or loamy fine sand.

Dubbs Series

The Dubbs series consists of well drained, moderately permeable soils. They formed in loamy alluvium on nearly level ridges at the western edge of the parish.

Dubbs soils are associated with Dexter, Dundee, Forestdale, and Perry soils. They lack the reddish brown ped surfaces in the Bt horizon that are characteristic of the Dexter soils. Dubbs soils have a lighter-colored subsoil and are better drained than Dundee, Forestdale, and Perry soils.

Most of the acreage is in crops. A small acreage is used for pasture, woodland, and homesites.

Typical pedon of Dubbs silty clay loam in an area of Dundee-Dubbs complex, 3.5 miles south of Goodwill, 3/4 mile west of Clear Lake Baptist Church, 471 feet south of center of gravel road, 15 feet east of airstrip, NE1/4NW1/4 sec. 17, T. 20 N., R. 9 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; common fine and very fine roots; strongly acid; abrupt smooth boundary.

B21t—8 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and few fine distinct brown mottles; moderate medium subangular blocky structure; firm; few fine roots; distinct patchy clay films on faces of peds; few medium black concretions; medium acid; clear smooth boundary.

B22t—19 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; distinct discontinuous clay films on faces of peds; few medium black concretions; medium acid; clear smooth boundary.

B31—32 to 44 inches; brown (7.5YR 5/4) silt loam; few fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; medium acid; clear smooth boundary.

B32—44 to 55 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct strong brown (7.5YR 5/6) and few fine faint light brownish gray mottles; weak medium subangular blocky structure; friable; medium acid; clear smooth boundary.

C—55 to 66 inches; yellowish brown (10YR 5/6) very fine sandy loam; few fine faint dark yellowish brown and light brownish gray mottles; massive; friable; medium acid.

The A horizon is brown or dark grayish brown silty clay loam, silt loam, or very fine sandy loam. The A horizon ranges from medium acid through very strongly acid.

The B2 horizon is brown, dark brown, yellowish brown, strong brown, or dark yellowish brown silty clay loam, loam, or clay loam. It ranges from medium acid through very strongly acid. The B3 horizon texture is silt loam, very fine sandy loam, or loam.

The C horizon is in shades of brown and is mottled in gray and brown. It is silt loam, very fine sandy loam, or loamy fine sand and ranges from medium acid through very strongly acid.

Dundee Series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on nearly level ridges at the western edge of the parish.

Dundee soils are associated with Dexter, Dubbs, Forestdale, and Perry soils. They have a grayer subsoil and are more poorly drained than Dexter and Dubbs soils. They have a less clayey subsoil than Forestdale and Perry soils.

Most of the acreage is in crops. A small acreage is used for homesites and woodland.

Typical pedon of Dundee silty clay loam in an area of the Dundee-Dubbs complex, 0.5 mile west of Highway 585, 36 feet north of center of gravel road, 27 feet east of powerline pole, SE1/4SW1/4 sec. 32, T. 21 N., R. 9 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

B21tg—4 to 12 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint yellowish brown (10YR 5/6) and few fine faint brown mottles; moderate medium subangular blocky structure; firm; few fine roots; thick discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

B22tg—12 to 23 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct dark brown (7.5YR 4/4) and few fine faint yellowish brown mottles; moderate medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; few fine black concretions; strongly acid; clear smooth boundary.

B3g—23 to 35 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few thin patchy clay films on faces of peds; few fine black concretions; medium acid; clear smooth boundary.

IIC1g—35 to 51 inches; light brownish gray (10YR 6/2) silt loam; common medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few medium black masses; slightly acid; clear smooth boundary.

IIC2g—51 to 70 inches; light brownish gray (10YR 6/2) loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium black masses; neutral.

The A horizon is a dark grayish brown, grayish brown, or brown silty clay loam or silt loam 4 to 8 inches thick. It is strongly acid.

The Bt horizon is grayish brown or dark grayish brown silty clay loam or silt loam mottled in shades of brown and gray. It ranges from medium acid through very strongly acid.

The C horizon is light brownish gray, grayish brown, or gray silt loam, very fine sandy loam, or loam. It ranges from neutral through strongly acid. Mottles are in shades of brown.

Foley Series

The Foley series consists of poorly drained, very slowly permeable soils. They are loamy throughout and have a high sodium saturation in the lower part of the subsoil. Foley soils formed in loess more than 5 feet thick. They are in nearly level areas and slight depressions on the terrace upland in the western part of the parish.

Foley soils are associated with Calhoun, Calloway, Deerford, Dexter, Dundee, and Grenada soils. The Foley soils are more poorly drained than the Calloway, Deerford, Dexter, Dundee, and Grenada soils. They differ from the Calloway, Dexter, Dundee, Grenada, and Calhoun soils in not being acid in the lower part of the subsoil.

Most of the acreage is used for pasture and crops. A small acreage is used for woodland.

Typical pedon of Foley silt loam in a pasture, 3 miles west of Mitchner, 264 feet north of blacktop road, SE1/4SW1/4 sec. 34, T. 19 N., R. 9 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; few fine faint light brownish gray and few fine faint yellowish brown mottles; weak medium subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2—5 to 15 inches; light brownish gray (10YR 6/2) silt loam; common medium faint yellowish brown (10YR 5/8) and few fine distinct strong brown mottles; weak coarse subangular blocky structure; friable; many fine roots; medium acid; clear smooth boundary.

B1g—15 to 21 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; tongues of A2 material extend through this horizon; slightly acid; clear irregular boundary.

B21tg—21 to 27 inches; light brownish gray (2.5YR 6/2) silty clay loam; few fine faint light olive brown mottles; strong medium angular blocky structure; firm; few fine roots; common patchy clay films on faces of peds; tongues of A2 material extend through this horizon; neutral; clear irregular boundary.

B22tg—27 to 44 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine faint light olive brown mottles; strong medium angular blocky structure; firm; few fine roots between peds; thick continuous clay films on faces of peds; few black stains on faces of peds; common fine black concretions; strongly alkaline; clear smooth boundary.

B23tg—44 to 53 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; patchy clay films; common fine black concretions; strongly alkaline; clear smooth boundary.

B24tg—53 to 61 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few patchy clay films; few fine black concretions; strongly alkaline; clear smooth boundary.

B3g—61 to 73 inches; light brownish gray (2.5Y 6/2) silt loam; common fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; many fine black concretions; strongly alkaline.

The A horizon is grayish brown, dark grayish brown, or brown silt loam and is medium acid to neutral. The A2 horizon is light brownish gray, grayish brown, or gray silt loam and is medium acid or slightly acid. Thickness of the A horizon ranges from 4 to 15 inches.

The Bt horizon is light brownish gray, grayish brown, or gray mottled in shades of brown. It is silty clay loam or heavy silt loam. The Bt horizon is medium acid or slightly acid in the upper part and ranges from neutral through strongly alkaline in the lower part.

The B3 horizon is light brownish gray, grayish brown, or gray mottled in shades of brown. It is silt loam or silty clay loam and ranges from mildly alkaline through strongly alkaline. Depth to layers with high sodium saturation varies from 16 to 30 inches.

Forestdale Series

The Forestdale series consists of poorly drained, very slowly permeable soils that formed in clayey and silty alluvium. These soils are in nearly level areas and depressions on the alluvial plain at the northwestern edge of the parish.

Forestdale soils are associated with Deerford, Dubbs, Dundee, and Perry soils. They have a more clayey B horizon and are more poorly drained than Deerford, Dubbs, and Dundee soils. Forestdale soils have a more developed and less clayey B horizon than Perry soils.

Most of the acreage is in crops and pasture. A very small acreage is in woodland.

Typical pedon of Forestdale silty clay loam in a field, 12 miles southwest of Oak Grove, 153 feet north of gravel road, 6 feet east of pasture fence, SW1/4SE1/4 sec. 19, T. 21 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine faint yellowish brown mottles; weak medium subangular blocky structure; sticky; common fine roots; neutral; abrupt smooth boundary.

B21tg—6 to 14 inches; gray (10YR 6/1) silty clay; common medium faint yellowish brown (10YR 5/6) and few fine distinct dark brown mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; thin discontinuous clay films on faces of peds; medium acid; clear smooth boundary.

B22tg—14 to 24 inches; gray (10YR 6/1) silty clay loam; common fine distinct strong brown mottles; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin patchy clay films on faces of peds; few fine black concretions; medium acid; clear smooth boundary.

B23tg—24 to 36 inches; gray (10YR 6/1) silty clay loam; common medium distinct dark brown (7.5YR 4/4) and few fine distinct strong brown mottles; moderate medium subangular blocky structure; firm; few fine roots; few thin patchy clay films on faces of peds; few fine black concretions; medium acid; clear smooth boundary.

B3—36 to 60 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct strong brown mottles; weak medium subangular blocky structure; friable; common fine black concretions; medium acid.

The A horizon is dark grayish brown or grayish brown silty clay loam 4 to 8 inches thick. It is neutral, medium acid, or strongly acid. Mottles are in shades of brown.

The Bt horizon is gray or light brownish gray silty clay or silty clay loam. It is medium acid or strongly acid. Mottles are in shades of brown.

The B3 horizon is gray or light brownish gray silt loam, silty clay loam, or clay loam. It is medium acid or strongly acid. Mottles are in shades of brown.

Grenada Series

The Grenada series consists of moderately well drained soils that have a fragipan. Permeability is moderate above the fragipan and slow within it. These soils are loamy throughout and have a very low sand content. They formed in loess more than 4 feet thick. These soils are nearly level to gently sloping, and they occupy ridges on the terrace upland.

Grenada soils are associated with Calhoun, Calloway, Dexter, Foley, and Memphis soils. They are better drained and have a less gray B horizon than the Calhoun, Calloway, and Foley soils. The Grenada soils are less well drained and have a more gray B horizon than the Dexter and Memphis soils.

Most of the acreage is in crops. A small acreage is used for pasture, homesites, and woodland.

Typical pedon of Grenada silt loam, 1 to 3 percent slopes, 1.5 miles northeast of Darnell, 7 feet north of fence row, 183 feet west of gravel road, SW1/4SW1/4 sec. 22, T. 20 N., R. 10 E.

Ap1—0 to 4 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; common fine roots; few fine black concretions; slightly acid; abrupt smooth boundary.

Ap2—4 to 7 inches; dark brown (10YR 4/3) silt loam; few fine faint yellowish brown mottles; weak fine platy structure; friable; few fine roots; common black stains on surface of peds; slightly acid; abrupt smooth boundary.

B21—7 to 19 inches; yellowish brown (10YR 4/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few fine black concretions; very strongly acid; clear smooth boundary.

B22—19 to 30 inches; yellowish brown (10YR 5/4) silt loam; many medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine black concretions; very strongly acid; abrupt wavy boundary.

A'2—30 to 33 inches; light gray (10YR 7/2) silt loam; common medium faint dark yellowish brown (10YR 4/4) and few fine faint yellowish brown mottles; weak medium subangular blocky structure; very friable; common fine black concretions; strongly acid; gradual wavy boundary.

B'x1—33 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint light gray (10YR 7/2) mottles; moderate coarse prismatic parting to moderate coarse subangular blocky structure; firm, compact and brittle; thick discontinuous clay films on faces of peds; silt coatings 1 to 5 centimeters wide between prisms; strongly acid; clear smooth boundary.

B'x2—44 to 54 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint dark yellowish brown mottles; weak coarse prismatic parting to moderate medium subangular blocky structure; firm, compact and slightly brittle; thick discontinuous clay films on faces of peds; light gray silt coatings 1 to 3 centimeters wide between prisms; strongly acid; clear smooth boundary.

B'x3—54 to 64 inches; yellowish brown (10YR 5/6) silt loam; common medium faint dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic parting to weak medium subangular blocky structure; firm, compact and slightly brittle; thin patchy clay films on faces of peds; gray silt coatings on surface of prisms; strongly acid.

The A horizon is dark brown, yellowish brown, or dark grayish brown silt loam 4 to 9 inches thick. The A horizon is slightly acid or medium acid. Mottles are in shades of brown.

The B horizon is yellowish brown or dark yellowish brown with brownish mottles. It is silt loam or light silty clay loam 11 to 24 inches thick. The B horizon ranges from medium acid through very strongly acid.

The A'2 horizon is gray, light gray, light brownish gray, or very pale brown silt loam. It ranges from medium acid through very strongly acid.

The B'x horizon is yellowish brown or dark yellowish brown silty clay loam or silt loam. It ranges from medium acid through very strongly acid.

Included with Grenada soils in mapping units 6, 7, and 8 are large areas of soils that have a hue of 7.5YR in parts of the B horizon; the Grenada series is restricted to soils that have a hue of 10YR in the B horizon. This color difference has no significant influence on the use of these soils.

Memphis Series

The Memphis series consists of well drained, moderately permeable soils. They are loamy throughout and have a low sand content. Memphis soils formed in loess more than 4 feet thick. These soils are nearly level and moderately steep and are in areas adjacent to and on the escarpment between the Mississippi River alluvial plain and the terrace upland in the eastern part of the parish.

Memphis soils are associated with Calhoun, Calloway, and Grenada soils. They are better drained and are browner throughout than Calhoun and Calloway soils. Memphis soils lack the fragipan that is characteristic of Grenada soils.

Most of the acreage is in woodland. A small acreage is in crops and pasture.

Typical pedon of Memphis silt loam, 0 to 2 percent slopes, 0.7 mile south of Floyd, 9 feet south of fence row, 373 feet east of Louisiana Highway 577, NW1/4NW1/4 sec. 20, T. 19 N., R. 10 E.

Ap1—0 to 4 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

Ap2—4 to 8 inches; dark brown (10YR 4/3) silt loam; few fine faint pale brown mottles; weak coarse platy structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

B21t—8 to 17 inches; dark brown (7.5YR 4/4) silty clay loam; weak coarse subangular blocky structure; friable; few fine roots; common fine pores; distinct discontinuous clay films on faces of peds; few fine black stains on peds; medium acid; clear smooth boundary.

B22t—17 to 33 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine pores; distinct discontinuous clay films on faces of peds; few pale brown silt coatings in lower part of horizon; strongly acid; clear smooth boundary.

B23t—33 to 47 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine pores; distinct discontinuous clay films on faces of peds; common pale brown silt coatings in lower part of horizon; strongly acid; clear smooth boundary.

B3—47 to 65 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine pores; few black stains on some faces of peds; pale brown silt coatings between peds; strongly acid.

The A horizon is dark brown, brown, dark yellowish brown, or grayish brown silt loam 4 to 10 inches thick. It is medium acid or strongly acid except where it has been limed.

The Bt horizon is dark brown, brown, or yellowish brown silty clay loam or silt loam that is 20 to 30 percent clay. It is medium acid or strongly acid.

Perry Series

The Perry series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium deposited by the Arkansas and Mississippi Rivers. These soils are in nearly level areas and slight depressions on the alluvial plain along Boeuf River at the northwestern edge of the parish.

Perry soils are associated with Dundee and Forestdale soils. Perry soils are more poorly drained than the Dundee soils and have a finer texture than Dundee and Forestdale soils.

Most of the acreage is in crops. A small acreage is in pasture and woodland.

Typical pedon of Perry clay in a field, 8 miles west of Oak Grove, 66 feet west of pasture fence, 486 feet north of corner of gravel road, SW1/4SE1/4 sec. 22, T. 22 N., R. 9 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay; weak medium subangular blocky structure; sticky; common fine roots; medium acid; abrupt smooth boundary.

B21g—5 to 17 inches; gray (10YR 5/1) clay; few medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few fine roots; few vertical cracks filled with dark brown silty clay; medium acid; clear smooth boundary.

B22g—17 to 23 inches; gray (10YR 5/1) clay; common medium distinct strong brown (7.5YR 5/6) mottles; firm; weak coarse subangular blocky structure; few fine roots; medium acid; clear smooth boundary.

B23g—23 to 31 inches; gray (10YR 6/1) clay; many medium distinct strong brown (7.5YR 5/6) and few fine faint dark yellowish brown mottles; weak coarse subangular blocky structure; very firm; few fine roots; few fine black concretions; medium acid; clear smooth boundary.

IIB24—31 to 47 inches; dark brown (7.5YR 4/4) silty clay; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine black concretions; slightly acid; clear smooth boundary.

IIB3—47 to 70 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine black concretions; mildly alkaline.

The A horizon is dark grayish brown, grayish brown, or very dark grayish brown clay or silty clay 4 to 9 inches thick. It is medium acid or strongly acid. Mottles are in shades of brown.

The B2g horizon is gray or dark gray clay. It ranges from strongly acid through neutral. Mottles are in shades of brown.

The IIB horizon ranges from slightly acid through moderately alkaline. Mottles are in shades of gray and brown.

Sharkey Series

The Sharkey series consists of poorly drained, very slowly permeable soils that formed in clayey Mississippi River alluvium. These soils are in nearly level areas and slight depressions on the alluvial plain along Bayou Macon at the eastern edge of the parish.

Sharkey soils are associated with Commerce soils. They have a finer texture and are more poorly drained than Commerce soils.

Most of the acreage is in crops.

Typical pedon of Sharkey clay in a field, 3 miles southwest of Oak Grove, 27 feet west of property line, 510 feet south of gravel road, SE1/4SW1/4 sec. 9, T. 21 N., R. 11 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) clay; common medium faint dark yellowish brown (10YR 4/4) mottles; weak thick platy structure; firm; few fine roots; neutral; abrupt smooth boundary.

A1—7 to 12 inches; dark gray (10YR 4/1) clay; common medium faint dark yellowish brown (10YR 4/4) mottles; weak very coarse subangular blocky structure; very firm; few fine roots; neutral; clear smooth boundary.

B21g—12 to 27 inches; dark gray (10YR 4/1) clay; common medium faint dark yellowish brown (10YR 4/4) and few fine faint yellowish brown mottles; moderate medium subangular blocky structure; firm; few fine black concretions; neutral; clear smooth boundary.

B22g—27 to 37 inches; gray (10YR 5/1) clay; common medium faint dark yellowish brown (10YR 4/4) and few fine faint yellowish brown mottles; moderate medium subangular blocky structure; firm; thin strata of silty clay loam about 3 inches thick; neutral; clear smooth boundary.

B3g—37 to 52 inches; gray (10YR 5/1) clay; common medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few black stains in root channels; neutral; clear smooth boundary.

Cg—52 to 76 inches; gray (10YR 5/1) clay; common medium faint yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; few fine black concretions; few streaks of grayish brown; mildly alkaline.

The A horizon is dark grayish brown, dark gray, or very dark gray clay or silty clay 4 to 12 inches thick. It ranges from medium acid through mildly alkaline. Mottles are in shades of brown.

The B horizon is dark gray or gray clay. It ranges from slightly acid through moderately alkaline between depths of 10 and 20 inches and ranges from neutral through moderately alkaline in the lower part. Mottles are in shades of brown.

The C horizon is dark gray or gray clay or silty clay and ranges from neutral through moderately alkaline. Mottles are in shades of brown.

Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to the latest literature available (*4*, *12*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 16, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquents (*Hapl*, meaning simple horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the Soils

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In this section, the processes of soil formation are discussed and related to the soils in the survey area.

Processes of Soil Formation

The processes of soil formation are those processes or events occurring in soils that influence the kind and degree of development of soil horizons. The rate and relative effectiveness of different processes is determined by the factors of soil formation: climate, living organisms, relief, parent material, and time.

Important soil-forming processes include those that result in (1) additions of organic, mineral, and gaseous materials to the soil; (2) losses of these same materials from the soil; (3) translocation of materials from one point to another within the soil; and (4) physical and chemical transformation of mineral and organic materials within the soil (*10*). Typically, many processes of soil formation occur simultaneously. Examples in the survey area include accumulation of organic matter, development of soil structure, and leaching of bases from soil horizons. The influence of any particular process may change over a period of time. For example, levees have reduced flooding and thus lowered the rate of accumulation of sediments on some soils in the survey area. Some important processes that have contributed to the formation of the soils in West Carroll Parish are discussed in the following paragraphs.

Organic matter has accumulated, undergone partial decomposition, and been incorporated in all the soils. Organic-matter production in soils is greatest in and above horizons near the soil surface. This results in the formation of soils with surface horizons that are higher in organic-matter content than the deeper horizons. The decomposition, incorporation, and mixing of organic residues into the soil horizons is accomplished mainly through the activity of living organisms. Many of the more stable products of decomposition remain as finely divided materials that contribute dark color, increase water-holding and cation exchange capacities, contribute to granulation, and serve as sources of plant nutrients.

Alluvial sediment that was deposited on the soil surface has been important in the formation of several of the soils, by providing new parent material in which processes of soil formation become active. In many places in the survey area, new materials accumulated more rapidly than they could be appreciably altered by the processes of soil formation. The evident depositional strata in some of the Commerce soils are a result of these rapid accumulations. Accumulations of sediment are also indicated by the different parent materials in the Perry soils and by thin silt loam or silty clay loam lenses in lower horizons of some of the Sharkey soils.

Processes resulting in development of soil structure have occurred in all the soils. Plant roots and other organisms rearrange soil material into secondary aggregates. Organic residues and secretions of organisms help to cement and stabilize structural aggregates. Alternate wetting and drying and shrinking and swelling help to develop structural aggregates, particularly in clayey soils. An example is the Sharkey soils.

The poorly drained soils in the survey area have horizons in which reduction and segregation of iron, and perhaps manganese, compounds have been important processes. Because these poorly aerated horizons are favorable for reductions, soluble reduced forms of iron and manganese are more common than the much less soluble oxidized forms. Reduction of these elements results in the gray colors that are characteristic of the Bg and Cg horizons in Calhoun, Sharkey, and Forestdale soils. Appreciable amounts of more soluble reduced forms of iron and manganese can be removed from the soil or translocated by water. The presence of brown mottles in predominantly gray horizons indicates the segregation and local concentration of oxidized iron compounds that are caused by alternate oxidation and reduction.

Loss of components from the soils in the parish has been an important process in their formation. Water moving through the soil has leached soluble bases and any free carbonates that were initially present from some horizons in all the soils. The most extensive leaching has occurred in the Dexter, Grenada, Memphis, Dubbs, and Forestdale soils. These soils are acid and do not become more alkaline as depth increases. The other soils in the parish are less severely leached as indicated by a more alkaline reaction in the lower horizons of the solum than in horizons near the surface.

The formation, translocation, and accumulation of clay in the profile have been important soil-forming processes in most of the soils in West Carroll Parish. Silica and alumina that are released as a result of weathering of such minerals as hornblende, amphibole, and feldspars can recombine with the components of water to form secondary clay minerals, for example, kaolinite. Biotite, glauconite, montmorillonite, and other layered silicate minerals may also weather to form vermiculite, kaolinite, or other clay minerals.

Horizons of clay accumulation develop largely as a result of the translocation of clay particles from upper to lower horizons. As water moves downward through the soil it can carry small amounts of clay in suspension. This clay is deposited and accumulates either at the depth to which water penetrates or in horizons where it becomes flocculated or is filtered out by fine pores. Over long periods these processes result in distinct horizons of clay accumulation. All the soils in West Carroll Parish, except the Commerce, Perry, and Sharkey soils, have a B horizon characterized by an accumulation of clay.

Factors of Soil Formation

A soil is a natural, three-dimensional body that formed on the earth's surface and has properties that result from the integrated effect of climate and living matter acting on parent material, as conditioned by relief over periods of time.

The interaction of five main factors influences the processes of soil formation and results in differences among the soils. These factors are the climate; the kind of plants and other organisms living in and on the soil; the relief of the land and its effect on runoff and soil moisture conditions; the physical and chemical composition of the parent material; and the length of time it took the soil to form.

The effect of a factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Because of these interactions, it is recognized that many of the differences in soils cannot be attributed to differences in only one factor. For example, organic-matter content in the soils in West Carroll Parish is influenced by several factors, including relief, parent material, and living organisms. The complexity of such interactions does not preclude recognition of the influence of a given factor on a specific soil property. In the following paragraphs the main factors of soil formation and their effect on the soils in the survey area are discussed.

Climate

West Carroll Parish has a humid, subtropical climate. A detailed discussion of the climate in the parish appears in the section "General Nature of the Parish."

The climate is relatively uniform through the parish. As a result, local differences in the soils are not due to differences in atmospheric climate. The warm average temperatures and large amounts of precipitation favor rapid weathering of readily weatherable minerals in the soils. The Dexter, Memphis, Grenada, Dubbs, and Forestdale soils are all highly leached and are medium acid or strongly acid throughout the profile. Other soils in the parish are less leached in lower horizons, and this is indicated by soil reaction that becomes less acid with increasing depth. All the soils except for the Commerce, Sharkey, and Perry soils have developed distinct horizons of clay accumulation.

Differences in weathering, leaching, and translocation of clay are due chiefly to variations in the factors of time, relief, and parent material, rather than to variations in climate. Weathering processes involving the release and reduction of iron are indicated in Perry soils and Calhoun soils, and in other soils that have a gray Ag, Bg, or Cg horizon. Oxidation and segregation of iron is caused by alternate oxidation and reduction and is indicated by mottled horizons and iron and manganese concretions in many of the soils.

Another important influence of climate on soil formation is expressed in the clayey soils that have large amounts of expanding-lattice minerals associated with large changes in volume that occur upon wetting and drying. Wetting and drying cycles and associated volume changes are important factors in the formation and stabilization of structural aggregates in these soils.

When the wet soils dry, cracks of variable width and depth can form as a result of the decrease in volume. The times when the cracks form and the depth and extent of cracking are influenced by climate. Repeated large changes in volume frequently result in damage to buildings, roads, and other structures. Deep, wide cracks may shear roots of plants. Also, much of the water from rainfall or irrigation is infiltrated through the cracks. However, once the soil has become wet, infiltration rates become slow or very slow. Cracks form extensively in the Sharkey and Perry soils late in summer and early in fall, when the soils are driest. During this time, cracks an inch or more wide and more than 20 inches deep form in the soil in most years. Smaller cracks sometimes form in the more silty Commerce soils.

Living Organisms

Living organisms affect the processes of soil formation in a number of ways and thereby exert a major influence on the kind and extent of horizons that develop. The growth of plants and the activity of other organisms physically disturb the soil, and this modifies porosity and influences the formation of soil structure and the incorporation of organic matter. Photosynthesis, in forming compounds necessary for plant growth, produces additional organic matter. The growth of plants and their eventual decomposition recycle soil nutrients and provide a major source of organic residues. By decomposing and incorporating organic matter in soils, micro-organisms enhance the development of soil structure and generally increase the infiltration rate and water-holding capacity in soils. Relatively stable organic compounds in soils generally have very high cation exchange capacities and thus increase the capacity of the soil to absorb and store calcium, magnesium, potassium, and other nutrients. The extent of these and other processes and the kind of organic matter produced can vary widely depending on the kinds of organisms living in and on the soil. For example, the organic matter content in soils that developed under pine forests tends to be lower than in soils that developed under hardwood forests (*3*).

The native vegetation on the Commerce, Sharkey, Perry, Dexter, Dubbs, Dundee, and Forestdale soils was mainly mixed bottomland hardwoods and their associated understory and ground cover. Native vegetation on the Memphis, Grenada, Calloway, Calhoun, Deerford, and Foley soils was mixed hardwood and pine. The uncultivated soils that developed under mixed hardwood and pine forest are generally lower in organic-matter content and have a more distinct A2 horizon than uncultivated soils that developed under the hardwood forest. The organic-matter content of cultivated soils is typically lower than that of similar uncultivated soils and can vary widely, depending on use and management.

Differences in the amount of organic matter that has accumulated in and on the soils are influenced by the kind and number of micro-organisms. Aerobic organisms use oxygen from the air to decompose organic matter through rapid oxidation. These organisms are most abundant and prevail for long periods in the better drained and aerated Dexter and Memphis soils. Anaerobic organisms are dominant in the more poorly drained soils for long periods during the year. Anaerobic organisms do not require oxygen from the air, and they decompose organic residues very slowly. These different rates of decomposition have caused greater accumulations of organic matter in the poorly drained Sharkey soils than in the better drained Commerce and Dexter soils.

Relief

Relief and other physiographic features influence soil formation by affecting internal soil drainage, runoff, erosion and deposition, and exposure to the sun and wind.

The influence of relief on soils in West Carroll Parish is especially evident in runoff rates, internal soil drainage, and depths to and duration of a seasonal high water table. The Memphis, Grenada, Calloway, and Calhoun soils, which formed in loess, have progressively less relief and generally occur at lower elevations in the order named. For example, on Memphis soils, which typically are moderately sloping to steep, runoff is medium and rapid; however, on the nearly level to depressional Calhoun soils, runoff is slow and very slow.

Depths to a seasonal high water table show similar variations related to differences in relief. The depths range from more than 6 feet in the Memphis soils to less than 2 feet in the Calhoun soils. Duration of a high water table is longer in soils that have less relief and are at lower elevations. For example, high water tables are generally present for 3 and 5 months, respectively, in the Grenada and Calhoun soils. Internal soil drainage also becomes more restricted with less relief and at lower elevations. Memphis, Grenada, Calloway, and Calhoun soils are well drained, moderately well drained, somewhat poorly drained, and poorly drained, respectively.

Similar relationships also exist in soils that developed in recent and in older alluvium. Table 17 shows the relationships between the soils and the topography, runoff, soil drainage, and depth and duration of the water table.

Parent Material

Parent material is the original, unconsolidated material in which soils develop. The effects of parent material are particularly expressed as differences in soil color, texture, permeability, and depth and degree of leaching. Parent material has also had a major influence on mineralogy of the soils and is a significant factor in determining their susceptibility to erosion. The soils in the parish developed in unconsolidated material deposited by water and wind. The characteristics, distribution, and deposit pattern of the parent materials are more thoroughly discussed in the section "Landforms and Surface Geology."

The Memphis, Grenada, Calloway, Calhoun, Deerford, and Foley soils developed in wind-deposited loess material about 20,000 years old. These soils make up about 75 percent of the parish. They occupy a wide band that trends in a northeast-southwest direction and that is bordered on the east and west by soils that formed in alluvium. The loess has a maximum thickness of about 14 feet in the eastern part of this wide band, and it becomes progressively thinner to the west.

Underneath the loess are older braided-stream terrace deposits. These are mixed with the overlying loess in the western part of the parish where loess deposits are thin. Small areas of these deposits are exposed at the surface. The Dexter soils, which formed in these deposits, are the oldest exposed sediments in the parish.

The soils that developed in loess typically occur at higher elevations than the soils that developed in younger alluvial parent material. The soils that developed in loess are steep to nearly level, and because of the silty nature of the parent material, they are more erodible than other comparably sloping soils in the area. They have an A horizon of silt loam that is underlain by a B horizon of silty clay loam or silt loam. The sand content is low throughout the profile, generally less than 10 percent. Recognizable horizons of clay accumulation have developed as a result of weathering and the formation and translocation of clay during soil formation.

Old alluvial deposits are parent material for the Dubbs, Dundee, and Forestdale soils. These deposits occur in the southwestern part of the parish adjacent to the loess-covered braided-stream terrace to the east. Soils that formed in these sediments are level or nearly level and make up about 10 percent of the parish. The Dubbs and Dundee soils developed in loamy deposits on natural levees and flood plains and have a loamy surface horizon that has a medium to high content of sand. Forestdale soils formed in more clayey sediments and generally have a more clayey texture and a lower sand content throughout the profile.

Recent alluvial deposits of the Mississippi River at the eastern edge of the parish are parent materials of soils that make up about 8 percent of the parish. All of these sediments are clayey except for Commerce soils, which are less clayey and at slightly higher elevations (*9*).

Another area of somewhat older alluvium is a narrow band adjacent to the Boeuf River along the northwestern edge of the parish. In this area, thin clayey deposits of Mississippi River alluvium are underlain at depths of a few feet by interstratified Arkansas and Mississippi River alluvium. Perry soils in the area have redder colors in the subsurface horizons that developed in Arkansas River alluvium and are more acid and more highly leached than the Sharkey soils, which indicates that the alluvium in this area is probably somewhat older than the Mississippi River alluvium along the eastern edge of the parish in which the Sharkey soils formed.

A number of other differences in these soils also can be partly attributed to differences in the parent materials. For example, cation exchange capacity, organic matter content, and shrink-swell are highest in the clayey Sharkey and Perry soils. Soil permeability, soil aeration, and content of readily weatherable minerals is lower in the Perry and Sharkey soils than in the Commerce soils. Consequently, the Commerce soils generally are more productive for most crops.

Time

The kinds of horizons that form and their degree of development are influenced by the length of time of soil formation. A long time is generally required for distinct horizons to develop. In the survey area, differences in the time of soil formation amount to several thousand years for some of the soils.

Commerce, Sharkey, and Perry soils are the youngest soils and are probably less than 3,000 years old (*9*). They have surface horizons that are characterized by accumulation of organic matter and development of soil structure, and B horizons that are characterized by development of soil structure. Some weathering is indicated by mottling in lower horizons.

The Dexter, Dubbs, Dundee, and Forestdale soils developed in much older parent material and have a prominent B horizon that is characterized by a distinct accumulation of clay. These soils are more highly leached and are more acid at comparable depths than the Commerce, Sharkey, and Perry soils.

Other soils in the survey area developed in loess parent material that is probably about 20,000 years old (*9*). These soils have distinct horizons of clay accumulation, and, except for the Foley and Deerford soils, are highly leached.

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Glossary

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

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

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

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

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

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

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

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

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

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

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

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

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

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

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

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

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

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

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

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

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

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

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

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

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

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

Favorable. Favorable soil features for the specified use.

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

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

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

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

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

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

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

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

Leaching. The removal of soluble material from soil or other material by percolating water.

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

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

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

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

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

Percolation. The downward movement of water through the soil.

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

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

Piping. Formation by moving water of subsurface tunnels or pipelike cavities in the soil.

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

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

	pH
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

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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

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

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

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

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

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

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

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

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

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

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

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

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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

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

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

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

Illustrations

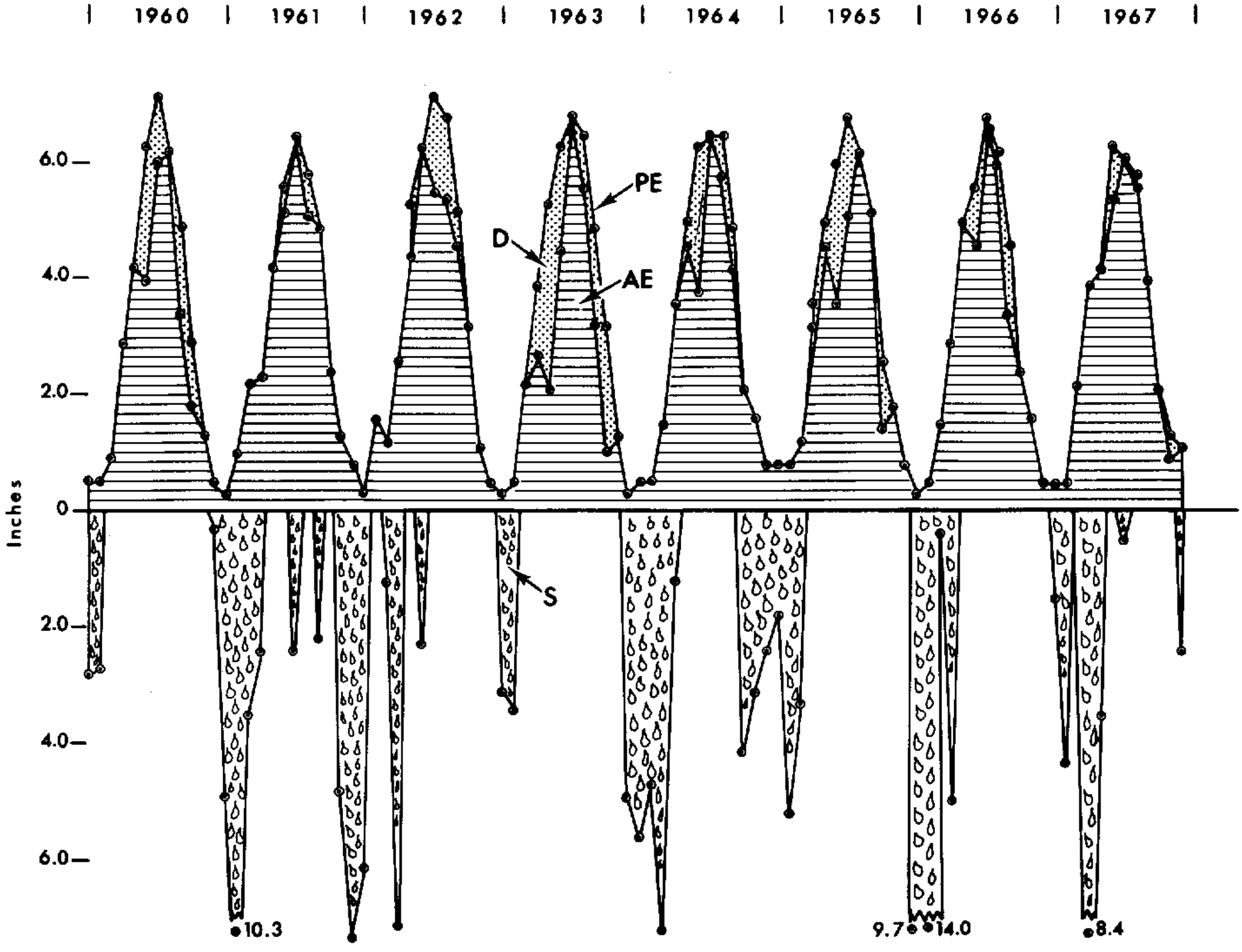


Figure 1.—Water-budget components recorded at Ryan airport in Baton Rouge from 1960 through 1967.

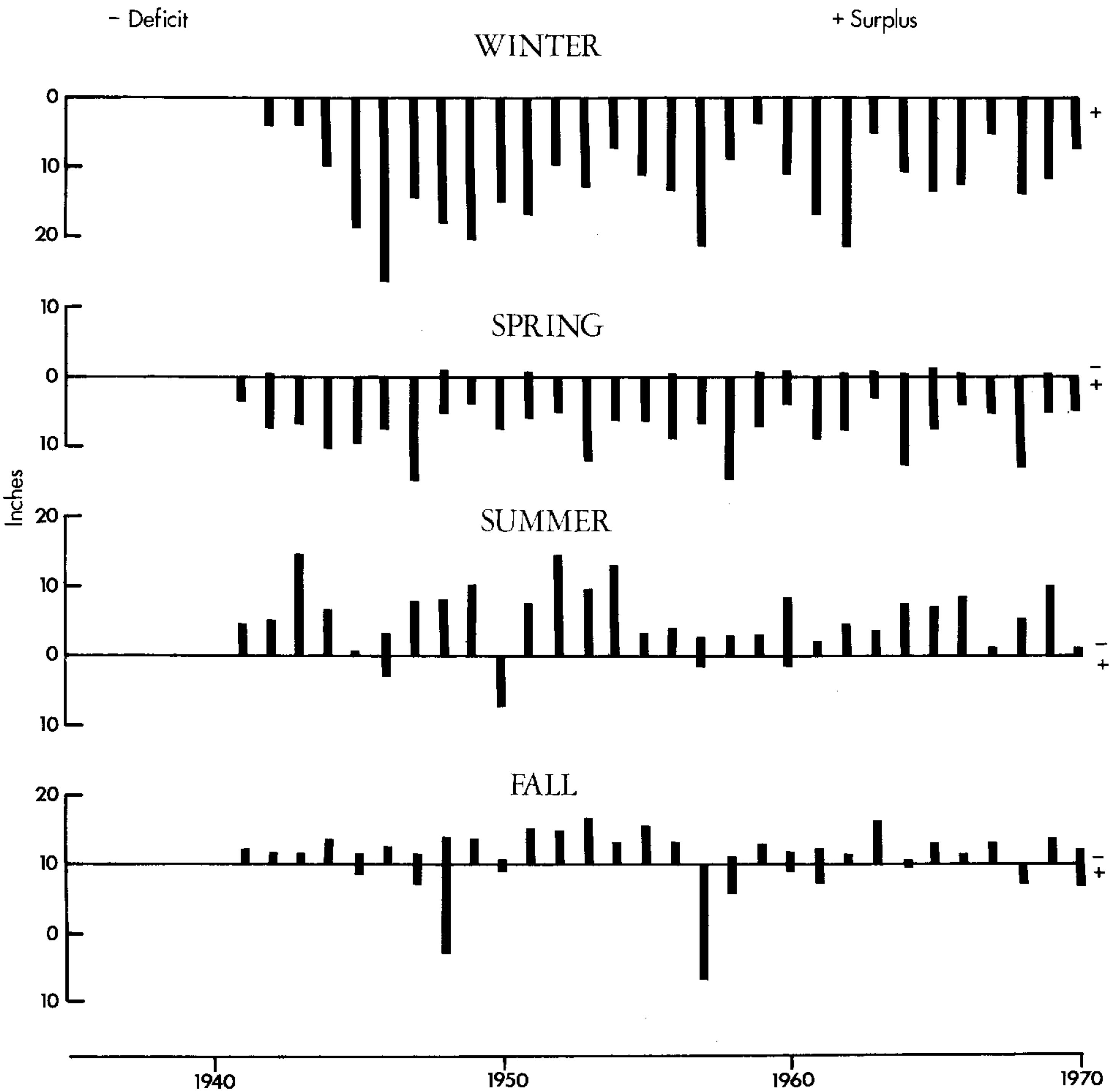


Figure 2.—Monthly water-budget surpluses and deficits in inches, by season of year. Data is for Lake Providence from 1941 through 1970.

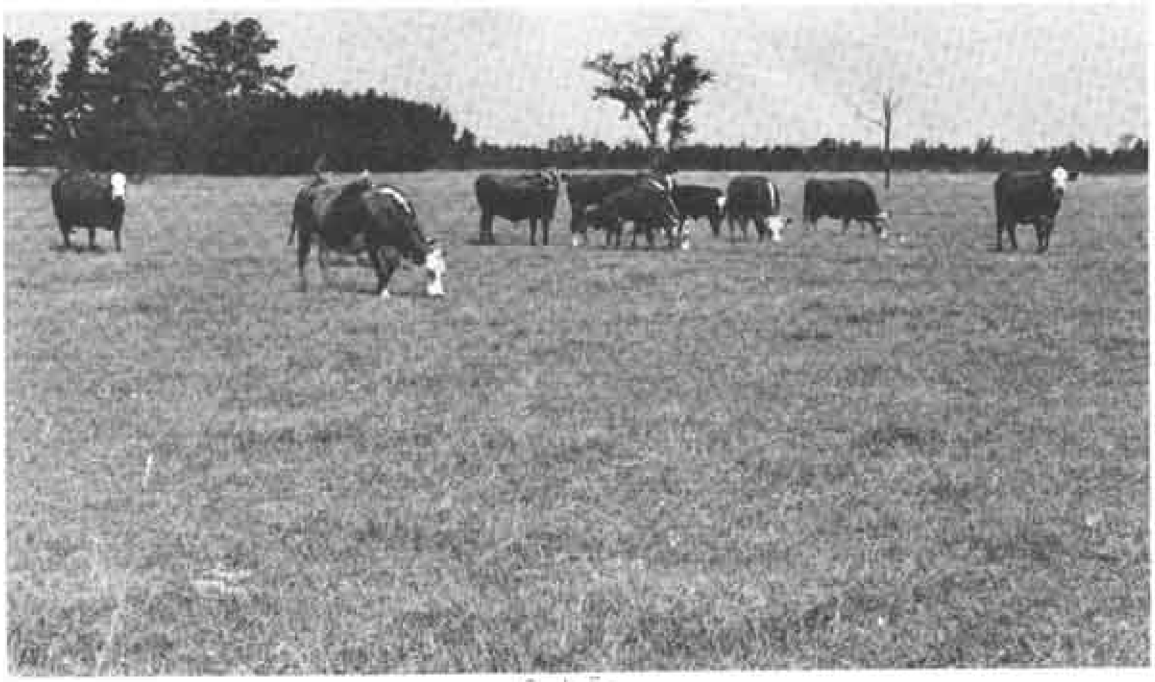
Figure 3.—Runoff is very slow in this area of Calhoun silt loam in cropland.

Figure 4.—Dwarf palmetto, a pest, in a pasture on Calhoun silt loam.

Figure 5.—A plowed field of Calhoun-Calloway complex. Darker areas are Calhoun soils, and lighter areas are Calloway soils.

Figure 6.—In this profile of Grenada silt loam, 1 to 3 percent slopes, compact and brittle subsoil layers begin at top of shovel blade and extend downward.

Figure 7.—An area of Grenada-Calhoun complex, gently undulating, on cultivated land. Lighter areas are Grenada soils, and darker areas are Calhoun soils.



Bahia
Figure 8.—Cattle grazing in a pasture of Pensacola ~~bermuda~~grass and common bermudagrass on Grenada-Calhoun complex, gently undulating.

Figure 9.—Tomato crop on Memphis silt loam, 0 to 2 percent slopes.

Figure 10.—An area of Memphis silt loam, 8 to 20 percent slopes, on the escarpment between the terrace uplands in background and the Mississippi River alluvial plain in foreground.

Figure 11.—Typical profile of Memphis silt loam, 8 to 20 percent slopes.

Figure 12.—Rice crop on Sharkey clay. The surface drainage system is needed because runoff is slow to very slow.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature					Precipitation		
	Average daily maximum	Average daily minimum	Extreme maximum and minimum	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--
	F	F	F	F	F	In	In	In
January----	56	36	85/5	79	14	5.3	1.6	11.0
February---	60	39	85/2	81	19	5.5	2.9	9.6
March------	67	45	93/16	86	26	5.6	3.8	7.7
April------	77	55	95/34	90	36	5.1	2.8	8.5
May--------	85	63	99/42	95	47	4.4	1.7	8.5
June-------	92	70	108/53	101	58	3.6	0.6	6.9
July-------	94	72	108/57	103	64	4.2	1.3	7.4
August-----	94	71	109/55	103	59	3.4	1.1	6.1
September--	89	65	110/35	100	49	3.1	0.7	5.6
October----	80	54	98/19	94	33	2.5	0.4	5.7
November---	68	44	90/20	87	23	4.6	1.4	9.1
December---	58	37	84/6	81	18	5.3	2.7	7.9
Year-----			110/2			52.7		

TABLE 2.--PROBABILITIES OF SPECIFIED LOW TEMPERATURES

[Data recorded at Lake Providence, 1962-1966]

Probability	Minimum temperature		
	24 F. or lower	28 F. or lower	32 F. or lower
SPRING:			
1 year in 10 later than--	February 26	March 16	April 1
2 years in 10 later than--	February 18	March 8	March 24
5 years in 10 later than--	February 4	February 21	March 9
FALL:			
1 year in 10 earlier than--	November 20	November 4	October 25
2 years in 10 earlier than--	November 22	November 11	October 30
5 years in 10 earlier than--	December 9	November 26	November 9

TABLE 3.--WATER-BUDGET DEFICITS AND SURPLUSES AT LAKE PROVIDENCE

[Recorded in the period 1941-70]

Month	Deficit								Surplus							
	Mean	Probability of deficit equal to or greater than--							Mean	Probability of surplus equal to or greater than--						
		.1 in	1 in	2 in	3 in	4 in	5 in	6 in		.1 in	2 in	4 in	6 in	8 in	10 in	12 in
	In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	In	Pct	Pct	Pct	Pct	Pct	Pct	Pct
January ------	---	---	---	---	---	---	---	---	4.7	100	73	50	27	13	13	---
February------	---	---	---	---	---	---	---	---	4.8	100	87	50	33	20	3	---
March---------	---	---	---	---	---	---	---	---	4.2	97	90	47	17	---	---	---
April---------	---	17	---	---	---	---	---	---	2.4	80	47	17	10	---	---	---
May-----------	0.3	63	10	---	---	---	---	---	1.0	37	23	13	3	---	---	---
June----------	1.4	83	53	30	10	---	---	---	0.3	10	7	---	---	---	---	---
July----------	2.0	83	63	43	27	20	10	---	0.2	3	3	3	---	---	---	---
August--------	2.5	93	73	57	30	23	13	3	---	3	---	---	---	---	---	---
September-----	1.7	77	63	40	23	7	---	---	0.2	7	3	3	---	---	---	---
October-------	0.7	60	33	13	---	---	---	---	0.2	10	3	---	---	---	---	---
November------	---	10	---	---	---	---	---	---	1.4	33	20	7	7	7	7	7
December------	---	---	---	---	---	---	---	---	3.0	80	53	27	10	7	7	---
Year-------	8.6	---	---	---	---	---	---	---	22.1	---	---	---	---	---	---	---

TABLE 4.--POTENTIAL OF SOIL ASSOCIATIONS FOR CROPLAND, PASTURELAND, AND URBAN LAND

[Soil associations ranked vertically in order of choice within the parish]

Cropland	Pastureland	Urban land
Sharkey association:	Dundee-Dubbs association:	Grenada-Calhoun association:
Good--high fertility, restricted choice of crops, multirow equipment adapted, surface layer stays wet for long periods, needs drainage, difficult to work and prepare seedbed.	Good--moderate fertility, good response to fertilizers, adapted to growing winter grazing plants, low areas need drainage.	Good--high elevation, no probability of flooding within 100 years, fair engineering qualities, has perched seasonal high water table.
Dundee-Dubbs association:	Sharkey association:	Dundee-Dubbs association:
Good--wide choice of crops, multirow equipment adapted, moderate fertility but responds well to fertilizers, low areas need drainage.	Good--high fertility, good response to nitrogen fertilizer, requires drainage, grazing may need to be restricted during wet periods, seedbed preparation is difficult.	Fair--low elevations, some probability of flooding within 100 years, fair engineering qualities, some areas have seasonal high water table.
Grenada-Calhoun association:	Grenada-Calhoun association:	Calhoun-Grenada association:
Good--wide choice of crops, multirow equipment adapted, moderately low fertility but responds well to fertilizers, low areas need drainage, erosion control practices needed, somewhat droughty in summer and fall.	Good--moderately low fertility, good response to fertilizers, low areas need drainage, somewhat droughty in late summer and fall.	Poor--intermediate elevations, little probability of flooding within 100 years, fair engineering qualities, has perched seasonal high water table.
Calhoun-Grenada association:	Calhoun-Grenada association:	Sharkey association:
Fair--moderately low fertility, good response to fertilizers, multirow equipment adapted, surface layer stays wet for long periods, needs drainage, somewhat droughty in summer and fall.	Fair--moderately low fertility, fair response to fertilizers, most areas need drainage, somewhat droughty in late summer and fall, grazing may need to be restricted during wet periods.	Poor--low elevations, some probability of flooding within 100 years, poor engineering qualities, high shrink-swell potential, low strength, has seasonal high water table, difficult to work.
Forestdale-Perry association:	Forestdale-Perry association:	Forestdale-Perry association:
Fair--moderately low fertility, fair response to fertilizers, multirow equipment adapted, surface layer stays wet for long periods, needs drainage, difficult to work and prepare seedbeds, droughty.	Fair--moderately low fertility, good response to fertilizers, requires drainage, seedbed preparation difficult, grazing may need to be restricted during wet periods.	Poor--low elevations, some probability of flooding within 100 years, poor engineering qualities, high shrink-swell potential, low strength, has seasonal high water table, difficult to work.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Area	Extent
		Acres	Pct
1	Calhoun silt loam	36,754	16.2
2	Calhoun-Calloway complex	11,612	5.1
3	Calloway silt loam	465	.2
17	Commerce silty clay loam	951	.4
19	Deerford silt loam	128	.1
4	Dexter silt loam, 1 to 3 percent slopes	1,757	.8
21	Dundee-Dubbs complex	22,250	9.8
5	Foley silt loam	1,280	.6
15	Forestdale silty clay loam	10,905	4.8
6	Grenada silt loam, 1 to 3 percent slopes	5,319	2.4
7	Grenada silt loam, 3 to 5 percent slopes	879	.4
8	Grenada-Calhoun complex, gently undulating	108,913	48.1
9	Memphis silt loam, 0 to 2 percent slopes	1,384	.6
14	Memphis silt loam, 8 to 20 percent slopes	1,779	.8
16	Perry clay	4,213	1.9
11	Sharkey clay	17,751	7.8
	Total	226,340	100.0
	Water	1,500	
	Total land area	227,840	

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management in 1974. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Cotton	Soybeans	Sweet potatoes	Common bermuda-grass	Bahiagrass	Improved bermuda-grass	Rice
	Lbs	Bu	Bu	AUM[1]	AUM[1]	AUM[1]	Bu
Calhoun:							
1	450	30	225	4.5	6.0	---	110
[2]2:							
Calhoun part	450	30	225	5.0	6.0	10.5	105
Calloway part	575	35	250	5.5	6.5	10.5	---
Calloway:							
3	525	35	250	5.5	6.5	10.5	---
Commerce:							
17	800	37	---	7.5	10.0	15.0	---
Deerford:							
19	500	28	---	5.5	6.0	---	---
Dexter:							
4	650	35	260	7.0	9.0	15.0	---
Dundee:							
[2]21:							
Dundee part	750	35	---	6.5	9.0	15.0	---
Dubbs part	775	35	---	6.5	9.0	15.0	---
Foley:							
5	575	28	---	5.5	5.5	---	110
Forestdale:							
15	600	35	---	6.5	8.5	---	120
Grenada:							
6	600	35	260	6.0	6.5	11.0	---
7	550	30	250	6.0	6.5	11.0	---
[2]8:							
Grenada part	575	35	240	5.0	6.0	11.0	---
Calhoun part	450	30	225	4.5	6.0	---	---
Memphis:							
9	750	35	260	7.0	9.0	15.0	---
14	---	---	---	5.0	7.5	12.0	---
Perry:							
16	475	33	---	6.0	8.5	---	120
Sharkey:							
11	600	40	---	6.5	8.5	---	130

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.
[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Calhoun:							
1	2w	Slight	Severe	Moderate	Cherrybark oak	---	Loblolly pine, slash pine.
					Water oak	---	
					Sweetgum	---	
					Loblolly pine	90	
					Slash pine	90	
[1]2:							
Calhoun part	2w	Slight	Severe	Moderate	Cherrybark oak	---	Loblolly pine, slash pine.
					Water oak	---	
					Sweetgum	---	
					Loblolly pine	90	
					Slash pine	90	
Calloway part	2w	Slight	Moderate	Slight	Cherrybark oak	90	Loblolly pine, slash pine.
					Loblolly pine	90	
					Sweetgum	90	
					Watergum	90	
					Slash pine	---	
Calloway:							
3	2w	Slight	Moderate	Slight	Cherrybark oak	90	Loblolly pine, slash pine.
					Loblolly pine	90	
					Sweetgum	90	
					Water oak	90	
					Slash pine	---	
Commerce:							
17	1w	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
					Sweetgum	---	
Deerford:							
19	2w	Slight	Moderate	Slight	Sweetgum	86	Loblolly pine, slash pine.
					Loblolly pine	92	
					Slash pine	92	
					Water oak	82	
					Cherrybark oak	90	
Dexter:							
4	1o	Slight	Slight	Slight	Loblolly pine	105	Loblolly pine, slash pine.
					Slash pine	105	
					Cherrybark oak	---	
					Water oak	---	
					Sweetgum	---	
Dundee:							
[1]21:							
Dundee part	2w	Slight	Moderate	Slight	Cherrybark oak	105	American sycamore, slash pine.
					Slash pine	105	
					Cherrybark oak	---	
					Water oak	---	
					Sweetgum	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Dundee:							
Dubbs part	2o	Slight	Slight	Slight	Cherrybark oak	100	Eastern cottonwood, American sycamore.
					Eastern cottonwood	100	
					Green ash	80	
					Nuttall oak	95	
					Shumard oak	100	
					Sweetgum	95	
					Water oak	90	
					Willow oak	95	
Foley:							
5	3w	Slight	Severe	Moderate	Sweetgum	80	Loblolly pine, slash pine.
					Cherrybark oak	80	
					Water oak	80	
					Loblolly pine	60	
					Slash pine	---	
Forestdale:							
15	1w	Slight	Severe	Moderate	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	95	
					Cherrybark oak	95	
					Nuttall oak	95	
					Water oak	90	
					Willow oak	95	
					Sweetgum	95	
Grenada:							
6, 7	2o	Slight	Slight	Slight	Cherrybark oak	85	Loblolly pine, slash pine.
					Water oak	80	
					Loblolly pine	95	
					Slash pine	95	
[1]8:							
Grenada part	2o	Slight	Slight	Slight	Cherrybark oak	85	Loblolly pine, slash pine.
					Water oak	80	
					Loblolly pine	95	
					Slash pine	95	
Calhoun part	2w	Slight	Severe	Moderate	Cherrybark oak	---	Loblolly pine, slash pine.
					Water oak	---	
					Sweetgum	---	
					Loblolly pine	90	
					Slash pine	90	
Memphis:							
9, 14	1o	Slight	Slight	Slight	Cherrybark oak	100	Loblolly pine, slash pine.
					Loblolly pine	105	
					Sweetgum	90	
					Water oak	90	
Perry:							
16	2w	Slight	Severe	Moderate	Cherrybark oak	---	Eastern cottonwood, sweetgum.
					Eastern cottonwood	90	
					Green ash	72	
					Sweetgum	92	
					Water oak	---	
					Pecan	---	
					Water hickory	---	
Sharkey:							
11	2w	Slight	Severe	Moderate	Green ash	85	Eastern cottonwood, American sycamore.
					Eastern cottonwood	100	
					Cherrybark oak	90	
					Sweetgum	90	
					Pecan	---	
					American sycamore	---	

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

TABLE 8.--BUILDING SITE DEVELOPMENT

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Calhoun:				
1	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.
[1]2:				
Calhoun part	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Calloway part	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Moderate: wetness, shrink-swell.
Calloway:				
3	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Moderate: wetness, shrink-swell.
Commerce:				
17	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Moderate: wetness, low strength, shrink-swell.	Moderate: wetness, low strength, shrink-swell.
Deerford:				
19	Severe: wetness, cutbanks cave.	Moderate: wetness, low strength, shrink-swell.	Moderate: wetness, low strength, shrink-swell.	Moderate: low strength, shrink-swell.
Dexter:				
4	Slight	Slight	Slight	Moderate: low strength.
Dundee:				
[1]21:				
Dundee part	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.
Dubbs part	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.
Foley:				
5	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.
Forestdale:				
15	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.
Grenada:				
6, 7	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: corrosive, wetness, low strength.	Moderate: low strength, wetness.
[1]8:				
Grenada part	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: corrosive, wetness, low strength.	Moderate: low strength, wetness.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Grenada:				
Calhoun part	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Memphis:				
9	Slight	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
14	Moderate: slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
Perry:				
16	Severe: wetness, too clayey.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.
Sharkey:				
11	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.

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

TABLE 9.--SANITARY FACILITIES

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Calhoun:					
1	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
[1]2:					
Calhoun part	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Calloway part	Severe: percs slowly, wetness.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
Calloway:					
3	Severe: percs slowly, wetness.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
Commerce:					
17	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Moderate: too clayey.	Fair: too clayey.
Deerford:					
19	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Dexter:					
4	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
Dundee:					
[1]21:					
Dundee part	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Dubbs part	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.
Foley:					
5	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Forestdale:					
15	Severe: wetness, percs slowly.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: wetness.
Grenada:					
6, 7	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Good.
[1]8:					
Grenada part	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Good.
Calhoun part	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Memphis:					
9	Slight	Moderate: seepage.	Slight	Slight	Fair: too clayey.
14	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: too clayey, slope.
Perry:					
16	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
Sharkey:					
11	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.

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

TABLE 10.--CONSTRUCTION MATERIALS

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor"]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Calhoun:				
1	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
[1]2:				
Calhoun part	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Calloway part	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Calloway:				
3	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Commerce:				
17	Fair: low strength, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Deerford:				
19	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Dexter:				
4	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Dundee:				
[1]21:				
Dundee part	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Dubbs part	Fair: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
Foley:				
5	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Forestdale:				
15	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
Grenada:				
6, 7	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
[1]8:				
Grenada part	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Calhoun part	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Memphis:				
9	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: ~~too clayey~~. thin layer
14	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: ~~too clayey~~, thin layer slope.
Perry:				
16	Poor: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
Sharkey:				
11	Poor: low strength, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.

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

TABLE 11.--WATER MANAGEMENT

["Seepage," "slope," and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Grassed waterways
Calhoun:					
1	Slight	Moderate: piping, erodes easily, low strength.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Wetness.
[1]2:					
Calhoun part	Slight	Moderate: piping, erodes easily, low strength.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Wetness.
Calloway part	Slight	Moderate: piping, compressible, low strength.	Percs slowly	Percs slowly	Favorable.
Calloway:					
3	Slight	Moderate: piping, compressible, low strength.	Percs slowly	Percs slowly	Favorable.
Commerce:					
17	Moderate: seepage.	Slight	Favorable	Slow intake	Favorable.
Deerford:					
19	Slight	Moderate: piping, compressible, erodes easily.	Cutbanks cave, percs slowly.	Excess alkali, percs slowly.	Excess alkali, erodes easily.
Dexter:					
4	Moderate: seepage.	Slight	Not needed	Slope, erodes easily.	Favorable.
Dundee:					
[1]21:					
Dundee part	Moderate: seepage.	Moderate: seepage, compressible, piping.	Complex slope	Complex slope	Favorable.
Dubbs part	Moderate: seepage.	Moderate: compressible, piping.	Complex slope	Complex slope	Favorable.
Foley:					
5	Slight	Moderate: compressible, low strength.	Percs slowly, cutbanks cave.	Slow intake. excess alkali, percs slowly.	Wetness, excess alkali.
Forestdale:					
15	Slight	Moderate: compressible.	Percs slowly	Slow intake, wetness, percs slowly.	Wetness.
Grenada:					
6, 7	Slight	Moderate: piping, low strength.	Not needed	Slow intake, erodes easily, percs slowly, slope.	Favorable.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
Grenada:					
[1]8:					
Grenada part	Slight	Moderate: piping, low strength.	Not needed	Percs slowly, complex slope.	Favorable.
Calhoun part	Slight	Moderate: piping, erodes easily, low strength.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Wetness.
Memphis: 9, 14	Moderate: seepage.	Moderate: piping, compressible, erodes easily.	Not needed	Erodes easily, slope.	Slope.
Perry: 16	Slight	Moderate: shrink-swell, low strength, compressible.	Percs slowly	Slow intake, wetness, percs slowly.	Wetness.
Sharkey: 11	Slight	Moderate: low strength, compressible, shrink-swell.	Percs slowly	Percs slowly, slow intake, wetness.	Wetness.

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

TABLE 12.--RECREATION DEVELOPMENT

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Calhoun:				
1	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
[1]2:				
Calhoun part	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Calloway part	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Calloway:				
3	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Commerce:				
17	Moderate: too clayey, percs slowly.	Moderate: wetness, too clayey.	Moderate: wetness, too clayey.	Moderate: wetness, too clayey.
Deerford:				
19	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Dexter:				
4	Slight	Slight	Moderate: slope.	Slight.
Dundee:				
[1]21:				
Dundee part	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Dubbs part	Slight	Slight	Slight	Slight.
Foley:				
5	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Forestdale:				
15	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Grenada:				
6, 7	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
[1]8:				
Grenada part	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
Calhoun part	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Memphis:				
9	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 12.--RECREATION DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Memphis: 14	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Perry: 16	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.
Sharkey: 11	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.

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

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Calhoun: 1	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Good.
[1]2: Calhoun part	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Good.
Calloway part	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Calloway: 3	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Commerce: 17	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
Deerford: 19	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Dexter: 4	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Dundee: [1]21: Dundee part	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Dubbs part	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Foley: 5	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Forestdale: 15	Fair	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good.
Grenada: 6, 7	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]8: Grenada part	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Calhoun part	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Good.
Memphis: 9	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Perry: 16	Fair	Fair	Fair	Good	Poor	Good	Good	Fair	Good	Good.
Sharkey: 11	Fair	Fair	Fair	Good	Poor	Good	Good	Fair	Good	Good.

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

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[NP means nonplastic]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Calhoun: 1	0-16	Silt loam	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	16-63	Silty clay loam, silt loam.	CL	A-6	0	100	100	100	95-100	32-40	12-18
[1]2: Calhoun part	0-24	Silt loam	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	24-63	Silty clay loam, silt loam.	CL	A-6	0	100	100	100	95-100	32-40	12-18
Calloway part	0-34	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	34-54	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	54-81	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
Calloway: 3	0-27	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	27-52	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	52-70	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
Commerce: 17	0-14	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	32-50	11-25
	14-77	Stratified very fine sandy loam to silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Deerford: 19	0-14	Silt loam	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	14-54	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	100	95-100	32-45	11-21
	54-88	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-17
Dexter: 4	0-5	Silt loam	ML, SM, CL-ML, SC-SM	A-4	0	100	100	85-100	45-75	<25	NP-4
	5-39	Silty clay loam, clay loam, silt loam, loam.	CL	A-6, A-4	0	100	100	90-100	70-90	32-40	8-18
	39-76	Sandy clay loam, fine sandy loam, loamy fine sand, loam.	SC, SM, CL	A-6, A-4	0	100	100	75-95	35-60	<38	NP-16
Dundee: [1]21: Dundee part	0-4	Silt loam, silty clay loam.	CL, CL-ML, CL	A-6, A-4	0	100	100	90-100	75-98	20-35	4-14
	4-35	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	90-100	70-95	28-44	12-22
	35-70	Silt loam, very fine sandy loam, loam.	CL, ML, CL-ML	A-4	0	100	100	85-100	60-90	<30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Dundee:											
Dubbs part-------	0-8	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4	0	100	100	100	85-100	20-30	5-10
	8-32	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	32-66	Very fine sandy loam to loamy fine sand.	ML, CL-ML, CL	A-4, A-6	0	100	100	85-95	55-90	20-35	5-14
Foley:											
5----------------	0-15	Silt loam-------	ML, CL, CL-ML	A-4, A-6, A-7-6	0	100	100	95-100	70-100	25-45	5-20
	15-44	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	30-49	11-25
	44-73	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	85-100	30-45	11-20
Forestdale:											
15----------------	0-6	Silty clay loam	CL	A-6, A-7-6	0	100	100	95-100	90-100	30-58	12-30
	6-36	Silty clay loam, silty clay.	CL, CH	A-7-6	0	100	100	95-100	75-100	40-65	20-40
	36-60	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	75-100	20-40	5-19
Grenada:											
6, 7--------------	0-7	Silt loam-------	ML, CL-ML	A-4	0	100	100	100	90-100	27-31	4-6
	7-30	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-100	35-40	13-15
	30-33	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	20-30	5-10
	33-60	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	90-100	35-42	15-21
[1]8:											
Grenada part-----	0-7	Silt loam-------	ML, CL-ML	A-4	0	100	100	100	90-100	27-31	4-6
	7-30	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-100	35-40	13-15
	30-60	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	90-100	35-42	15-21
Calhoun part-----	0-21	Silt loam-------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	21-63	Silty clay loam, silt loam.	CL	A-6	0	100	100	100	95-100	32-40	12-18
Memphis:											
9, 14-------------	0-8	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	8-33	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	90-100	35-48	15-25
	33-65	Silt loam-------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Perry:											
16----------------	0-5	Clay------------	CH	A-7-6	0	100	100	100	95-100	60-80	33-50
	5-31	Clay------------	CH	A-7-6	0	90-100	85-100	75-100	70-100	45-80	22-50
	31-70	Clay, silty clay.	CH, CL	A-7-6	0	100	100	100	95-100	45-80	22-50

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sharkey:											
11[1]	0-12	Clay, silty clay loam, silt loam.	CL-ML, CL, CH	A-4, A-6, A-7-6	0	100	100	100	95-100	25-85	5-50
	12-52	Clay	CH	A-7-6	0	100	100	100	95-100	56-85	30-50
	52-76	Clay, silty clay	CH, CL	A-7-6	0	100	100	100	95-100	45-85	22-50

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

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES

[The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile]

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors	
						Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH					
Calhoun:									
1	0-16	0.2-0.6	0.21-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	16-63	0.06-0.2	0.20-0.22	4.5-7.3	Low	High	Moderate	0.43	
[1]2:									
Calhoun part	0-24	0.2-0.6	0.21-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	24-63	0.06-0.2	0.20-0.22	4.5-7.3	Low	High	Moderate	0.43	
Calloway part	0-34	0.6-2.0	0.20-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	34-54	0.06-0.2	0.09-0.12	4.5-6.0	Moderate	High	Moderate	0.43	
	54-81	0.06-0.2	0.09-0.12	5.1-7.8	Low	High	Moderate	0.43	
Calloway:									
3	0-27	0.6-2.0	0.20-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	27-52	0.06-0.2	0.09-0.12	4.5-6.0	Moderate	High	Moderate	0.43	
	52-70	0.06-0.2	0.09-0.12	5.1-7.8	Low	High	Moderate	0.43	
Commerce:									
17	0-14	0.2-0.6	0.20-0.22	5.6-7.8	Moderate	High	Low	0.32	5
	14-77	0.2-2.0	0.20-0.23	6.6-8.4	Low	High	Low	0.37	
Deerford:									
19	0-14	0.6-2.0	0.21-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	14-54	0.06-0.2	0.12-0.18	5.1-8.4	Moderate	High	Low	0.43	
	54-88	0.2-0.6	0.12-0.15	6.6-8.4	Low	High	Low	0.49	
Dexter:									
4	0-5	0.6-2.0	0.15-0.24	5.1-6.5	Low	Low	Moderate	0.37	5
	5-39	0.6-2.0	0.15-0.24	4.5-6.0	Low	Moderate	Moderate	0.32	
	39-75	0.6-6.0	0.08-0.18	4.5-5.5	Low	Low	Moderate	0.24	
Dundee:									
[1]21:									
Dundee part	0-4	0.6-2.0	0.15-0.20	4.5-6.5	Low	High	Moderate	0.37	5
	4-35	0.2-0.6	0.15-0.20	4.5-7.3	Moderate	High	Moderate	0.32	
	35-70	0.6-2,0	0.14-0.18	4.5-7.3	Low	High	Moderate	0.32	
Dubbs part	0-8	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	5
	8-32	0.6-2.0	0.18-0.22	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	32-66	2.0-6.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
Foley:									
5	0-15	0.6-2.0	0.13-0.24	4.5-7.3	Low	High	Low	0.49	3
	15-44	0.2-0.6	0.18-0.24	5.1-9.0	Moderate	High	Low	0.43	
	44-73	<0.06	0.10-0.14	7.4-9.0	Low	High	Low	0.49	
Forestdale:									
15	0-6	0.2-0.6	0.20-0.22	4.5-6.0	Moderate	High	Moderate	0.43	5
	6-36	<.0-0.6	0.14-0.18	4.5-6.0	High	High	Moderate	0.28	
	36-60	0.2-0.6	0.17-0.22	5.1-6.0	Moderate	High	Moderate		
Grenada:									
6, 7	0-7	0.6-2.0	0.20-0.23	4.5-6.5	Low	Moderate	Moderate	0.43	3
	7-30	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	30-33	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	33-60	0.06-0.2	0.10-0.12	4.5-6.0	Low	Moderate	Moderate	0.43	
[1]8:									
Grenada part	0-7	0.6-2.0	0.20-0.23	4.5-6.5	Low	Moderate	Moderate	0.43	3
	7-30	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	30-33	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	33-60	0.06-0.2	0.10-0.12	4.5-6.0	Low	Moderate	Moderate	0.43	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Risk of corrosion		Erosion factors	
						Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH					
Grenada:									
Calhoun part-----	0-21	0.2-0.6	0.21-0.23	4.5-6.0	Low-------	High----------	Moderate	0.49	3
	21-63	0.06-0.2	0.20-0.22	4.5-5.5	Low-------	High----------	Moderate	0.43	
Memphis:									
9, 14------------	0-8	0.6-2.0	0.20-0.23	4.5-6.0	Low-------	Low-----------	Moderate	0.49	5
	8-33	0.6-2.0	0.20-0.22	4.5-6.0	Low-------	Moderate------	Moderate	0.43	
	33-65	0.6-2.0	0.20-0.23	4.5-6.0	Low-------	Low-----------	Moderate	0.43	
Perry:									
16---------------	0-5	<0.06	0.17-0.20	5.1-7.3	High------	High----------	Low	0.24	5
	5-31	<0.06	0.17-0.20	5.1-8.4	High------	High----------	Low	0.28	
	31-70	<0.06	0.17-0.20	6.1-8.4	High------	High----------	Low	0.28	
Sharkey:									
11---------------	0-12	0.06-0.2	0.18-0.22	6.6-8.4	Very high-	High----------	Low	0.24	5
	12-52	<0.06	0.18-0.20	6.1-8.4	Very high-	High----------	Low	0.28	
	52-76	<0.2	0.08-0.22	6.1-8.4	Very high-	High----------	Low	0.28	

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

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Deerford	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Dexter	Fine-silty, mixed, thermic Ultic Hapludalfs
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Foley	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Perry	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Sharkey	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts

TABLE 17.--RELATIONSHIPS BETWEEN SOILS AND TOPOGRAPHY, RUNOFF, DRAINAGE, AND WATER TABLE

Soil series grouped by parent material	Topography	Runoff	Internal drainage class	Seasonal high water table	
				Depth	Duration
				Feet	
Soils that formed in loess:					
Calhoun	Nearly level and depressional.	Slow and very slow.	Poorly drained	0.0-2.0	Dec.-Apr.
Calloway	Nearly level	Slow	Somewhat poorly drained.	1.0-2.5	Dec.-Apr.
Deerford	Nearly level	Slow	Somewhat poorly drained.	0.5-1.5	Dec.-Apr.
Foley	Nearly level and depressional.	Slow and very slow.	Poorly drained	0.0-1.5	Dec.-Apr.
Grenada	Nearly level and gently sloping.	Medium and rapid.	Moderately well drained.	1.5-2.5	Jan.-Mar.
Memphis	Moderately sloping and steeply sloping.	Medium and rapid.	Well drained	>6.0	None
Soils that formed in old alluvium:					
Dubbs	Nearly level ridges.	Medium	Well drained	>6.0	None
Dundee	Nearly level	Slow and medium	Somewhat poorly drained.	1.5-3.5	Dec.-Apr.
Forestdale	Nearly level and depressional.	Slow and very slow.	Poorly drained	0.0-1.5	Dec.-Apr.
Soils that formed in recent alluvium:					
Commerce	Nearly level ridges.	Medium and slow	Somewhat poorly drained.	1.5-4.0	Dec.-Apr.
Perry	Nearly level and depressional.	Slow and very slow.	Poorly drained	0.0-2.0	Dec.-Apr.
Sharkey	Nearly level and depressional.	Slow and very slow.	Poorly drained	0.0-2.0	Dec.-Apr.
Soils that formed in braided-stream terrace deposits:					
Dexter	Narrow convex ridges.	Medium	Well drained	>6.0	None

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