SOIL SURVEY OF

Madison Parish, Louisiana

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.

Major fieldwork for this soil survey was completed in the period 1968–72. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the

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SOIL SURVEY OF MADISON PARISH, LOUISIANA

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE,
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MADISON PARISH is in the northeastern part of Louisiana (fig. 1). Tallulah is the parish seat.

The climate of the parish is warm and temperate. Summers are hot and humid. Winters are mild.

on the same kind of soil. Yields under defined management are estimated for all the soils.

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

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

General soil map

The general soil map at the back of this survey shows, in color, the soil associations in the survey area.[1] A soil association is a landscape that has a distinctive pattern of soils in defined proportions. It typically consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in an association can occur in other associations, but in different patterns.

A map showing soil associations is useful to people who want to have a general idea of the soils in a survey area, who want to compare different parts of that area, or who want to locate large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide for broad planning on a watershed, a wooded tract, or a wildlife area or for broad planning of recreational facilities, community developments and such engineering works as transportation corridors. It is not a suitable map for detailed planning for management of a farm or field or for selecting the exact location of a road or building or other structure, because the soils within an association ordinarily vary in slope, drainage, and other characteristics that affect their management.[2]

The soil associations in this survey area (fig. 3) have been grouped into general kinds of landscapes for broad interpretative purposes. Each of the broad groups and the soil associations in it are described on the following pages.

Loamy and clayey soils on natural levees

Two soil associations consist of nearly level loamy and clayey soils on the natural levees of the Mississippi River and its distributaries. These soils formed in alluvium deposited by the Mississippi River. Slopes range from 0 to 3 percent but are dominantly less than 1 percent. The nearly level loamy soils are at the highest elevations along the Mississippi River levee and along Joes Bayou. The natural levees slope away from the stream channels. The nearly level clayey soils are on the lower elevations of the natural levees of Joes Bayou and are at the greatest distance from the stream channel. These associations make up 20 percent of the parish.

1. Commerce-Bruin association

Nearly level, somewhat poorly drained and moderately well drained, loamy soils

This association consists of loamy soils on the natural levees of the Mississippi River, Walnut Bayou, Roundaway Bayou, Bayou Bidal, and Eagle Lake. Slopes are 0 to 3 percent. Elevation ranges from 80 to 95 feet above sea level.

This association makes up about 11 percent of the parish. It is about 76 percent Commerce soils and 14 percent Bruin soils. Sharkey and Tunica soils make up most of the remaining 10 percent of this association.

Commerce soils are on the higher parts of the natural levees. They have a surface layer of dark grayish-brown silt loam. The subsoil is dark grayish-brown silty clay loam in the upper 9 inches and grayish-brown and dark grayish-brown silt loam below. Runoff is medium to slow, and permeability is moderately slow. These soils are somewhat poorly drained.

Bruin soils are on the highest part of the natural levees. They have a surface layer of dark grayish-brown and dark-brown silt loam. The subsoil is brown and dark-brown silt loam that is mottled with shades of brown. Runoff is medium, and permeability is moderate. These soils are moderately well drained.

Minor in this association are small areas of Sharkey and Tunica soils. These clayey, poorly drained soils are on the lower parts of the natural levees.

Most areas of this association are used for crops and pasture. A small acreage is used as sites for homes and light industry. The soils of this association are well suited to crops and pasture because of their loamy texture, high natural fertility, and nearly level slopes. They are limited for some uses by wetness and low strength. Most of the farms in this association are 100 to 1,000 acres in size and are operated by the owner.

2. Dundee-Sharkey association

Nearly level, somewhat poorly drained, loamy soils and poorly drained, clayey soils

This association consists of loamy and clayey soils on the natural levees of the Joes Bayou, Bayou Macon, and Spring Bayou. Slopes are 0 to 1 percent. Elevation dominantly ranges from 70 to 80 feet above sea level.

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[1] About 7,400 acres of Warren County, Mississippi, is included on this map.

[2] Madison Parish joins Tensas Parish on the south. Slight differences occur in the components of associations joined on the general soil maps of these two parishes. These differences are mainly a result of the design of the surveys and recent changes in soil taxonomy.

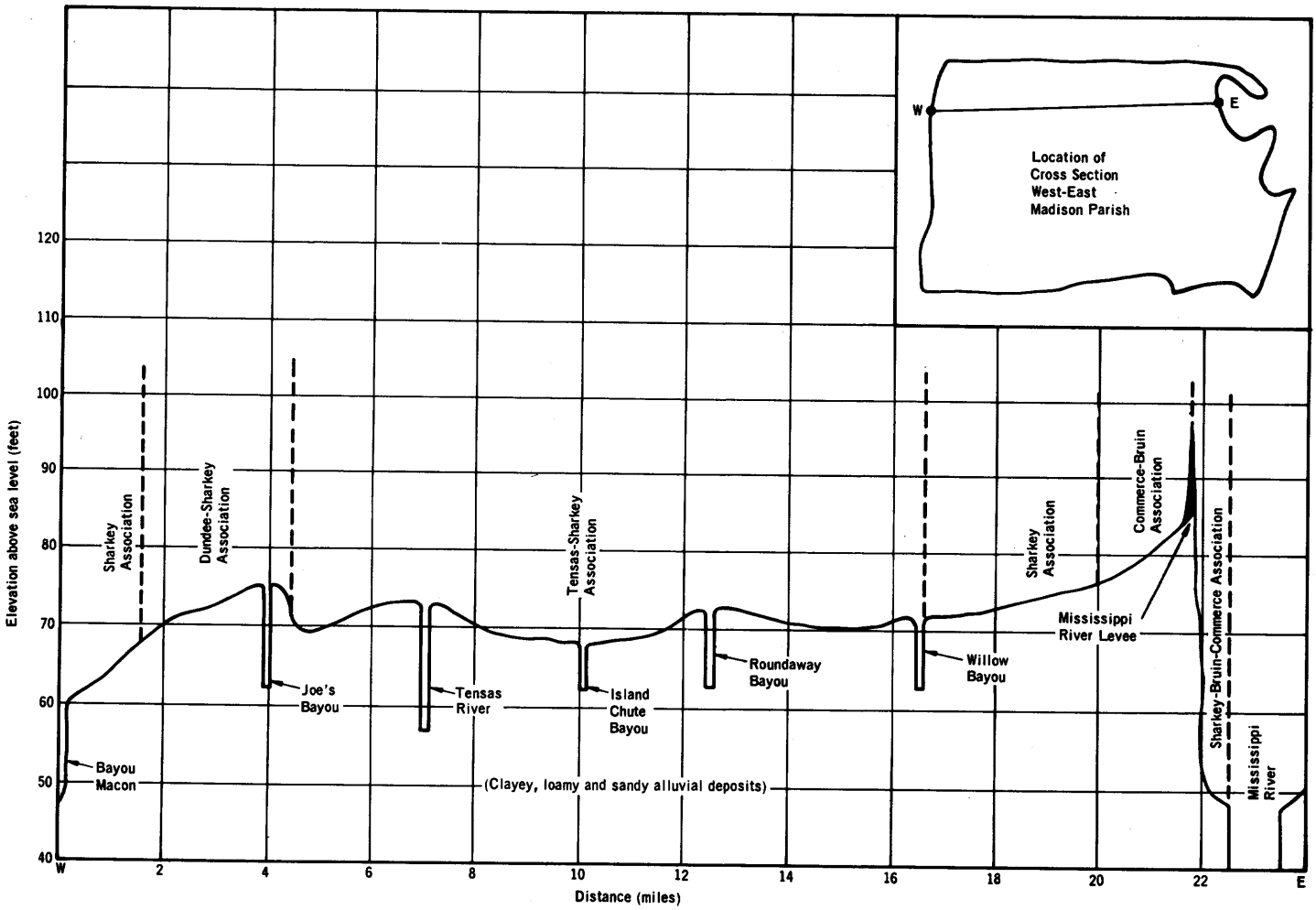

***Figure 3.*—Relationship of soil associations to elevation.**

This association makes up about 9 percent of the parish. It is 76 percent Dundee soils and 14 percent Sharkey soils. Tensas soils, Tunica soils, and Udifluvents make up most of the remaining 10 percent of this association.

Dundee soils are on the higher elevations of the

Most areas of this association are used for crops and pasture. A small acreage is used as woodland. The soils of this association are well suited to the crops commonly grown in this area. They are also well suited to use as woodland. The Sharkey soils are limited for

3. **Sharkey association** low strength, high shrink-swell potential, and uneven

The soils of this association are well suited to woodland. Bruin, Commerce, Sharkey, and Tunica soils

series is the soil profile, that is, the sequence of layers from the surface downward to underlying material

and methods of soil mapping can be obtained from the Soil Survey Manual (*10*).[3]

Bruin series

The Bruin series consists of moderately well drained, moderately permeable soils. These soils are on the highest part of the natural levees along the Mississippi

weak, medium, subangular blocky structure; friable; moderately alkaline.

The A horizon ranges from 5 to 12 inches in thickness. It is dark grayish brown or dark brown and is mottled in shades of brown. It is slightly acid to mildly alkaline in reaction. The B horizon is dark brown or brown and is mottled in shades of brown. It is neutral to moderately alkaline in reaction. The C horizon is

Crevasse series

20 inches. Also included are small areas of Bruin,

brown silt loam about 9 inches thick. The subsoil extends to a depth of about 33 inches. It is grayish-brown silty clay loam in the upper 5 inches and grayish-brown loam below. It is mottled throughout in shades of brown.

Most areas of these soils are used for crops. A small acreage is used for woodland and pasture.

Representative profile of Dundee silt loam, in a field, 12 miles west of Tallulah and 2 miles southwest of

brown or dark grayish brown and is mottled in shades of brown. It is silty clay loam, loam, or silt loam in texture and is medium acid to strongly acid in reaction. Clay films range from patchy to almost continuous on faces of peds. The C horizon is grayish brown, light brownish gray, or dark grayish brown and is mottled in shades of brown. It is generally stratified. It is silt loam, very fine sandy loam, loam, or silty clay loam in texture, but in places it has layers of silty clay or clay

Included with this soil in mapping are small areas [redacted] and remain wet for long periods. Dundee silt loam and

cannot be shown separately at the scale used in mapping.

Included with these soils in mapping are small areas of Tensas soils on the ridges and Tunica soils in the swales and on the lower slopes.

Most areas of these soils are used for woodland. A small acreage is used for crops and pasture. Suitable crops are cotton, soybeans, wheat, and oats. Suitable pasture plants are common bermudagrass, dallisgrass, Pensacola bahiagrass, white clover, tall fescue, and ryegrass. Drainage is necessary if the swales are used for crops and pasture. Management is somewhat difficult because of short, irregular slopes and wetness in the swales, which delays planting and cultivation. Smoothing and leveling of land improve drainage and increase efficiency of farm equipment. Erosion is a hazard on the ridges. Most crops respond well to fertilizer. Lime is generally needed on the Dundee soils. Capability unit IIIw–6; Dundee soils in woodland suitability group 2w5, and Sharkey soils in woodland suitability group 2w6.

Sharkey series

The Sharkey series consists of poorly drained, very slowly permeable soils that have a clayey or loamy surface layer and a clayey subsoil. These soils formed in clayey slack-water deposits on broad flats and on the lower part of natural levees.

In a representative profile the surface layer is dark grayish-brown clay about 6 inches thick. The subsoil extends to a depth of about 40 inches. It is dark-gray clay mottled in shades of brown. The underlying material is gray clay.

Most of the acreage is used for woodland. The remaining acreage is used for crops and pasture.

Representative profile of Sharkey clay, in a field, 1.5 miles north of Tallulah, 17 feet west of power pole, 342 feet northeast of field road, 1 mile south of road to

with 45 degree angle; moderately alkaline; clear, smooth boundary.

C1g—40 to 49 inches, gray (10YR 5/1) clay; common, medium, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; some coarse, subangular blocky peds; firm; moderately alkaline; clear, smooth boundary.

C2g—49 to 83 inches, gray (10YR 5/1) clay; common, medium, faint, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; few, soft, black concretions; moderately alkaline.

The A horizon ranges from 4 to 10 inches in thickness. It is dark grayish brown, dark gray, or very dark grayish brown and is mottled in shades of brown. It is silty clay loam or silt loam in texture and is medium acid to moderately alkaline in reaction. The B horizon is dark-gray or gray clay that averages more than 60 percent clay content. It is mottled in shades of brown. It is medium acid to moderately alkaline between depths of 10 and 20 inches and is slightly acid to moderately alkaline below. The C horizon is dark-gray, gray, or olive-gray clay and is mottled in shades of brown. Some profiles have loamy material below a depth of 36 inches. The C horizon is slightly acid to moderately alkaline in reaction.

In the Sharkey soils, frequently flooded, strata are present that have a chroma of 2. These browner colors are outside the range defined for the Sharkey series, but this difference does not alter use or management of the soils.

Sharkey soils are associated with Bruin, Commerce, Dundee, Tensas, and Tunica soils. Sharkey soils have finer textured B and C horizons and are more poorly drained than Bruin, Commerce, and Dundee soils. They are more poorly drained and more alkaline than Tensas

ture; firm; common fine pores; common patchy clay films on ped surfaces and root channels; medium acid; clear, smooth boundary.

IIB31t—22 to 29 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 pores; common patchy clay films; some root channels filled with very dark gray material; very few, fine, brown concretions; medium acid; clear, smooth boundary.

IIB32t—29 to 37 inches, grayish-brown (10YR 5/2) silt loam; common, medium, dis-

reaction. Some profiles are mildly alkaline below a depth of 60 inches.

Tensas soils are associated with Dundee, Sharkey, and Tunica soils. Tensas soils are finer textured in the surface layer and in the upper part of the subsoil than Dundee soils. They are more acid and are better drained than Sharkey and Tunica soils. They are coarser textured in the lower part of the B horizon than Sharkey and Tunica soils.

Ta—Tensas silty clay. This somewhat poorly drained soil is mostly on nearly level areas on the lower parts of the natural levees of Bayou Macon, Joes Bayou, and the Tensas River. It is clayey in the upper part of the profile and loamy in the lower part. Areas range from about 10 to 900 acres in size, but most areas are more than 40 acres. Slopes are 0 to 1 percent.

has a seasonally high water table at a depth of 1 foot to 3 feet during the months of December through April. Permeability is very slow. Shrink-swell potential is very high in the upper 22 inches and low to moderate below. Wetness causes poor aeration and restricts plant root development. A very high shrink-swell potential, wetness, and low strength are the main limitations for most uses.

The Sharkey soils have a profile similar to the one described as representative of the Sharkey series, but the surface layer is silty clay loam and clay. These soils are in the swales. They are high in natural fertil-

blocky structure; firm; few fine pores; mildly alkaline; clear, smooth boundary.

A12—3 to 8 inches, dark grayish-brown (10YR 4/2) clay and common, medium, faint, dark yellowish-brown (10YR 4/4) mottles and few, fine, faint, yellowish-brown mottles; moderate, medium, subangular blocky structure; firm; few fine pores; neutral; clear, smooth boundary.

B21g—8 to 17 inches, dark-gray (10YR 4/1) clay; common, medium, faint, dark yellowish-brown (10YR 4/4) mottles and few, fine, faint, yellowish-brown mottles; moder-

Tu—Tunica clay. This nearly level soil is on the lower parts of natural levees. It is poorly drained and is clayey in the surface layer and in the subsoil and loamy in the underlying material. Areas range from about 10 to 1,400 acres in size, but most areas are more than 60 acres. Slopes are 0 to 1 percent.

This soil is high in natural fertility. Runoff is slow. Permeability is very slow in the clayey surface layer and in the subsoil and moderate in the loamy underlying material. A seasonally high water table is at a

Udipsamments

Udipsamments consists of excessively drained, rapidly permeable soils. These soils occupy some of the highest elevations in the parish. They formed in sandy sediment of the Mississippi River and are between the river and the protective levee.

In a representative profile the surface layer is dark yellowish-brown loamy sand about 4 inches thick. The underlying material is brown sand and fine sand mot-

Class VIII soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes (None in Madison Parish).

Estimated yields

Table 2 lists estimated yields of the principal crops grown under high level management in Madison Parish. The estimates are based on observations made by farmers, soil scientists, and others who have knowledge of yields in the parish and on research data. The estimated yields are average yields per acre that can be expected by good commercial farmers at the level of management which tends to produce the highest economic returns.

Crops other than those shown in table 2 are grown in the parish, but their predicted yields are not included, because their acreage is small or reliable data on yields are not available.

The estimated yields given in table 2 can be expected if the following management practices are used:

1. Rainfall is effectively used and conserved.
2. Surface drainage systems are installed.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Insect, disease, and weed control measures are consistently used.
6. Fertilizer is applied according to soil test and crop needs.
7. Suitable crop varieties are used at recommended seeding rates.

Woodland [4]

Merchantable hardwood woodland covers about half of Madison Parish. Use of the soils for row crops,

[4] MAX JOHNSTON, woodland conservationist, Soil Conservation Service, assisted in preparation of this section.

TABLE 2.—*Estimated average yields per acre of principal crops and pasture plants under high level of management*

[Absence of yield indicates crop is not suited to the soil or is not commonly grown on this soil]

Soil	Crops				Pasture	
	Cotton	Corn	Soybeans	Rice	Common bermudagrass	Coastal bermudagrass
	Lb of lint	*Bu*	*Bu*	*Bu*	*AUM* [1]	*AUM* [1]
Bruin silt loam	950	100	42		8.5	15.5
Bruin and Commerce soils, frequently flooded:						
Bruin					6.5	
Commerce					6.5	
Commerce silt loam	900	95	40		8.5	15.5
Commerce silty clay loam	850	85	40		8.0	15.0

mainly soybeans, has greatly reduced the acreage of woodland in the parish. From 1962 to 1972, it is estimated that more than 63,000 acres of woodland was cleared. Most of the clearing was done on the clayey soils.

Two forest cover types are represented in Madison Parish. The main type is made up of cherrybark, water oak, sweetgum, pecan, green ash, sugarberry, and American elm. Less extensive is the riverfront type, which mainly consists of eastern cottonwood, American sycamore, and black willow.

In table 3 the suitability of the soils in Madison Parish for woodland is given. This table shows the potential productivity of the soils for important trees, rates the soils for various limitations to management, and lists trees that are suitable for planting.

The soils in table 3 are placed in woodland suitability groups. The purpose of these groups is to assist owners in planning the use of the soils for wood crops. Each group is made up of soils that are suited to the same kind of trees; that need approximately the same kind of management where the vegetation is similar; and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol, such as 1o4, 2w6, or 3s5. The first part of the symbol, always a number, indicates relative potential productivity of the soils in the group: 1, very high; 2, high; 3, moderately high.

These ratings are based on field determinations of average site index. Site index is the height, in feet, that the dominant trees of a given species, on a specified kind of soil, reach in a natural, unmanaged stand in a stated number of years. For the merchantable hardwoods in Madison Parish, the site index is the height reached in 50 years, except for cottonwood, for which the index is the height reached in 30 years, and sycamore, for which the index is the height reached in 35 years.

The second part of the symbol identifying a woodland group is a small letter. This letter indicates an important soil property that imposes a slight, moder-

Erosion hazard refers to the potential hazard of soil losses in well-managed woodland. The hazard is *slight* if expected soil losses are small; *moderate* if some soil losses are expected and care is needed during logging and construction to reduce soil losses; and *severe* if special methods of operation are necessary for preventing excessive soil losses (*3, 11*).

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting the trees. The most limiting characteristics are drainage, texture of the surface layer, slope, and depth to the water table. *Slight* means that there is no restriction in the kind of equipment or in the time of year it is used; *moderate* means that use of equipment is restricted for less than 3 months of the year; and *severe* means that special equipment is needed and its use is restricted for more than 3 months of the year.

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

In the last column is a list of trees suitable to plant for commercial wood production.

Wildlife[5]

The soils of Madison Parish provide food and cover for many forms of wildlife. The suitability of the soils as habitat for wildlife depends mainly on the types of vegetation the soils can produce and on man's use of

TABLE 3.—*Suitability of the soils for woodland*

Soil series and map symbol	Woodland suitability group	Potential productivity		Limitations of management			Trees to plant
		Important trees	Site index	Erosion hazard	Equipment limitation	Seedling mortality	
Bruin: Ba, BC For Commerce part of BC, see Commerce series.	1o4	Eastern cottonwood American sycamore Sweetgum Black willow Pecan	110 --- 105 --- ---	Slight	Slight	Slight	Eastern cottonwood, American sycamore, sweetgum.
Commerce: Cm, Cn, Co.	1w5	Eastern cottonwood Nuttall oak Water oak Pecan American sycamore Sweetgum	115 90 110 --- --- 110	Slight	Moderate	Slight	Eastern cottonwood, American sycamore, sweetgum.
Crevasse: Cr	2s6	American sycamore Eastern cottonwood Black willow	--- 100 ---	Slight	Moderate	Severe	Eastern cottonwood, American sycamore.
Dundee: Dd, De, Ds For Sharkey part of Ds, see Sharkey series, Sa.	2w5	Eastern cottonwood Cherrybark oak Water oak Sweetgum Nuttall oak	100 100 95 100 ---	Slight	Moderate	Slight	Eastern cottonwood, sweetgum, American sycamore.
Sharkey:							
Sa, Sb, Sc, Sd, St For Tunica part of St, see Tunica series, Tu.	2w6	Cherrybark oak Sweetgum Eastern cottonwood Water oak Pecan American sycamore Green ash American elm Sugarberry	90 90 100 90 --- --- 85 --- ---	Slight	Severe	Moderate	Eastern cottonwood, water oak, sweetgum, American sycamore, green ash.
Sf, SS, SU For Tunica part of SU, see Tunica series.	3w6	Eastern cottonwood Nuttall oak Green ash Sugarberry Overcup oak Water hickory	95 80 75 --- --- ---	Slight	Severe	Severe	Eastern cottonwood, green ash.
Tensas: Ta, Ts For Sharkey part of Ts, see Sharkey series, Sa.	2w6	Cherrybark oak Sweetgum Eastern cottonwood Water oak Pecan American sycamore Green ash American elm Sugarberry	100 100 105 95 --- --- 80 --- ---	Slight	Severe	Moderate	Eastern cottonwood, sweetgum, American sycamore, green ash.
Tunica:							
Tu	2w6	Cherrybark oak Sweetgum Eastern cottonwood Water oak Pecan American sycamore Green ash American elm Sugarberry	90 90 100 90 --- --- 85 --- ---	Slight	Severe	Moderate	Eastern cottonwood, sweetgum, American sycamore, green ash.
Tunica part of SU	2w6	Eastern cottonwood	95	Slight	Severe	Severe	Eastern cottonwood

TABLE 3.—*Suitability of the soils for woodland*—Continued

Soil series and map symbol	Woodland suitability group	Potential productivity		Limitations of management			Trees to plant
		Important trees	Site index	Erosion hazard	Equipment limitation	Seedling mortality	
Udifluvents: Ud.	2o6	Eastern cottonwood Sweetgum	90 90	Severe	Moderate	Moderate	Eastern cottonwood.
Udipsamments: Us.[1]							

[1] Unsuited for commercial woodland because of droughtiness.

of mallard, wood duck, pintail, and widgeon. Most of the duck hunting is done over flooded land.

Trapping of furbearers is light, but a few mink, nutria, raccoon, and otter are taken.

Madison Parish is also the home of two animals that appear on the list of rare and endangered species—the alligator and the red wolf. Alligators are in the bayous and lakes of most of the parish, but the red wolf is limited to a small area on the river side of the Mississippi River levee.

The largest and most important lakes of this parish are Bear, Indian, Despair, Buck, Judd, and One lakes. These lakes are small but provide most of the fishing in this parish. Several bayous also furnish limited fishing. Fishing can be considered moderate to poor in this parish.

Soils directly influence the kinds and amounts of vegetation and amounts of water available, and in this way they indirectly influence the kinds of wildlife that wildlife habitat are very severe and that unsatisfactory results are to be expected. It is either impossible or impractical to create, improve, or maintain habitats on soils in this category.

Each soil is rated in table 4 according to its suitability for producing various kinds of plants and other elements that make up wildlife habitat. The ratings take into account mainly the characteristics of the soils and closely related natural factors of the environment. They do not take into account climate, present use of the soils, or present distribution of wildlife and people. For this reason, selection of an area to be developed for wildlife habitat requires an inspection of the site.

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

Domestic grasses and legumes.—This group consists of grasses and legumes that are established by plant-

TABLE 4.—*Suitability of the soils for elements of wildlife habitat and for kinds of wildlife*

Soil series and map symbols	Elements of wildlife habitat						Kinds of wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Bruin:									
Ba	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BC:									
Bruin part	Poor	Fair	Fair	Good	Poor	Poor	Fair	Good	Poor.
Commerce part	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
Commerce: Cm, Cn, Co.	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Crevasse: Cr	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Dundee:									
Dd, De	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ds:									
Dundee part	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Sharkey part	Fair	Fair	Fair	Good	Good	Fair	Fair	Good	Fair.
Sharkey:									
Sa, Sb, Sc	Fair	Fair	Fair	Good	Good	Good	Fair	Good	Good.
Sd	Fair	Fair	Fair	Good	Good	Fair	Fair	Good	Fair.
Sf, SS	Poor	Fair	Fair	Good	Fair	Fair	Poor	Fair	Fair.
St:									
Sharkey part	Fair	Fair	Fair	Good	Good	Poor	Fair	Good	Fair.
Tunica part	Fair	Fair	Fair	Good	Good	Poor	Fair	Good	Fair.
SU:									
Sharkey part	Poor	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair.
Tunica part	Poor	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair.
Tensas									
Ta	Fair	Fair	Fair	Good	Good	Good	Fair	Good	Good.
Ts:									
Tensas part	Fair	Fair	Fair	Good	Good	Poor	Fair	Good	Fair.
Sharkey part	Fair	Fair	Fair	Good	Good	Poor	Fair	Good	Fair.
Tunica: Tu	Fair	Fair	Fair	Good	Good	Good	Fair	Good	Good.
Udifluvents: Ud.	Fair	Fair	Poor	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Udipsamments: Us.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

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

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

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.

identified as GW, GP, GM, GC, SW, SP, SM, and SC; seven classes of fine-grained soils, identified as ML, CL, OL, MH, CH, CL–ML, and OH; and one class of highly organic soils, identified as Pt.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6,

TABLE 5.—*Estimated engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. fully the instructions for referring to other series that appear in the first column

Soil series and map symbols	Depth from surface	USDA texture	Classification	
			Unified	AASHTO
	Inches			
*Bruin: Ba, BC.	0–11	Silt loam	ML	A–4
For properties of Commerce part of BC, see Commerce series.	11–71	Silt loam, very fine sandy loam	ML, CL–ML	A–4
Commerce: Cm, Cn, Co.	0–7	Silt loam, silty clay loam	ML, CL, CL–ML	A–4, A–6, A–7–6

properties of the soils

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
of this table. The symbol < means less than; the symbol > means more than]

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Reaction	Permeability	Available water capacity	Shrink-swell potential
No. 4	No. 10	No. 40	No. 200						
				Pct		*pH*	*Inches per hour*	*Inch per inch of soil*	
100	100	95–100	85–100	<23	[1] NP–3	6.1–7.8	0.6–2.0	0.21–0.23	Low.
100	100	95–100	55–100	<28	NP–7	6.6–8.4	0.6–2.0	0.18–0.23	Low.
100	100	100	75–100	<45	NP–23	5.6–7.8	0.2–2.0	0.20–0.23	Low to moderate.
100	100	100	85–100	32–45	11–23	6.1–8.4	0.2–0.6	0.20–0.22	Low to moderate.
100	100	100	75–100	23–37	3–15	6.6–8.4	0.2–0.6	0.20–0.23	Low to moderate.
100	100	90–100	5–12	----------	NP	6.1–8.4	6.0–20.0	0.03–0.06	Very low.
100	100	95–100	75–95	<45	NP–22	5.6–6.5	0.6–2.0	0.18–0.20	Low to moderate.
100	100	95–100	75–100	35–48	13–25	5.1–6.0	0.2–0.6	0.18–0.20	Low to moderate.
100	100	85–100	55–95	<40	NP–18	5.6–7.3	0.2–2.0	0.18–0.20	Low to moderate.
100	100	100	95–100	<85	NP–50	5.6–8.4	<2.0	0.18–0.22	Low to very high.
100	100	100	95–100	56–85	36–50	5.6–8.4	<0.06	0.18–0.20	Very high.
100	100	100	95–100	25–85	5–50	6.1–8.4	<0.20	0.18–0.22	Moderate to very high.
100	100	100	95–100	46–60	22–35	4.5–6.0	<0.06	0.18–0.20	Very high.
100	100	100	95–100	51–75	26–45	4.5–6.5	<0.06	0.18–0.20	Very high.
100	100	100	80–100	25–40	5–17	5.6–7.3	0.2–2.0	0.20–0.22	Low to moderate.
100	98–100	95–100	90–100	45–75	20–45	5.6–7.8	<0.06	0.15–0.20	Very high.
100	98–100	95–100	90–100	51–75	25–45	6.1–7.8	<0.06	0.15–0.20	Very high.
100	95–100	75–95	51–90	25–40	5–18	6.6–8.4	0.6–2.0	0.18–0.21	Low to moderate.
100	100	100	90–100	25–65	5–40	([2])	([2])	([2])	([2])
100	100	90–95	0–4	----------	NP	6.6–8.0	6.0–20.0	<0.05	Very low.

ate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* means soil properties so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance. For some uses, the rating of severe is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material is a characteristic that affects suitability, but also considered in the

TABLE 6.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. fully the instructions for referring to other series

Soil series and map symbols	Suitability as a source of—		Degree and kind of limitations for—		
	Topsoil	Roadfill	Pond reservoir areas	Dwellings without basements	Septic tank absorption fields
*Bruin:					
Ba	Good	Fair: low strength.	Moderate: seepage.	Slight	Moderate: percs slowly.
BC For Commerce part, see Commerce series.	Good	Fair: low strength.	Moderate: seepage.	Very severe: floods.	Severe: floods.
Commerce:					
Cm	Good	Fair: wet, low strength, shrink-swell.	Moderate: seepage.	Moderate: wet, low strength, shrink-swell.	Severe: wet, percs slowly.
Cn, Co	Fair: too clayey.	Fair: wet, low strength, shrink-swell.	Moderate: seepage.	Moderate: wet, low strength, shrink-swell.	Severe: percs slowly, wet.
Commerce part of BC	Good	Fair: wet, low strength, shrink-swell.	Moderate: seepage.	Very severe: floods.	Severe: floods, percs slowly, wet.
Crevasse: Cr	Poor: too sandy.	Good	Severe: seepage.	Very severe: floods.	Severe: floods.
*Dundee:					
Dd	Fair: thin layer.	Fair: wet, low strength, shrink-swell.	Moderate: seepage.	Moderate: wet, low strength, shrink-swell.	Severe: wet, percs slowly.
De, Ds For Sharkey part of Ds, see Sharkey	Fair: too clayey.	Fair: wet, low strength,	Moderate: seepage.	Moderate: wet, low	Severe: wet, percs slowly.

interpretations of the soils

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
that appear in the first column of this table]

	Degree and kind of limitations for—Continued							
	Sewage	Local roads	Small commercial	Sanitary landfills	Camp areas	Picnic areas	Playgrounds	Paths and trails

stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings and small commercial buildings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness and slope.

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

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet. [illegible]

apply only to a depth of about 6 feet, and therefore limitation ratings of *slight* or *moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but regardless of that, every site should be investigated before it is selected.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

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

horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme instances, determines it almost entirely. Finally, time

The action of the soil-forming factors is reflected in the soil profile, which is a succession of horizons, or layers, from the surface down to unaltered parent material. The horizons differ in one or more properties,

Living organisms

Plants, animals, insects, bacteria, fungi, and micro-organisms are important in the formation of soils.

ries. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for

are used as family differentiae (see table 7). An example is the coarse-loamy, siliceous, acid, thermic family of Typic Haplaquents.

SERIES: The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile.

General nature of the parish

Madison Parish, once a part of Carroll, Franklin, Richland, and Tensas Parishes, was established by Acts of the Louisiana State Legislature in 1839 and

The total number of farms in Madison Parish decreased from 735 in 1959 to 443 in 1969. The total land used for farming increased from 206,893 acres in 1959 to 242,575 acres in 1969. The average size of farms increased from 282 acres in 1959 to 548 acres in 1969.

Physiography and geology[7]

Madison Parish is on the Mississippi River alluvial plain. The Mississippi River and its abandoned channels form the eastern boundary of the parish, and Bayou Macon forms the western boundary.

Elevation in the parish averages about 80 feet above sea level along the northern boundary and about 60

the meanders of the streams that form them. These deposits are obscured in some places by overlying natural levee deposits that [illegible]

tive levee system. Sand and other nonplastic material can be obtained from bar deposits along the Mississippi Ri[illegible]

TABLE 9.—*Probabilities of last freezing temperatures in spring and first in fall*

[Data recorded at Tallulah 2SW]

Probability	Dates for given probability and temperature		
	24° F or lower	28° F or lower	32° F or lower
Spring:			
1 year in 10 later than	March 10	March 27	April 8
2 years in 10 later than	February 28	March 20	April 2
5 years in 10 later than	February 8	March 5	March 22
Fall:			
1 year in 10 earlier than	November 3	October 28	October 14
2 years in 10 earlier than	November 7	October 30	October 20
5 years in 10 earlier than	November 24	November 11	October 29

moderate temperatures; a few clear, mild days; and more rain.

annual total, or slightly less than 2,800 hours per year. Windspeed is mainly less than 10 miles per hour, but

pumped in millions of gallons per day in 1970 were as follows (*4*) : irrigation, 6.04; industrial, 4.0; public supply, 0.80; rural-domestic, 0.20; and livestock, 0.13. The aquifer is capable of yielding a large quantity of water. Pumping tests in the Tallulah area (*9*) indicate that a properly constructed and developed well that is screened in the lower, more permeable part of the aquifer is capable of yielding as much as 7,000 gallons per minute. At this rate of pumping, the drawdown

State and local efforts toward land development in the Alluvial Valley of the lower Mississippi River.
(7) Patrick, W. J., Jr., C. B. Haddan, and J. A. Hendrix. 1957. The effect of longtime use of winter cover crops on certain physical properties of Commerce loam. Soil Sci. Soc. Amer. Proc. 21: 366–368.
(8) Saucier, R. T. 1967. Geological investigation of the Boeuf-Tensas basin, lower Mississippi Valley. Tech. Rep. No. 3–757, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss.
(9) Turcan, A. N., Jr., and R. R. Meyer. 1962. Alluvial aquifer

nor alkaline. The degree of acidity or alkalinity is expressed as—

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

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

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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.

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; the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

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."

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

Tilth, soil. The condition of 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.

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