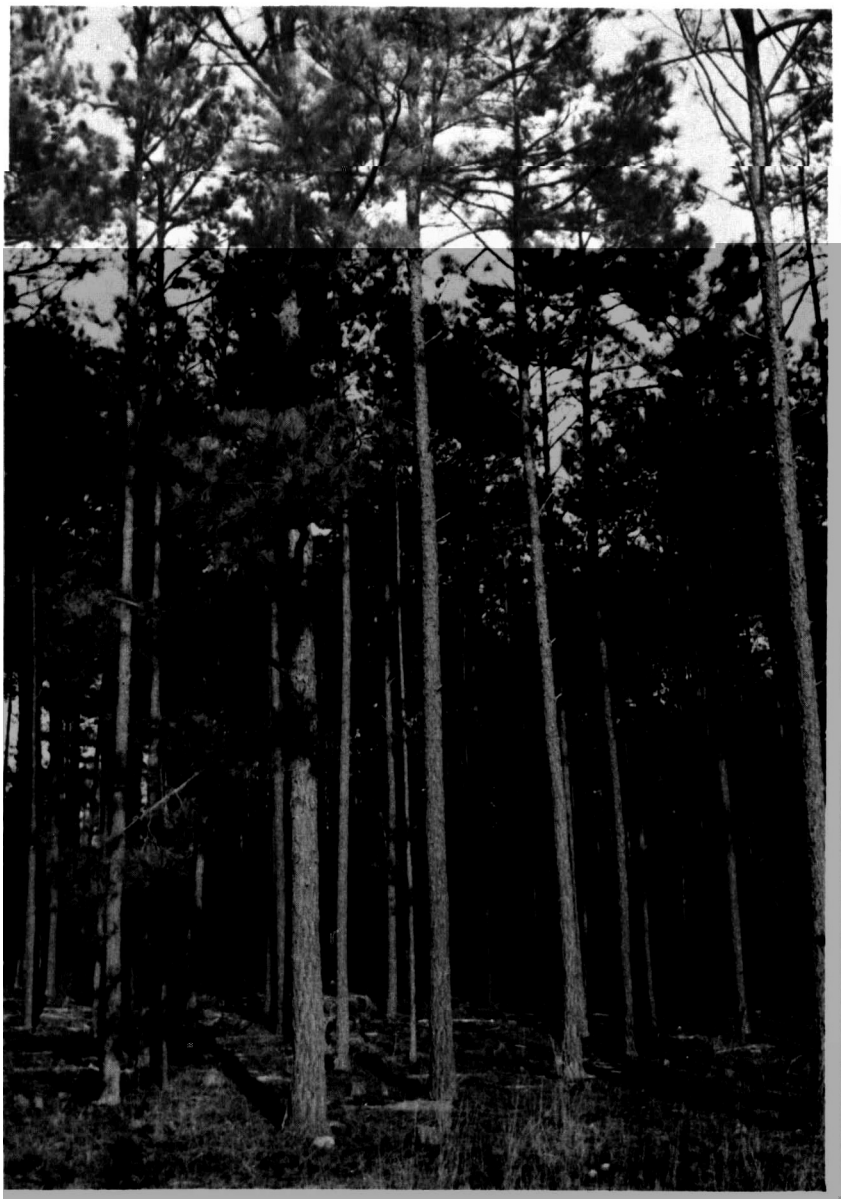
# SOIL SURVEY



# Howard County, Arkansas

United States Department of Agriculture
Soil Conservation Service
and
Forest Service
In cooperation with
Arkansas Agricultural Experiment Station

Major fieldwork for this soil survey was done in the period 1964–68. Soil names and descriptions were approved in 1970. Unless otherwise indicated, statements in this publication refer to conditions in the county in 1968. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Mine Creek Soil and Water Conservation District.

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

# HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing soils that have a slight limitation for a given use can be colored green, those with a moder-

# Contents

# SOIL SURVEY OF HOWARD COUNTY, ARKANSAS

BY JAMES E. HOELSCHER, CHARLIE N. McCOLLUM, AND GLEN D. LAURENT, SOIL CONSERVATION SERVICE

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

HOWARD COUNTY is in southwestern Arkansas (fig.1). The Saline River, from Millwood Reservoir north to Dierks Reservoir, forms the county's western boundary with Sevier County. The county is irregular in shape. It ranges from about 18 miles in width at the northern boundary to about 8 miles in width at the southern boundary. Its maximum length is about 42 miles. According to United States Census reports, the approximate area is 384,000 acres, or 600 square miles.

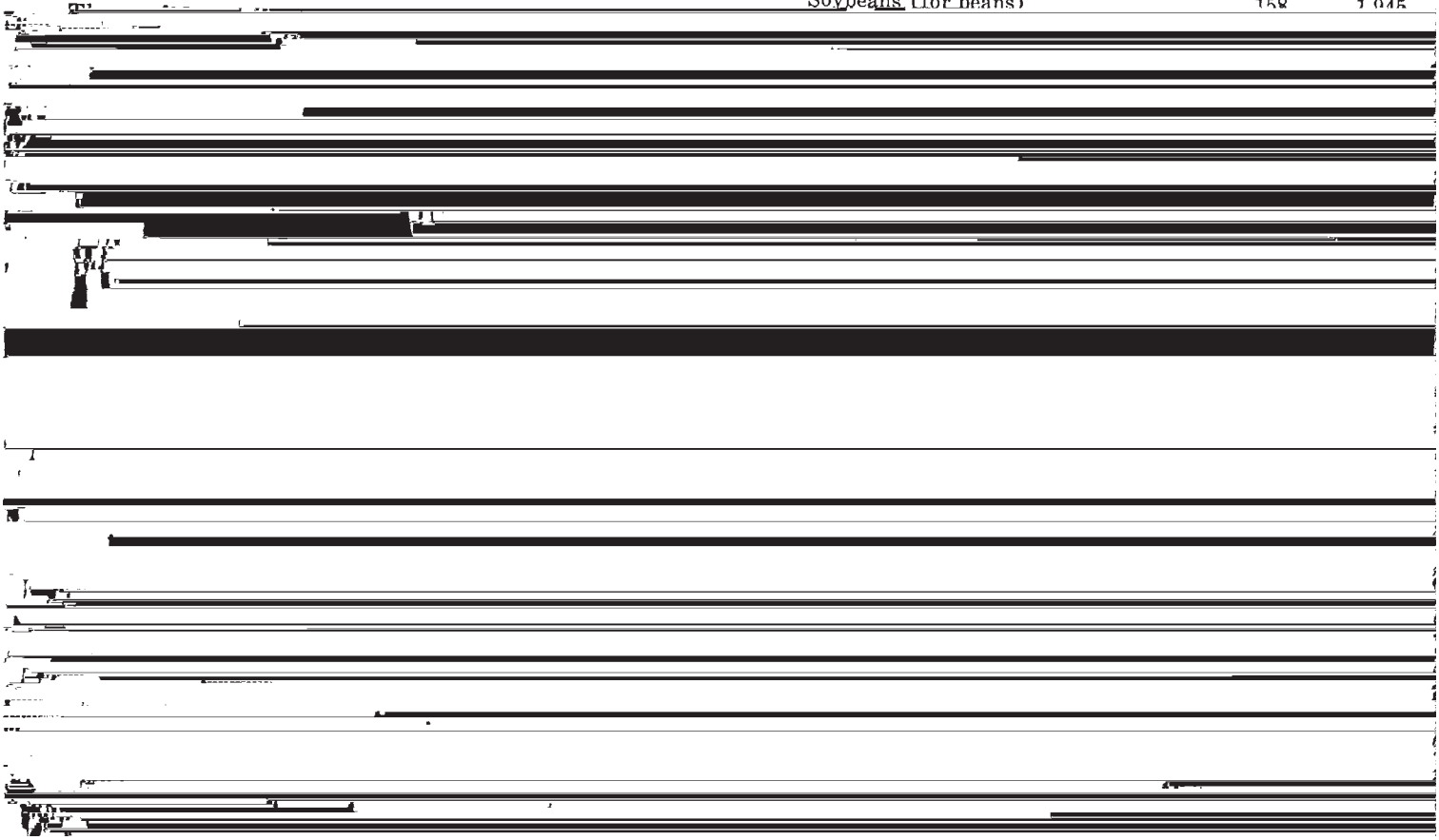
In 1970, the population of the county was 11,412. Nashville, the county seat, is the largest town in the county and has a population of 4,016.

## *General Nature of the County*

reforestation began and now about 72 percent of the county is in woodland that is managed for the production of pulpwood, poles, and sawlogs. Most of the remaining land is used for pasture and forage crops, and a small acreage is used for peach orchards, winter small grain, cotton, and soybeans. In 1969, about 31 percent of the county was in farms.

According to the 1969 Census of Agriculture, 658 acres of oats was grown for grain; 50,068 acres was in pasture but this acreage included only cropland pastured and improved pasture, and 175,555 peach trees were growing in 1964. The acreage of other principal crops in 1964 and 1969 was as follows:

| Crop: | *1964* | *1969* |
|---|---|---|
| Cotton | 791 | 193 |
| Cotton | 846 | 1,437 |
| Soybeans (for beans) | 158 | 1,945 |



of them worked off the farm 100 days or more. Nearly all the farms are small enough that the operator's family, with occasional outside help in peak seasons, can do the work.

Most farms are mechanized to some extent, but equipment for clean-tilled crops decreased greatly between 1964 and 1969. Most equipment is used for livestock and poultry farming.

## Physiography and Drainage

Howard County includes parts of three land resource areas. These are the Ouachita Mountains in the north, the Southern Coastal Plain, and the Blackland Prairies. The soils formed in material weathered from folded

## Climate [1]

Howard County has long, hot, humid summers, and mild winters. Precipitation generally is ample and is well distributed throughout the year. Table 1 shows data on precipitation and temperatures from the U.S. Weather Bureau station at Nashville.

Summer is characterized by bright sunshine, high temperatures, and high humidity, interrupted by short periods of scattered showers and thunderstorms, mainly

summer, temperatures of 100°F. or higher can be expected. In the fall, days are warm and the nights are cool. This is normally the driest, most pleasant season.

The Gulf of Mexico provides a year round source

season, about one-third of the annual precipitation falls in the 3-month period March through May. Precipitation generally is well distributed throughout the year. General rains in winter and early in spring are

steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A soil

basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Sacul fine sandy loam, 3 to 8 percent slopes, is one of several phases within the Sacul series.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

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

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

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Pickens soils, 3 to 12 percent slopes, is an undifferentiated soil group in this county.

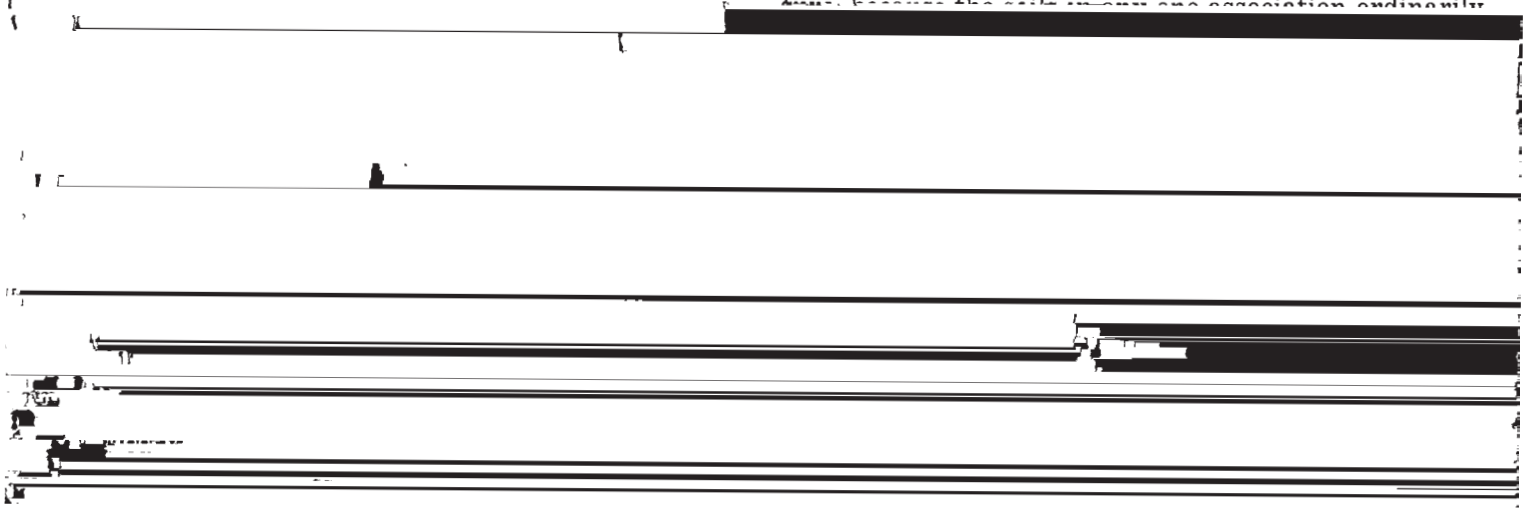
tures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or a high water table. They see that streets, road 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 Howard County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar struc-



tops, rolling to steep wooded mountainsides, and narrow stream valleys. The valleys are long and winding. They range from little wider than the stream to as much as one-half mile wide and are about 450 to 800 feet above sea level. The mountainsides rise from the valleys by generally smooth, uniform slopes. Slopes generally are 12 to 40 percent. Most ridgetops are less than one-fourth mile wide. They are long and winding, and the slopes are mainly 3 to 12 percent. Most ridgetops range from 750 to 1,000 feet above sea level, but a few are nearly 1,700 feet high. Sherwood soils are mainly on the ridgetops, and Pickens soils are mainly on the side slopes.

This association makes up about 44 percent of the county. Sherwood soils make up about 44 percent of the association, and Pickens soils 25 percent. The remaining 31 percent is Rock land and very shallow

tion centers. The slopes and the underlying bedrock are moderate to severe limitations to the construction of highways or large buildings. There are suitable residential building sites in parts of the association, but accessibility is a problem and the limitations to use for septic tank drainage fields are severe.

### 2. *Saffell-Sacul association*

*Deep, well drained and moderately well drained, nearly level to moderately steep, loamy, acid soils on rolling Coastal Plain uplands*

This association consists of rolling, strongly dissected uplands and narrow, winding flood plains of intermittent streams in the north-central part of the county. Slopes range from 1 to 20 percent in most places, but are dominantly less than 1 percent on the

mining for gravel in the county are in the Saffell parts of this association.

### 3. *Blevins-Sacul-Ruston association*

*Deep, well drained and moderately well drained, nearly level to moderately sloping, loamy, acid soils on rolling Coastal Plain uplands*

This association consists of rolling, strongly dis-

### 4. *Ozan-Adaton-Toine association*

*Deep, poorly drained and well drained, level, loamy, acid soils on bottom lands and low stream terraces in the Coastal Plain*

This association consists of level flood plains and low stream terraces in the western part of the county, along the Saline River and its larger tributaries. It includes the part of Millwood Reservoir that lies in

severely eroded. Slopes range from 3 to 20 percent. Slopes are dominantly less than 1 percent on the flood plains, which are subject to occasional or frequent flooding.

This association makes up about 10 percent of the county. Oktibbeha soils make up about 23 percent of the association, Sumter soils 20 percent, Leeper soils

## *Descriptions of the Soils*

This section describes the soil series and mapping units in Howard County. Each soil series is described in detail, and then, briefly, each mapping unit in that series. The description of each mapping unit contains suggestions about use and management of the soil.

yellowish-brown, mottled silty clay; the next 32 inches is gray, mottled silty clay; and beneath this is 16 inches of gray, mottled clay.

Angie soils are low in natural fertility. The available water capacity is high, and permeability is slow. The root zone is deep, but roots penetrate slowly into the lower part of the subsoil.

If these soils are well managed, they are fairly well suited to most crops and pasture plants grown in the county. Most of the acreage is wooded. Tilth is easy to maintain. These soils respond well to fertilizer and lime.

Representative profile of Angie silt loam, 1 to 3 percent slopes, in a moist wooded area in the NE¼SE¼SE¼ sec. 27, T. 10 S., R. 28 W.:

and Tiak soils and a few areas that have a silty clay loam surface layer over a mottled red and gray clay subsoil.

Runoff from this soil is medium, and erosion is a severe hazard. Crops that leave a large amount of residue can be grown year after year under good management that includes contour cultivation and terracing of long slopes. Sown crops that leave a large amount of residue can be safely grown year after year without terracing.

Most of this soil is wooded with shortleaf and loblolly pine or mixed pines and hardwoods. Of the small acreage that is cleared, nearly all is used for pasture.

Such crops as soybeans, grain sorghum, and winter small grains are fairly well suited to this soil. Better

O1—1½ inches to ½ inch, pine needles and oak leaves.
O2—½ inch to 0, partly decomposed forest debris.
A1—0 to 7 inches, yellowish-brown (10YR 5/4) loam; moderate, medium, granular structure; very friable; many medium and fine roots; many wormholes; many fine pores; medium acid; clear, smooth boundary.
A2—7 to 16 inches, light yellowish-brown (10YR 6/4) silt loam; very friable; many medium and few fine roots; many wormholes; many fine pores; medium acid; gradual, smooth boundary.
B21t—16 to 22 inches, yellowish-brown (10YR 5/8) loam; weak, medium, subangular blocky structure; friable; few, thin, patchy clay films on faces of peds; few sand grains bridged with clay; many medium and fine roots; few wormholes; few medium pores; strongly acid; gradual, wavy boundary.
B22t—22 to 32 inches, yellowish-brown (10YR 5/8) loam; few root channels filled with yellow (10YR 7/6) fine sandy loam; moderate, medium, subangular blocky structure; friable; many, thin, patchy clay films on [illegible]

suited than most other forage plants are bermudagrass, Pensacola bahiagrass, tall fescue, crimson clover, annual lespedeza, and sericea lespedeza. Capability unit IIe–1; woodland group 3o1.

**Blevins loam, 3 to 8 percent slopes** (BlC).—This soil is in areas of 20 to 300 acres. It has the profile described as representative of the series. Included with it in mapping are a few small areas of Ruston, Sacul, and Savannah soils.

Runoff from this soil is medium to rapid, and erosion is a severe hazard. Because of the erosion hazard and low fertility, this soil is only fairly well suited to farming. Most areas of this soil are wooded, dominantly with pines.

Such crops as winter small grains and other crops that leave large amounts of residue are suited to this

thin, patchy clay films on faces of peds and in pores; few fine roots; few wormholes; many fine pores; few, fine, rounded quartz pebbles; very strongly acid; abrupt, wavy boundary.

Bx1—24 to 50 inches, red (2.5YR 4/6) clay loam; many, coarse, prominent, light-gray (10YR 7/1) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; mottles are in polygonal seams; texture of material in the seams is fine sandy loam; few, thin, patchy clay films on faces of peds; no clay films on mottled areas; few wormholes; many fine pores; few, fine, rounded quartz pebbles; very strongly acid; gradual, wavy boundary.

Bx2—50 to 58 inches, red (2.5YR 4/6) clay loam; many, coarse, prominent, light-gray (10YR 7/1) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; mottles are in polygonal seams; texture of the material in the seams is fine sandy loam; few, thin, patchy clay films on faces of peds; no clay films on mottled areas; many fine pores; few, fine, rounded quartz pebbles; very strongly acid; gradual, wavy boundary.

Bx3—58 to 72 inches, red (2.5YR 4/6) clay loam; many, coarse, prominent, light-gray (10YR 7/1) mottles; moderate, coarse, subangular blocky structure; firm; few, fine, rounded quartz pebbles; very strongly acid.

The Ap or A1 horizon is yellowish brown, dark grayish brown, brown, strong brown, or dark yellowish brown. The B1 horizon is yellowish red or strong brown, and the B2t horizon is yellowish red or red. The Bx horizon is yellowish-red or red clay loam or sandy clay loam. Reaction is medium

These soils are better suited to native range than to most other uses. They respond poorly to fertilizer.

Representative profile of Demopolis silty clay, 3 to 12 percent slopes, severely eroded, in a moist idle area in the NW¼SE¼NE¼ sec. 29, T. 11 S., R. 27 W.:

Ap—0 to 5 inches, olive (5Y 5/3) silty clay; moderate, medium, granular structure; friable, sticky and plastic; many medium and fine roots; few wormholes; many fine pores; few fossil shells; few partly weathered chalk fragments; moderately alkaline; calcareous; clear, smooth boundary.

C—5 to 13 inches, pale-olive (5Y 6/4) silty clay; few, fine, faint, olive-gray mottles; massive; firm, sticky and plastic; few fine roots; few fine pores; few fossil shells; about 75 percent of volume is partly weathered chalk fragments; moderately alkaline; calcareous; abrupt, wavy boundary.

R—13 to 19 inches, olive-gray (5Y 5/2) chalk; horizontal platy rock structure.

The Ap horizon is olive, olive gray, grayish brown, or dark grayish brown. It is 0 to 15 percent, by volume, weathered chalk fragments. The C horizon is pale olive, olive, olive gray, light olive gray, or pale brown. It is 50 to 80 percent, by volume, weathered chalk fragments. Fossils range from 0 to 10 percent of volume in all horizons.

Demopolis soils are associated with the Sumter soils. They are more shallow and contain slightly less clay than Sumter soils and do not have a B horizon.

**Demopolis silty clay, 3 to 12 percent slopes, severely**

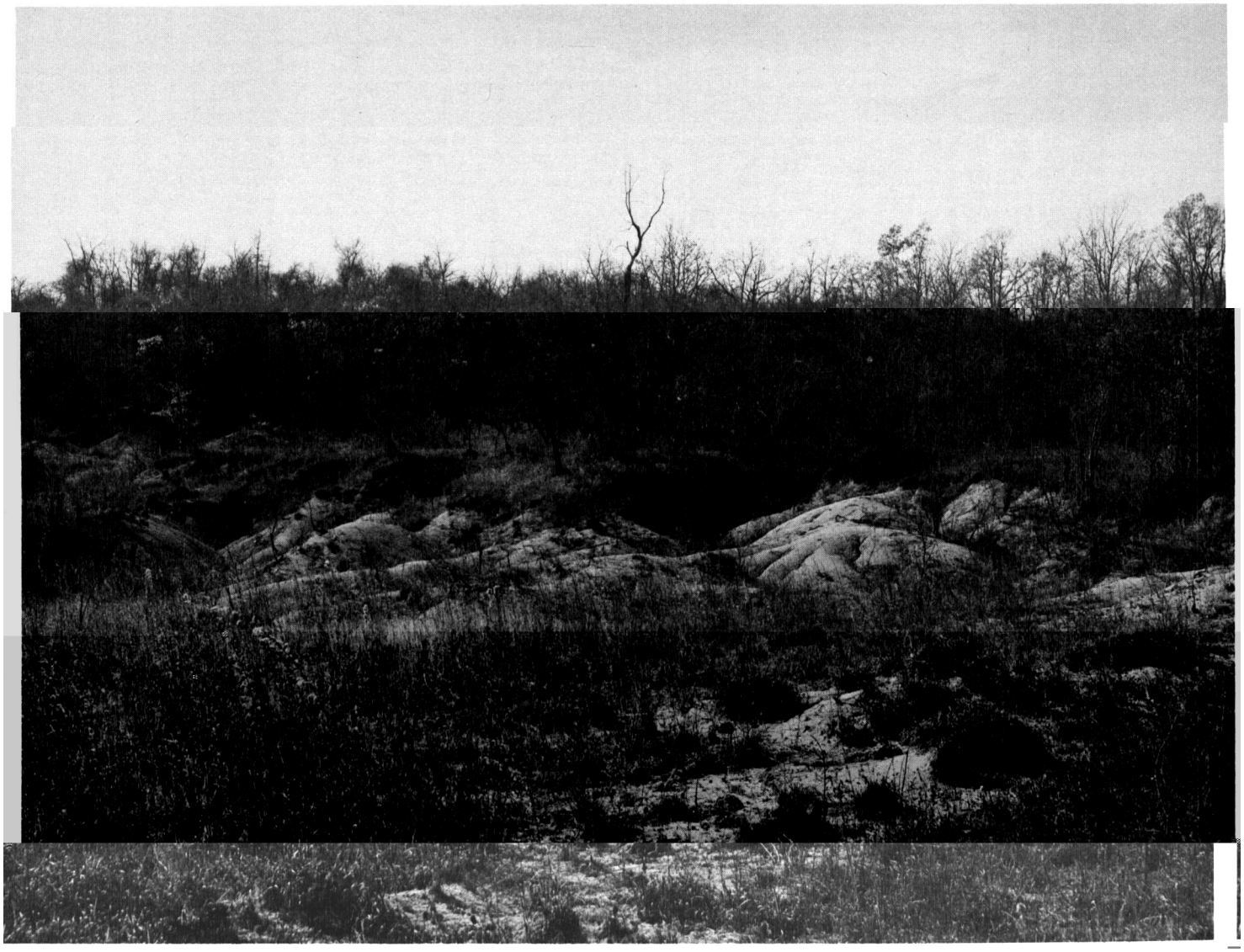


*Figure 2.*—**A gullied area of Demopolis silty clay, 3 to 12 percent slopes, severely eroded, showing the chalk bedrock.**

slightly sticky and plastic; thick clay films on faces of peds and in pores; many medium and fine roots;

thin, patchy clay films on faces of peds; few fine roots; few fine pores; about 2 percent of volume is

holes; few fine pores; mildly alkaline; gradual.

ping system and pattern of land use are planned. Nearly all the acreage is used for pasture and hay crops and the soil is well suited to this use.

Under good management, crops that leave a large amount of residue can be grown year after year. Suitable crops are cotton, soybeans, and grain sorghum. Areas that are only occasionally flooded are fairly well suited to winter small grains, but flooding may damage the crop some years. Suitable forage plants are alfalfa, bermudagrass, tall fescue, johnsongrass, dallisgrass, white clover, and annual lespedeza. Capability unit IIw–1 where occasionally flooded, capability unit IVw–1 [redacted]

C2—64 to 72 inches, thinly stratified yellowish-red (5YR 5/8) sandy loam and red (2.5YR 4/6) sandy clay loam; massive to platy rock structure; very firm; few fine roots on bedding planes; few fine pores; very strongly acid.

The A1 or Ap horizon is dark grayish brown to brown. The Bt horizon is yellowish red or red. The C horizon has yellowish-brown and gray mottles in places. The A horizon is slightly acid to very strongly acid, and the B and C horizons are strongly acid or very strongly acid.

Because these soils do not have mica flakes in the B and C horizons, they are outside the range defined for the series. This difference does not alter their usefulness or response to treatment.

[redacted]

B22—11 to 19 inches, dark-brown (10YR 4/3) loam; common, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; many fine roots; many crawfish holes; few worm-

formed in sediments of the Gulf Coastal Plain. The native vegetation is mixed pines and hardwoods.

In a representative profile the surface layer is yel-

Runoff is rapid, and erosion is a very severe hazard. Such crops as winter small grains that leave large amounts of residue can be grown occasionally if the cropping system includes grasses and legumes most of the time. Suitable forage plants are bermudagrass

plastic; continuous clay films on faces of peds; few fine roots; very strongly acid; gradual, smooth boundary.

B23tg—32 to 43 inches, gray (10YR 6/1) silty clay; common, medium, prominent, red (2.5YR 4/8) mottles and few fine faint pale brown mottles; moderate

These soils are better suited to pasture and hay or native grass range than to most other uses. They are suitable for woodland. Most of the acreage is used for pasture. Tilth is difficult to maintain because the surface is clayey. These soils respond well to fertilizer and lime.

Representative profile of Oktibbeha clay, 3 to 8 percent slopes, eroded, in a moist pasture area in the SW¼SE¼NE¼ sec. 34, T. 10 S., R. 27 W.:

Ap—0 to 5 inches, brown (10YR 4/3) clay that has common plow shards of yellowish-red (5YR 5/8) clay from the B21t horizon; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium, granular structure; firm; abundant fine roots; few crawfish holes; few wormholes; few fine pores; mildly alkaline; clear, smooth boundary.

B21t—5 to 12 inches, yellowish-red (5YR 5/8) clay; common, fine, prominent, pale-brown mottles; moderate, medium, subangular blocky structure; very firm; thick clay films or pressure faces on faces of peds;

kogee and Sumter soils and small areas that have a surface layer of silt loam or fine sandy loam.

Runoff from this soil is rapid, and the hazard of further erosion is very severe. This soil is poorly suited to cultivated crops. It is better suited to forage crops or woodland than to most other farm uses.

Winter small grains are among the crops that can be safely grown occasionally if the soil is used for grasses and legumes most of the time. Suitable forage plants are bermudagrass, Pensacola bahiagrass, tall fescue, white clover, and annual lespedeza. Capability unit IVe–3; woodland group 3c8.

**Oktibbeha clay, 8 to 12 percent slopes, eroded** (OkD2).—This soil is in areas of 20 to 50 acres. Included with it in mapping are a few areas of Sumter soils and small areas that have a surface layer of silt loam or fine sandy loam.

Runoff from this soil is rapid, and the hazard of

ture; friable; few, thin, patchy clay films on faces of peds; many sand grains bridged with clay; common tongues of light-gray fine sandy loam; many clean sand grains; few fine roots; few fine pores; very strongly acid; gradual, smooth boundary.

B22tg—29 to 38 inches, light-gray (10YR 7/1) loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles and common, fine, distinct, brownish-yellow mottles; weak, medium, subangular blocky structure; friable; few, thin, patchy clay films on faces of peds; many sand grains bridged with clay; few clean sand grains; few fine roots; few fine pores; few, fine, black concretions; about 1 percent of volume is fine pebbles; strongly acid; gradual, smooth boundary.

B23tg—38 to 56 inches, light-gray (10YR 7/1) loam; common, fine, distinct, yellowish-brown mottles; weak, medium, subangular blocky structure; firm; few, thin, patchy clay films on faces of peds; many sand grains bridged with clay; few fine pores; few, fine, black concretions; about 2 percent of volume is fine pebbles; strongly acid; gradual, wavy boundary.

B3g—56 to 72 inches, light-gray (10YR 7/1) loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; few, fine, black concretions; few fine pores; strongly acid.

The A1 or Ap horizon is light brownish gray to dark grayish brown. The B2tg horizon is light-gray or light brownish-gray loam or sandy clay loam. The B3g horizon is loam or sandy clay loam. Reaction is medium acid to very strongly acid in the A horizon and strongly acid or very strongly acid in the B horizon.

Ozan soils are associated with Adaton, Blevins, Toine, and Angie soils. They contain more sand than Adaton soils. They are not so brown as and are more poorly drained than Blevins and Toine soils. They contain less clay in the B horizon and are more poorly drained than Angie soils. They have an A horizon that tongues into the B horizon, which the associated [illegible]

In a representative profile the surface layer is dark grayish-brown shaly fine sandy loam about 6 inches thick. The subsoil is yellowish-brown shaly fine sandy loam about 6 inches thick. The underlying material is shale bedrock, which is tilted and fractured.

Pickens soils are low in natural fertility. The available water capacity is low, and permeability is moderate.

These soils are unsuited to crops. Under good management, however, they are suited to most forage plants grown in the county. Nearly all of the acreage is wooded. Tilth is fairly easy to maintain, but the root zone is shallow. The soils give a fair to poor response to lime and fertilizer.

Representative profile of Pickens shaly fine sandy loam in an area of Pickens-Sherwood-Rock land association, hilly, in a moist wooded area in the NW¼NW¼NW¼ sec. 7, T. 6 S., R. 29 W.:

O1—1½ inches to ½ inch, pine needles and oak leaves.

O2—½ inch to 0, partly decomposed forest debris.

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) shaly fine sandy loam; moderate, medium, granular structure; very friable; many medium and fine roots; few wormholes; many fine pores; about 35 percent of volume is fragments of shale and sandstone; medium acid; clear, smooth boundary.

B—6 to 12 inches, yellowish-brown (10YR 5/4) shaly fine sandy loam; weak, medium, subangular blocky structure; friable; few sand grains are bridged with clay; common medium and fine roots; few wormholes; few fine pores; about 40 percent of volume is fragments of shale and sandstone; strongly acid; abrupt, irregular boundary.

R—12 to 18 inches, thinly bedded shale, tilted and fractured; few medium roots between shale [illegible]

**Ozan fine sandy loam** (On).—This soil is level and poorly drained. It is on flood plains, stream terraces, and upland flats. It is in areas of 20 to 80 acres. Included with it in mapping are areas of Adaton and Blevins soils, areas that have a finer textured subsoil, and a few small areas of rounded mounds that are 50 to 100 feet in diameter and 2 to 4 feet high.

This soil is fairly well suited to farming, but excess water is a severe hazard and some areas are subject to occasional flooding. Nearly all the acreage is in wood-

The A1 or Ap horizon is dark grayish-brown or brown shaly fine sandy loam, shaly silt loam, stony fine sandy loam, or fine sandy loam. Content of coarse fragments is 10 to 40 percent, by volume. The B horizon is yellowish-brown or brown silt loam or fine sandy loam that is shaly or stony. Content of coarse fragments in the B horizon is 35 to 70 percent, by volume. The soil is 10 to 20 inches thick over tilted, folded, and fractured shale or interbedded shale and sandstone bedrock. Reaction is medium acid to extremely acid in the A horizon and is strongly acid to extremely acid in the B horizon.

Pickens soils are associated with the Pirum and Sherwood soils. They are shallower to bedrock than the associated

**Pickens-Sherwood-Rock land association, hilly** (PkE).—This association is on side slopes and ridgetops in the Ouachita Mountains. Slopes range from 20 to 50 percent. Most areas are about 100 to 600 acres in size. The delineations are much larger and the composition of this unit is more variable than for most other mapping units in the county. Mapping has been controlled well enough, however, for the anticipated uses of the soils.

The Pickens soil makes up about 35 percent of the association, the Sherwood soil 35 percent, Rock land 10 percent, and included soils 20 percent.

The Pickens soil is mainly on the side slopes of [illegible] described as representative of foot slopes of ridges. It has a profile similar to the one described as representative of the Sherwood series, but the content of coarse fragments ranges from few to many. Most areas of Rock land are narrow bands at the top of sharp ridges.

Included with these soils in mapping are small areas of Pirum soils, narrow strips of well-drained, loamy soil material along valley drainageways, and narrow, gently sloping ridgetops.

Runoff is rapid, and erosion is a very severe hazard if the plant cover is disturbed. All of the association is wooded with shortleaf pine, loblolly pine, or mixed pines and hardwoods (fig. 4). The soils are unsuited to cultivated crops. They are better suited to trees than

land is poorly suited as woodland. Pickens soil, capability unit VIIs-1; woodland group 4 [illegible]

coarse fragments. Thickness of the profile ranges from 22 to 42 inches. The A horizon is [illegible]

needed in the steeper areas. The Pickens soil is not suitable for cultivation, but is fairly well suited to bermudagrass, annual lespedeza, and other forage crops. Pirum soil, capability unit IIIe–2; woodland group 3o7. Pickens soil, capability unit VIs–1; woodland group 4d3.

**Pirum-Sherwood association, undulating** (PsB).—This steeper areas. Capability unit IIIe–2; woodland group 3o7.

## Rock Land

Rock land consists of long, narrow outcrops of hard, fine-grained sandstone and novaculite on crests and

B3—64 to 72 inches, yellowish-red (5YR 5/8) fine sandy loam; few, fine, prominent, light yellowish-brown mottles; weak, coarse, subangular blocky structure;

Runoff from this soil is medium to rapid, and erosion is a severe hazard.

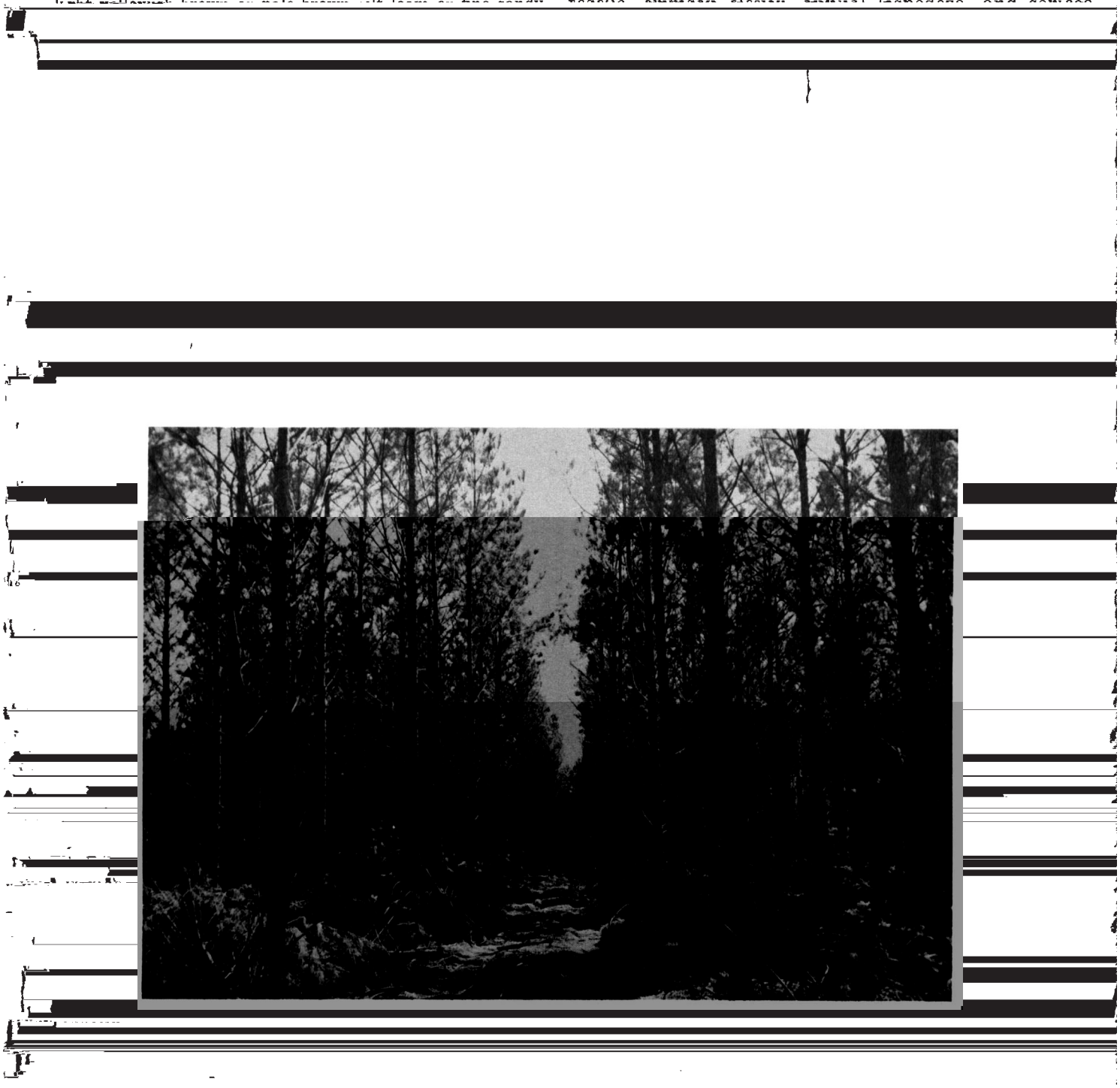
and few, fine, distinct, brownish-yellow mottles; moderate, coarse, subangular blocky structure; firm; few, thin, patchy clay films on faces of peds and in pores; few fine roots; few wormholes; many medium pores; few pebbles; very strongly acid; gradual, smooth boundary.

Cg—59 to 72 inches, light-gray (10YR 7/1) soft shale of silt loam texture; common, coarse, prominent, red (2.5YR 5/8) mottles; platy rock structure; friable; about 2 percent of volume is pebbles; extremely acid.

The A1 or Ap horizon is dark grayish brown, brown, yellowish brown, or dark yellowish brown. The A2 horizon is

Runoff from this soil is medium, and erosion is a severe hazard. Most of the area is wooded with shortleaf pine, loblolly pine, and hardwoods. Of the small acreage that is cleared, nearly all is used for pasture or hay.

Under good management that includes contour cultivation, clean-tilled crops that leave a large amount of residue can be grown year after year. Winter small grains and grain sorghum are among the crops that are suited to this soil. Better suited than other forage plants are bermudagrass, Pensacola bahiagrass, tall



crimson clover, annual lespedeza, and sericea lespedeza. Capability unit IVe-1; woodland group 3c2.

**Sacul fine sandy loam, 8 to 12 percent slopes** (SaD).—This soil is in areas of 10 to 100 acres. Included with it in mapping are a few small areas where the slopes are more than 12 percent and small areas of Blevins, Tiak, and Angie soils.

Runoff from this soil is rapid, and erosion is a severe hazard. Most of the area is wooded with shortleaf pine, loblolly pine, and hardwoods. Of the small acreage that is cleared, nearly all is used for pasture. This soil is not suitable for cultivated crops.

Better suited than other forage plants are bermudagrass, Pensacola bahiagrass, crimson clover, annual lespedeza, and sericea lespedeza. Capability unit VIe-2; woodland group 3c2.

## Saffell Series

The Saffell series consists of deep, nearly level to moderately steep, well-drained soils. These soils formed in gravelly sediments of the Gulf Coastal Plain. The native vegetation is mixed pines and hardwoods.

In a representative profile the surface layer is dark grayish-brown gravelly sandy loam about 8 inches thick. The upper part of the subsoil is yellowish-red and red gravelly sandy clay loam about 39 inches thick, and the lower part is strong-brown gravelly sandy loam about 15 inches thick. The underlying material is yellowish-brown gravelly sandy loam.

Saffell soils are low in natural fertility. The available water capacity is moderate to low, and permeability is moderately rapid. The root zone is deep.

These soils are best suited to forage crops and woodland. Most of the acreage is in pasture. These soils are difficult to till because of the high gravel content. They respond well to lime and fertilizer.

B3—47 to 62 inches, strong-brown (7.5YR 5/6) gravelly sandy loam; weak, fine, subangular blocky structure; friable; few sand grains are bridged with clay; few roots; few fine pores; about 70 percent of volume is gravel; strongly acid; gradual, wavy boundary.

C—62 to 72 inches, yellowish-brown (10YR 5/6) gravelly sandy loam; massive; friable; few fine roots; about 70 percent of volume is gravel; strongly acid.

The Ap or A1 horizon is reddish brown, dark brown, or dark grayish brown. The B2 horizon is yellowish red or red. The B3 horizon is strong brown or yellowish red. The C horizon is yellowish brown to yellowish red. Gravel content ranges from 25 to 40 percent in the A horizon and from 40 to 70 percent in the B and C horizons, and the percentage increases with increasing depth. The A horizon is medium acid or strongly acid, and the B and C horizons are strongly acid or very strongly acid.

Saffell soils are associated with Sacul, Luverne, Millwood, Blevins, and Ruston soils. They are more clayey in the B horizon than Sacul, Luverne, and Millwood soils, and they are better drained than Sacul soils. They are more gravelly than any of the associated soils.

**Saffell gravelly sandy loam, 1 to 3 percent slopes** (SeB).—This gravelly soil is in areas of 20 to 30 acres. Included with it in mapping are a few small areas of Sacul, Ruston, and Millwood soils and gravel pits.

Runoff from this soil is medium, and erosion is a moderate hazard. Most of the acreage is cleared and is used for pasture. Some areas are used for peach orchards (fig. 8), and a few areas are wooded with pines or mixed pines and hardwoods.

Under good management that includes contour tillage, clean-tilled crops that leave a large amount of residue can be grown year after year. Peaches, winter small grains, and other crops are suited to this soil. Better suited than other pasture plants are bermudagrass, Pensacola bahiagrass, weeping lovegrass, ball clover, crimson clover, and sericea lespedeza. Capability unit IIe-2; woodland group 4f2.

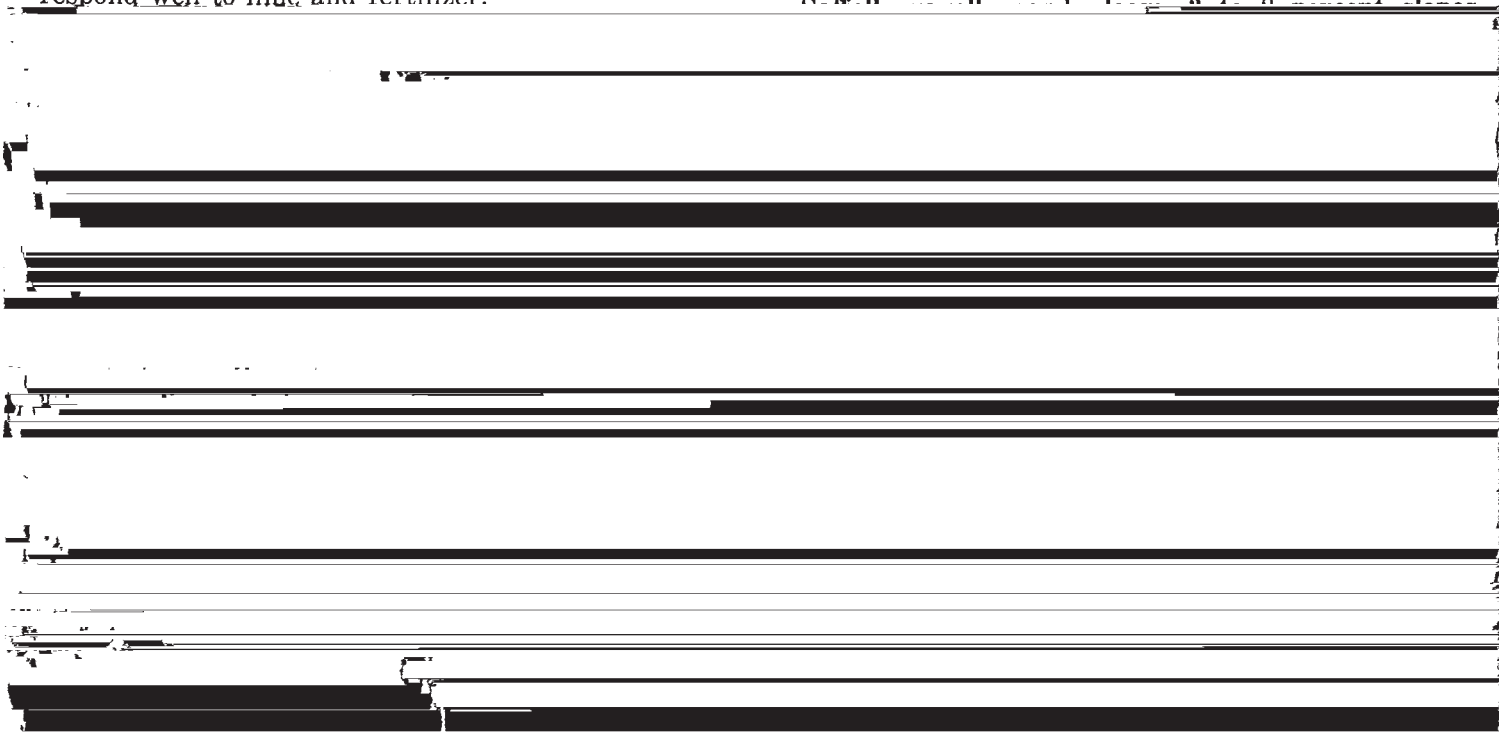


*Figure 8.*—**A peach orchard in an area of Saffell gravelly sandy loam, 1 to 3 percent slopes.**

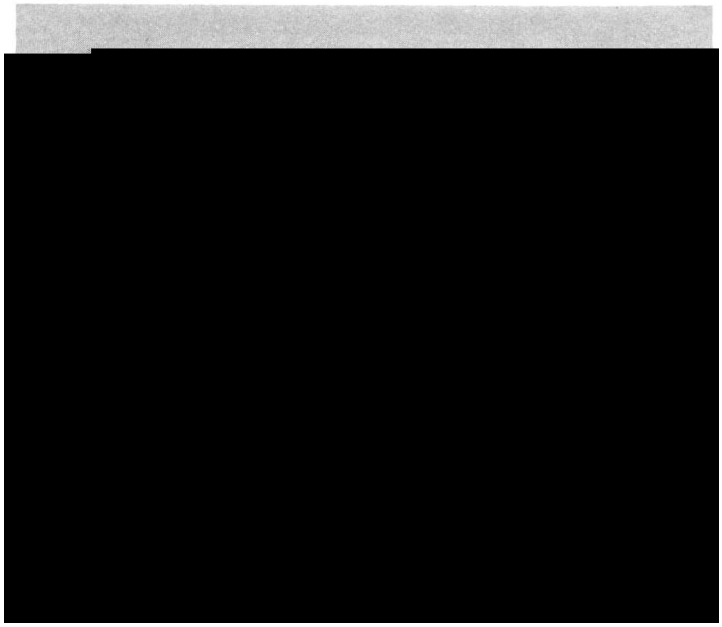


*Figure 9.*—**Gravel pit in an area of Saffell gravelly sandy loam, 3 to 8 percent slopes. The Saffell soils are an important source of gravel and sand.**

but it is suited to forage crops and woodland. Most of the acreage is cleared and is used for pasture. A few small areas are used for peach orchards, and a few areas are used for woodland consisting of pines or mixed pines and hardwoods.

Under good management, peach orchards can be grown in the less sloping areas. Better suited than other pasture plants are bermudagrass, Pensacola bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza. Capability unit VIe–4; woodland group 4f2.

## Savannah Series

The Savannah series consists of deep, nearly level and gently sloping, moderately well drained soils that have a fragipan. These soils are on uplands of the Gulf Coastal Plain. The native vegetation is mixed pines and hardwoods.

In a representative profile the surface layer is brown fine sandy loam about 9 inches thick. The upper part of the subsoil is yellowish-brown loam and clay loam about 26 inches thick; the middle part, about 23 inches thick, is a firm, brittle fragipan of gray, red, and brownish-yellow, mottled clay loam; and the lower part is gray, mottled sandy clay loam that extends to a depth of 72 inches or more.

Savannah soils are low in natural fertility. The available water capacity is moderate, and permeability

is moderately slow. The fragipan restricts the penetration of water and roots, and the root zone is only moderately deep.

These soils are suited to most crops grown in the county. Most of the acreage is used for pasture or woodland. Tilth is easy to maintain. These soils respond well to fertilizer and lime.

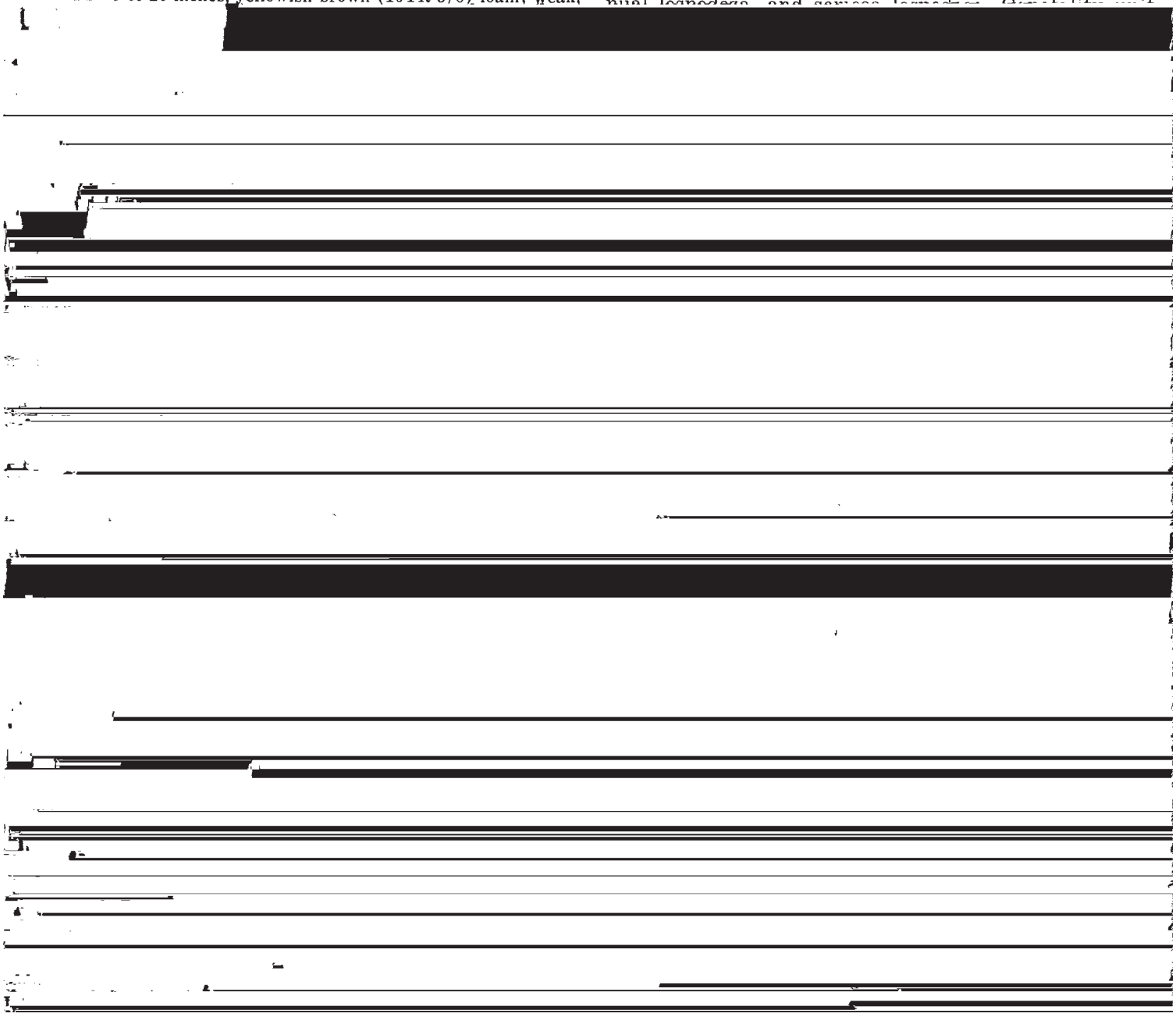
Representative profile of Savannah fine sandy loam, 3 to 8 percent slopes, in a moist wooded area in the NE¼SW¼NW¼ sec. 1, T. 10 S., R. 28 W.:

O1—1 to ½ inch, pine needles and oak leaves.
O2—½ inch to 0, partly decomposed forest debris.
A1—0 to 9 inches, brown (10YR 5/3) fine sandy loam; moderate, medium, granular structure; very friable; many roots; few wormholes; strongly acid; clear, smooth boundary.
B1—9 to 20 inches, yellowish-brown (10YR 5/6) loam; weak,

**Savannah fine sandy loam, 3 to 8 percent slopes** (SfC).—This soil is in areas of 20 to 30 acres. This soil has the profile described as representative of the series. Included with it in mapping are a few small areas of Blevins, Sacul, and Cane soils.

Runoff from this soil is medium to rapid, and erosion is a severe hazard. Because of the erosion hazard and low fertility, this soil is only fairly suitable for farming. Most areas are wooded, dominantly with shortleaf pine and loblolly pine. Nearly all cleared areas are used for pasture.

Under careful management that includes contour tillage and terracing, this soil is suited to winter small grains and other crops that leave large amounts of residue. Suitable forage plants are bermudagrass, Pensacola bahiagrass, tall fescue, crimson clover, an-



ture; firm; both patchy and continuous, thin clay films on faces of peds; few medium roots; many fine pores; about 5 percent of volume is angular sandstone fragments; very strongly acid; abrupt, irregular boundary.

R—37 inches, tilted and fractured, acid, interbedded sandstone and shale.

The A1 or Ap horizon is dark grayish-brown, brown, or yellowish-brown fine sandy loam, gravelly fine sandy loam, or stony fine sandy loam. Where present, the A2 horizon is light yellowish-brown or brownish-yellow sandy loam that is gravelly in some places and stony in others. The B2 horizon is yellowish-red or red sandy clay loam, gravelly sandy clay loam, or stony sandy clay loam underlain by interbedded sandstone and shale at a depth of 21 to 48 inches. Coarse fragments in all horizons range from 0 to 25 percent of the

of this unit is more variable than for most other mapping units in the county. Mapping has been controlled well enough, however, for the anticipated uses of the soils.

The Sherwood soil makes up about 50 percent of the association, the Pickens soil 25 percent, and included soils 25 percent.

The Sherwood soil is mainly on the wider ridgetops, but it is also in bands on the sides and foot slopes of ridges. It has the profile described as representative of the series. The Pickens soil is mainly on the side slopes of ridges.

Included with these soils in mapping are small areas

is fairly well suited to woodland. Some large areas are strip mined for gypsum. Capability unit VIe–3. Sumter soil in woodland group 4c2c; Black Clay Prairie range site. Oktibbeha soil in woodland group 3c8.

### Terouge Series

The Terouge series consists of deep, level and nearly level, somewhat poorly drained soils in the blacklands. The native vegetation is mixed hardwoods and an understory of tall grasses.

many calcium carbonate nodules; moderately alkaline and calcareous; gradual, smooth boundary.

A12—31 to 58 inches, very dark gray (10YR 3/1) clay; few, fine distinct, yellowish-brown mottles and common, medium, prominent, olive-gray (5Y 4/2) mottles; massive when wet but moderate, medium, angular blocky structure when moist; very firm, sticky and plastic; few slickensides that do not intersect; pressure faces on peds; common fine roots; few crawfish holes; few fine pores; many calcium carbonate nodules; moderately alkaline and calcareous; gradual, wavy boundary.

AC—58 to 72 inches, gray (5Y 5/1) clay; many, medium, distinct, olive (5Y 5/4) and very dark gray (10YR

**Tiak Series**

very firm, sticky and plastic; common slickensides; few fine roots; few fine pores; very strongly acid.

yellowish-brown mottles; moderate, medium, subangular blocky structure; friable; few, thin, patchy clay films on faces of peds; few fine roots; few wormholes; few fine pores; very strongly acid; clear, wavy boundary.

B23t—44 to 55 inches, dark yellowish-brown (10YR 4/4) sandy clay loam; common, fine, distinct, gray mottles and common, fine, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; friable; sand grains are coated and bridged with clay; few fine roots; few wormholes; many fine pores; very strongly acid; gradual, wavy boundary.

B3—55 to 72 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; common, medium, distinct, gray (10YR 6/1) mottles; weak, coarse, subangular blocky structure; very friable; sand grains are coated and bridged with clay; few fine roots; few wormholes; few fine pores; few dark concretions; very strongly acid.

The Ap or A1 horizon is brown or yellowish brown. The A12 horizon is brown or dark yellowish brown. The B21t horizon is dark yellowish brown or yellowish brown. The A horizon is slightly acid to strongly acid, and the B horizon is strongly acid or very strongly acid.

Toine soils are associated with Adaton, Ozan, Blevins, and Ruston soils. They are better drained and browner than Adaton and Ozan soils. They are not so well drained and have a thinner B2 horizon than Blevins soils. They are not so well drained and have a thinner B2 horizon that is not so red as that of Ruston soils.

**Toine loam** (To).—This level, well-drained soil is on flood plains and low stream terraces. It is in areas of 20 to 50 acres. Included with it in mapping are small areas of Adaton and Blevins soils.

This soil is suitable for farming, but nearly all areas are subject to flooding in winter and in spring. Crops planted early in spring are damaged by flooding and, in some years, have to be replanted. Damaging floods are infrequent between June and December. Frequency and intensity of flooding on each tract should be determined before the cropping system and the pattern of land use are planned. Nearly all the acreage is used for pasture and hay crops, and the soil is well suited

reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

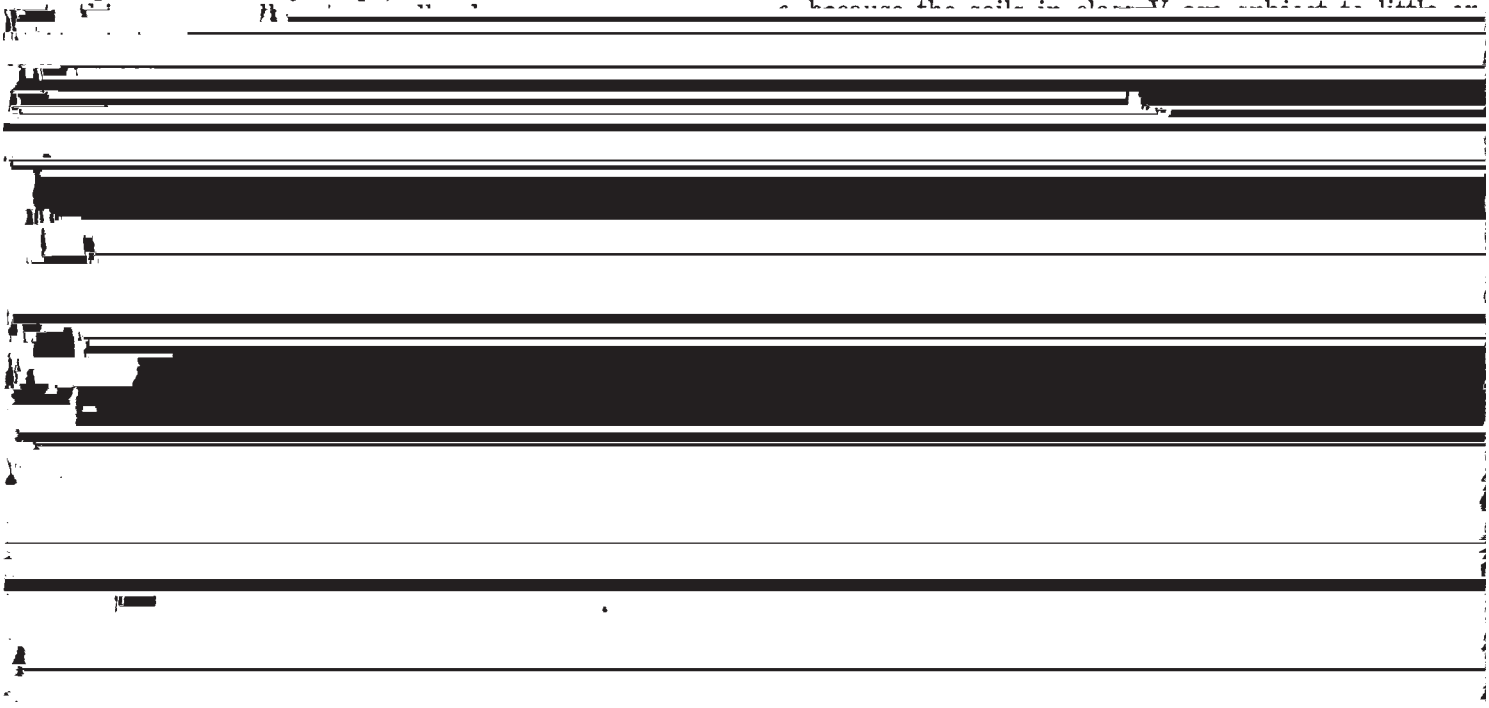
Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

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

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. In class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products.

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

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and



be learned by turning to the "Guide to Mapping Units" at the back of this publication or by referring to the notation at the end of the description of each mapping unit in the section "Descriptions of the Soils." In each of these descriptions, use and management of the soil

Unit VIe–2.—Deep, moderately sloping to moderately steep, well drained and moderately well drained, loamy soils that have a clayey subsoil.

Unit VIe–3.—Deep and moderately deep, gently sloping to rolling, moderately well drained and

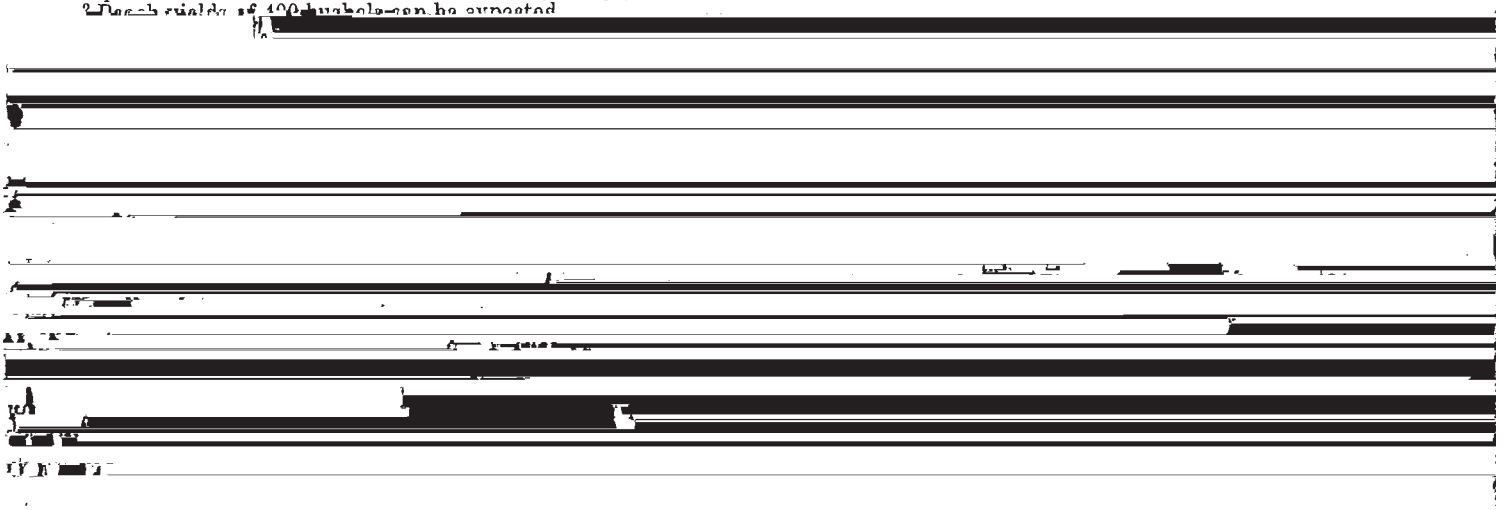
TABLE 3.—*Predicted yields per acre of principal crops grown under improved management*

[Absence of a figure indicates that the crop is not suited or not commonly grown on the soil specified or that the soil is nonarable]

| Soil | Corn | Cotton (lint) | Soybeans | Bermudagrass | | Bahiagrass | Tall fescue |
|---|---|---|---|---|---|---|---|
| | | | | Common | Coastal | | |
| | *Bu* | *Lb* | *Bu* | *AUM* [1] | *AUM* [1] | *AUM* [1] | *AUM* [1] |
| Adaton silt loam | | | 30 | 6.0 | 8.0 | 7.5 | 7.0 |
| Angie silt loam, 1 to 3 percent slopes | | | 20 | 6.0 | 7.5 | 7.5 | 6.0 |
| Angie silt loam, 3 to 8 percent slopes | | | | 5.5 | 7.0 | 7.0 | 5.5 |
| Blevins loam, 1 to 3 percent slopes | 55 | 500 | 30 | 7.0 | 8.0 | 7.5 | 6.0 |
| Blevins loam, 3 to 8 percent slopes | 50 | 475 | 25 | 6.5 | 8.0 | 7.5 | 5.5 |
| Cane fine sandy loam, 3 to 8 percent slopes | | | | 6.5 | 7.5 | 7.0 | 6.0 |
| Demopolis silty clay, 3 to 12 percent slopes, severely eroded | | | | | | | |
| Greenville loam, 3 to 8 percent slopes | | | | 7.0 | 8.0 | 7.5 | 5.5 |
| Kaufman clay | 55 | 650 | 35 | 7.5 | 9.0 | | 9.0 |
| Leeper silty clay | 55 | 650 | 35 | 7.5 | 9.0 | | 9.0 |
| Luverne fine sandy loam, 8 to 20 percent slopes | | | | 5.5 | 6.0 | 6.5 | |
| Marietta silt loam, silty subsoil variant | 75 | 700 | 35 | 7.5 | 9.0 | 9.0 | 9.0 |
| Millwood fine sandy loam, 3 to 8 percent slopes | | | | 5.5 | 6.5 | 6.5 | 5.0 |
| Millwood fine sandy loam, 8 to 12 percent slopes | | | | 5.0 | 6.0 | 6.0 | 4.5 |
| Muskogee silt loam, 1 to 3 percent slopes | 60 | 500 | 25 | 7.0 | 8.0 | 7.5 | 7.5 |
| Oktibbeha clay, 3 to 8 percent slopes, eroded | | | | 6.0 | 7.0 | 6.0 | 6.0 |
| Oktibbeha clay, 8 to 12 percent slopes, eroded | | | | 5.0 | 6.5 | 5.5 | |
| Ozan fine sandy loam | | | | 6.0 | 8.0 | 7.5 | 7.0 |
| Pickens soils, 3 to 12 percent slopes | | | | 4.5 | 5.5 | 5.0 | |
| Pickens-Sherwood-Rock land association, hilly | | | | | | | |
| Pirum fine sandy loam, 3 to 8 percent slopes | 45 | | | 6.5 | 7.5 | 7.0 | 5.5 |
| Pirum-Pickens association, undulating | | | | | | | |
| Pirum-Sherwood association, undulating | | | | | | | |
| Ruston fine sandy loam, 1 to 3 percent slopes | 60 | 500 | 30 | 7.0 | 8.0 | 7.5 | 6.0 |
| Ruston fine sandy loam, 3 to 8 percent slopes | 55 | 500 | 25 | 7.0 | 8.0 | 7.5 | 5.5 |
| Sacul fine sandy loam, 1 to 3 percent slopes | 45 | | 25 | 5.5 | 7.0 | 6.5 | 5.0 |
| Sacul fine sandy loam, 3 to 8 percent slopes | | | | 5.5 | 7.0 | 6.5 | 5.0 |
| Sacul fine sandy loam, 8 to 12 percent slopes | | | | 5.0 | 6.5 | 6.0 | |
| Saffell gravelly sandy loam, 1 to 3 percent slopes [2] | | | | 4.5 | 5.5 | 5.5 | |
| Saffell gravelly sandy loam, 3 to 8 percent slopes [2] | | | | 4.0 | 5.0 | 5.0 | |
| Saffell gravelly sandy loam, 8 to 20 percent slopes | | | | 3.5 | 4.0 | 4.0 | |
| Savannah fine sandy loam, 1 to 3 percent slopes | | | | 7.0 | 8.0 | 7.5 | 6.5 |
| Savannah fine sandy loam, 3 to 8 percent slopes | | | | 6.5 | 7.5 | 7.0 | 6.0 |
| Sherwood fine sandy loam, 3 to 8 percent slopes | 45 | | | 6.5 | 7.5 | 7.0 | 5.5 |
| Sherwood fine sandy loam, 8 to 12 percent slopes | | | | 5.5 | 6.5 | 7.0 | |
| Sherwood-Pickens association, rolling | | | | | | | |
| Sumter clay, 3 to 12 percent slopes, eroded | | | | 5.0 | 6.0 | | |
| Sumter-Oktibbeha association, rolling | | | | | | | |
| Terouge clay, 0 to 1 percent slopes | 55 | 650 | 35 | 7.5 | 9.0 | | 9.0 |
| Terouge clay, 1 to 3 percent slopes | 50 | 650 | 30 | 6.5 | 8.0 | | 7.0 |
| Tiak soils, 8 to 20 percent slopes | | | | 4.5 | 5.0 | 5.0 | |
| Toine loam | 75 | 700 | 35 | 7.5 | 9.0 | 9.0 | 9.0 |

[1] AUM is animal-unit-months, a term used to express the number of months that 1 animal unit can graze 1 acre without injury to the pasture. An animal unit is 1 cow or steer, 5 hogs, or 7 sheep.

[2] Low yields of 100 bushels can be expected



suitability for wood crops, potential productivity, and management requirements. These factors depend on such soil characteristics as depth; arrangement of layers in the profile; texture, drainage, color, reaction, and consistence of each layer; content of humus and minerals; degree of erosion; and slope.

Each group has been assigned a symbol that basically consists of three elements. The first element in the

Major hazards and limitations.—Under this heading are given the degree and kinds of soil-related limitations in the management of woodland. In this county equipment limitations, seedling mortality, and erosion are major concerns.

Equipment limitations refer to soil characteristics and topographic features that restrict or prohibit the use of ordinary equipment for planting, constructing

TABLE 4.—*Woodland groups and*

[The symbol > means more than;

| Woodland groups | Major hazards and limitations | Potential productivity | |
|---|---|---|---|
| | | Important wood crops | Estimated [1] site index |
| Group 1w6: Deep, level, somewhat poorly drained, clayey soils on flood plains; very high potential productivity; well suited to hardwoods.<br>Ka, Le, TeA. | Severe equipment limitations and moderate to severe seedling mortality because of wetness, flooding, and texture of surface soil. | Cottonwood<br>Sweetgum<br>Water oaks<br>Green ash | >106<br>> 96<br>> 96<br>86–95 |

*factors in woodland management*

the symbol < means less than]

| Preferred species | | Understory vegetation used as forage | |
|---|---|---|---|
| In existing stands | For planting | Principal plants (excellent condition) | Estimated yields by canopy class (yearly growth) |
| | | | *Pounds of air-dry forage per acre* |
| Cottonwood, sweetgum, sycamore, water oaks, Nuttall oak, cow oak, cherrybark oak, overcup oak, hackberry, Shumard oak. | Sweetgum, sycamore, green ash, Nuttall oak, cherrybark oak, cow oak, Shumard oak. | Eastern gamagrass, switchgrass, Virginia wildrye, plumegrasses, beaked panicum, velvetgrass, sedges, flat sedges. | Open: 4,000–7,000<br>Sparse: 2,500–5,000<br>Medium: 1,500–3,000<br>Dense: 400–2,000 |
| Sweetgum, cottonwood, Nuttall oak, cherrybark oak, Shumard oak, southern red oak, cow oak, water oaks, green ash, sycamore, silver maple, hackberry, loblolly pine. | Cherrybark oak, cow oak, Shumard oak, cottonwood, sycamore, sweetgum, green ash, silver maple, loblolly pine. | Switchgrass, eastern gamagrass, Virginia wildrye, switchcane, big bluestem, meadow dropseed, beaked panicum, low panicums, sedges. | Open: 4,000–7,500<br>Sparse: 3,000–5,000<br>Medium: 1,500–3,500<br>Dense: 100–2,000 |
| Loblolly pine, shortleaf pine, sweetgum, cherrybark oak, Shumard oak, southern red oak, white oak, water oaks, black walnut, black cherry. | Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, yellow-poplar, black walnut, cottonwood, sycamore, sweetgum. | Little bluestem, big bluestem, switchgrass, indiangrass, plumegrasses, beaked panicum, low panicums, Virginia wildrye. | Open: 4,000–7,000<br>Sparse: 3,000–5,000<br>Medium: 1,500–3,500<br>Dense: 100–2,000 |
| Loblolly pine, shortleaf pine, sweetgum, water oaks, cow oak, cherrybark oak, southern red oak, Shumard oak. | Loblolly pine, shortleaf pine, sweetgum, cherrybark oak, Shumard oak, yellow-poplar. | Plumegrasses, beaked panicum, longleaf uniola, spike uniola, little bluestem, big bluestem, switchgrass, low panicums. | Open: 4,000–6,000<br>Sparse: 2,000–5,000<br>Medium: 1,000–2,500<br>Dense: 400–1,200 |
| Loblolly pine, shortleaf pine, sweetgum, water oaks, cherrybark oak, southern red oak, cow oak, Shumard oak, Nuttall oak. | Loblolly pine, sweetgum, sycamore, Nuttall oak, Shumard oak. | Switchgrass, big bluestem, little bluestem, velvetgrass, beaked panicum, low panicums, plumegrasses, longleaf uniola, spike uniola, sedges, flat sedges. | Open: 3,000–4,000<br>Sparse: 1,500–3,000<br>Medium: 1,000–2,000<br>Dense: 200–1,500 |
| Loblolly pine, shortleaf pine | Loblolly pine, shortleaf pine | Big bluestem, little bluestem, indiangrass, plumegrasses, longleaf uniola, spike uniola, beaked panicum, low panicums. | Open: 4,500–6,000<br>Sparse: 2,000–5,000<br>Medium: 1,000–2,500<br>Dense: 100–1,500 |
| Loblolly pine, shortleaf pine, sweetgum, red oaks, white oaks. | Loblolly pine, shortleaf pine, white oaks, red oaks. | Big bluestem, little bluestem, indiangrass, beaked panicum, low panicums, longleaf uniola, spike uniola, low panicums. | Open: 4,000–6,000<br>Sparse: 2,000–5,000<br>Medium: 1,000–2,500<br>Dense: 200–1,500 |
| Loblolly pine, shortleaf pine, sweetgum, red oaks, white oaks. | Loblolly pine, sweetgum, shortleaf pine. | Big bluestem, little bluestem, indiangrass, beaked panicum, low panicums, longleaf uniola, spike uniola. | Open: 4,000–6,000<br>Sparse: 2,000–5,000<br>Medium: 1,000–2,500<br>Dense: 200–1,500 |
| Loblolly pine, shortleaf pine | Loblolly pine, shortleaf pine | Beaked panicum, big bluestem, little bluestem, indiangrass, longleaf uniola, plumegrasses, low panicums, paspalums. | Open: 4,000–5,000<br>Sparse: 2,000–4,000<br>Medium: 1,000–2,500<br>Dense: 200–1,200 |
| Loblolly pine, shortleaf pine, | Loblolly pine, shortleaf pine, | Big bluestem, little bluestem, | Open: 4,000–6,000 |

TABLE 4.—*Woodland groups and factors*

| Woodland groups | Major hazards and limitations | Potential productivity | |
|---|---|---|---|
| | | Important wood crops | Estimated [1] site index |
| [illegible] | Severe erosion hazard; | Redcedar | 35–45 |

*in woodland management*—Continued

| Preferred species | | Understory vegetation used as forage | |
|---|---|---|---|
| In existing stands | For planting | Principal plants (excellent condition) | Estimated yields by canopy class (yearly growth) |
| Redcedar, osage-orange | Redcedar | Little bluestem, indiangrass, side-oats grama, Virginia wildrye, prairie-clover, compassplant, sensitivebrier. | *Pounds of air-dry forage per acre*<br>Open: 2,000–4,000<br>Sparse: 1,500–3,000<br>Medium: 500–2,000<br>Dense: 200–1,000 |
| Redcedar, osage-orange | Redcedar | Big bluestem, little bluestem, indiangrass, switchgrass, low panicums, paspalums, compassplant, prairie-clover, native lespedezas. | Open: 4,500–6,000<br>Sparse: 3,000–5,000<br>Medium: 2,000–4,000<br>Dense: 400–2,000 |
| Loblolly pine, shortleaf pine, redcedar. | Loblolly pine, shortleaf pine, redcedar. | Big bluestem, little bluestem, indiangrass, Virginia wildrye, skeletongrass, low panicums, native lespedezas. | Open: 2,500–4,000<br>Sparse: 1,500–3,000<br>Medium: 800–2,000<br>Dense: 500–1,000 |
| Loblolly pine, shortleaf pine, redcedar. | Loblolly pine, shortleaf pine, redcedar (hand planting or direct seeding only). | Little bluestem, blackseed needlegrass, indiangrass, side-oats grama, low panicums, prairie-clover, native lespedezas. | Open: 2,500–4,000<br>Sparse: 1,500–3,000<br>Medium: 1,000–2,500<br>Dense: 200–1,200 |

Increasers are plants in the climax vegetation that normally increase in number as the decreasers are reduced. These plants commonly are the shorter, less productive, less palatable plants.

Invaders are plants that are not a part of the climax vegetation but that become established after the climax vegetation has been heavily grazed. Many invaders are woody plants; some are herbaceous perennials and annuals. They may originate nearby or at a great part of the original vegetation, and has many invaders.

Recognizing changes in the plant cover is one of the most important factors in good range management. Often the changes are overlooked or misunderstood. Growth following heavy rainfall, for example, may appear to improve the condition of the site when actually the cover is weedy and productivity is declining.

[redacted]

Range condition indicates the degree to which the composition of the existing plant community differs from the climax vegetation. Four classes are recognized. A range is in excellent condition if 76 to 100 percent of the vegetation is of the same kind as that in the original stand; it is in good condition if the percentage is between 51 and 75; in fair condition if the percentage is between 26 and 50; and in poor condition if the percentage is 25 or less.

Two range sites are recognized in Howard County. They do not include all the soils of the county but only those used mainly as native range. Each site description includes estimates of total herbage yield, one for favorable years, and one for unfavorable years, when the site is in excellent condition. These estimates represent total air-dried herbage clipped at ground level from random plots. The amount of usable forage or of mowed hay is considerably less. After a year or two

indiangrass, compassplant, prairie clover, and native lespedezas. As the condition of the site deteriorates, compassplant, prairie acacia, prairie clover, dropseeds, and silver bluestem increase and dominate the plant community. Further deterioration reduces the palatable forbs and legumes. Then annuals increase or invade the site along with osage-orange (bois d'arc), hawthorn, persimmon, redcedar, and other woody plants.

If this site is in excellent condition, the estimated annual yield per acre of air-dry herbage ranges from about 6,000 pounds in years of favorable rainfall to about 4,400 pounds in years of unfavorable rainfall.

*Chalky Ridge range site*

The only soil in this site is Demopolis silty clay, 3 to 12 percent slopes, severely eroded. This soil is well drained and is slowly permeable. The root zone is shallow, and the available water capacity is low. This soil is calcareous silty clay overlying chalk.

In excellent condition, this site produces moderate amounts of little bluestem, indiangrass, side-oats grama, Virginia wildrye, compassplant, prairie clover,

mation about the soils is useful for these purposes and provides a basis for planning multiple-use management. It also helps determine the specific sites for development, protection, and improvement of habitat elements. Present vegetation reflects past land use and may be a false criterion in judging potential for development for wildlife food and habitat.

In table 5 on page 42, the suitability of soils for eight elements of widlife habitat and three classes of wildlife are given. These ratings apply to the establishment, improvement, and maintenance of habitat, but they do not take into account the present use of the soil, the distribution of wildlife, or the distribution of the human population. The suitability of a specific site

In table 5, a rating of well suited indicates that habitats generally are easily created, improved, or maintained; that the soil has few or no limitations that affect management; and that satisfactory results can be expected.

Suited indicates that habitats can be created, improved, or maintained in most places; that the soil has moderate limitations that affect management; and

designed to be drained and planted to crops, or they can be permanent impoundments.

Ponds and reservoirs are in areas suitable for developing water of suitable depth, quantity, and quality to produce fish and wildlife. These areas are suitable for impoundments, levees, and dugouts.

The three kinds of wildlife listed in table 5 are defined as follows:

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

[redacted]

of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some terms used by soil scientists may be unfamiliar to engineers, and some words have different meanings in soil science than they have in engineering. Among the terms that have special meaning in soil science are sand, silt, clay, surface soil, subsoil, and horizon. These and other terms are defined in the Glossary at the back of this survey.

## Engineering Classification Systems

[redacted]

TABLE [illegible]. Suitability of the soils for elements

| Soil | Elements of wildlife habitat | | |
|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herbaceous plants |
| Adaton silt loam | Suited | Suited | Suited |
| Angie silt loam, 1 to 3 percent slopes | Well suited | Well suited | Well suited |
| Angie silt loam, 3 to 8 percent slopes | Suited | Well suited | Well suited |
| Blevins loam, 1 to 3 percent slopes | Well suited | Well suited | Well suited |
| Blevins loam, 3 to 8 percent slopes | Suited | Well suited | Well suited |
| Cane fine sandy loam, 3 to 8 percent slopes | Suited | Well suited | Well suited |
| Demopolis silty clay, 3 to 12 percent slopes, severely eroded | Unsuited | Poorly suited | Suited |
| Greenville loam, 3 to 8 percent slopes | Suited | Well suited | Well suited |
| Kaufman clay | Suited [1] | Suited | Suited |
| Leeper silty clay | Suited [1] | Suited | Suited |
| Luverne fine sandy loam, 8 to 20 percent slopes | Poorly suited | Suited | Well suited |
| Marietta silt loam, silty subsoil variant | Suited [1] | Well suited | Well suited |
| Millwood fine sandy loam, 3 to 8 percent slopes | Suited | Well suited | Well suited |
| Millwood fine sandy loam, 8 to 12 percent slopes | Poorly suited | Suited | Well suited |
| Muskogee silt loam, 1 to 3 percent slopes | Well suited | Well suited | Well suited |
| Oktibbeha clay, 3 to 8 percent slopes, eroded | Suited | Suited | Suited |
| Oktibbeha clay, 8 to 12 percent slopes, eroded | Poorly suited | Suited | Suited |
| Ozan fine sandy loam | Suited | Suited | Suited |
| Pickens soils, 3 to 12 percent slopes | Poorly suited | Poorly suited | Suited |
| Pickens-Sherwood-Rock land association, hilly: | | | |
| Pickens soil | Unsuited | Unsuited | Suited |
| Sherwood soil | Unsuited | Unsuited | Well suited |
| Rock land | Unsuited | Unsuited | Poorly suited |
| Pirum fine sandy loam, 3 to 8 percent slopes | Suited | Suited | Well suited |
| Pirum-Pickens association, undulating: | [illegible] | [illegible] | [illegible] |

*of wildlife habitat and kinds of wildlife*

| Elements of wildlife habitat—Continued | | | | | Kinds of wildlife | | |
|---|---|---|---|---|---|---|---|
| Hardwood woody plants | Low-growing coniferous woody plants | Wetland food and cover plants | Shallow water developments | Ponds and reservoirs | Openland | Woodland | Wetland |
| Well suited | Poorly suited | Well suited | Well suited | Well suited | Suited | Well suited | Well suited. |
| Well suited | Poorly suited | Poorly suited | Poorly suited | Well suited | Well suited | Well suited | Poorly suited. |
| Well suited | Poorly suited | Unsuited | Unsuited | Well suited | Well suited | Wells uited | Unsuited. |
| Well suited | Poorly suited | Unsuited | Unsuited | Suited | Well suited | Well suited | Unsuited. |
| Well suited | Poorly suited | Unsuited | Unsuited | Suited | Well suited | Well suited | Unsuited. |
| Well suited | Poorly suited | Unsuited | Unsuited | Suited | Well suited | Well suited | Unsuited. |
| Poorly suited | Suited | Unsuited | Unsuited | Poorly suited | Suited | Suited | Unsuited. |
| Well suited | | | | | | | |

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 milli- [illegible] diameter. "Loam," for example, is soil mate-

to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that results at the area from which topsoil is taken.

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

As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

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

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic; and the liquid limit, from a plastic to a liquid

farm uses The degrees of limitation reflect all the features of the given soil that affect a particular use. These ratings apply to a depth of 6 feet, or less if the depth is to bedrock. Slight means that soils have properties favorable for the specified use, and limitations are so minor that they can easily be overcome; good performance and low maintenance can be expected from the soils. Moderate means that the soils have properties moderately favorable for the specified use, and that the limitations can be overcome or modified with planning, design, or special maintenance. Severe means that the soils have one or more properties unfavorable for the rated use, and that the limitations are difficult and costly to modify or overcome; major soil reclamation, special design, or intensive maintenance is required.

The soil map and the information in table 9 are useful as guides for evaluating areas for the specific uses, but detailed onsite investigations are needed for final evaluation. This is because as much as 15 percent

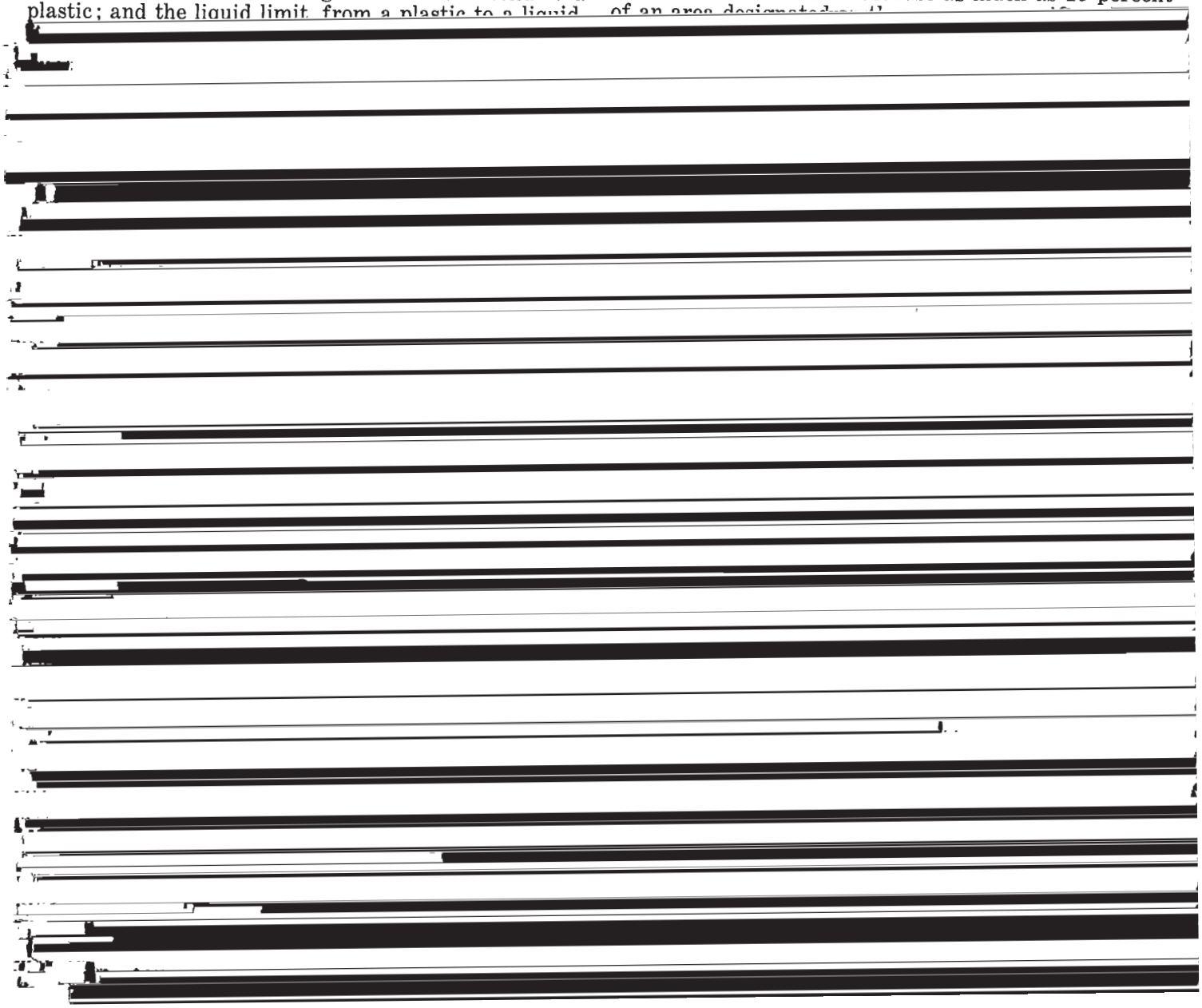


TABLE 6.— *Soil properties*

[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. the instructions for referring to other series that appear in the first column of

| | Approximate | Depth | Classification |
|---|---|---|---|

*significant in engineering*

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

| Classification—Con. | Coarse fraction greater than 3 inches | Percentage less than 3 inches passing sieve— | | | | Permeability | Available water capacity | Reaction | Shrink-swell potential |
|---|---|---|---|---|---|---|---|---|---|
| AASHO | | No. 4 (4.7 mm) | No. 10 (2.0 mm) | No. 40 (0.42 mm) | No. 200 (0.074 mm) | | | | |
| | *Percent* | | | | | *Inches per hour* | *Inches per inch of soil* | *pH value* | |
| A–4 or A–6 | | | 100 | 95–100 | 75–90 | 0.63–2.0 | 0.20–0.22 | 4.5–6.0 | Low. |
| A–6 | | | 100 | 95–100 | 80–95 | 0.06–0.20 | 0.19–0.21 | 4.0–5.5 | Low. |
| A–7 | | | 100 | 95–100 | 85–95 | 0.06–0.20 | 0.17–0.19 | 4.0–5.5 | Moderate. |
| A–4 or A–6 | | 95–100 | 95–100 | 85–100 | 70–90 | 0.63–2.0 | 0.20–0.22 | 5.1–6.0 | Low. |
| A–6 | | | 100 | 90–100 | 75–90 | 0.20–0.63 | 0.19–0.21 | 4.0–5.5 | Low to moderate. |
| A–7 | | | 100 | 90–100 | 75–95 | 0.06–0.20 | 0.17–0.20 | 4.0–5.5 | Moderate. |
| A–7 | | | 100 | 90–100 | 80–95 | 0.06–0.20 | 0.17–0.20 | 4.0–5.5 | Moderate. |
| A–4 or A–6 | | 95–100 | 95–100 | 95–100 | 65–80 | 0.63–2.0 | 0.16–0.18 | 4.5–6.0 | Low. |
| A–4 or A–6 | | 95–100 | 95–100 | 95–100 | 70–90 | 0.63–2.0 | 0.20–0.22 | 4.5–6.0 | Low. |
| A–4 or A–6 | | 95–100 | 95–100 | 95–100 | 75–95 | 0.63–2.0 | 0.16–0.18 | 4.0–5.5 | Low. |
| A–4 or A–6 | | 95–100 | 95–100 | 95–100 | 80–95 | 0.63–2.0 | 0.20–0.22 | 4.0–5.5 | Low. |

TABLE 6.—*Soil properties significant*

| Soil series and map symbols | Approximate depth to— | | Depth from surface (typical profile) | Classification | |
|---|---|---|---|---|---|
| | Bedrock | Seasonal high water table | | USDA texture | Unified |
| | *Feet* | *Feet* | *Inches* | | |
| *Pirum: PmC, PpB, PsB<br>For Pickens part of PpB, see Pickens series; for Sherwood part of PsB, see Sherwood series. | 2–3.5 | >6 | 0–11<br>11–36 | Fine sandy loam<br>Sandy clay loam | SM or ML<br>CL, CL-ML, or SC |
| Rock land.<br>Mapped only in an association with Pickens and Sherwood soils. Properties too variable to be estimated. | | | | | |
| Ruston: RuB, RuC | >6 | >6 | 0–6<br>6–40<br>40–72 | Fine sandy loam<br>Loam<br>Fine sandy loam | SM or ML<br>SC, ML, or CL<br>SM or ML |
| Sacul: SaB, SaC, SaD | >6 | 2–3 | 0–5<br>5–13<br>13–30<br>30–42<br>42–59<br>59–72 | Fine sandy loam<br>Silt loam<br>Silty clay<br>Clay loam<br>Loam<br>Silt loam | ML<br>ML<br>CL or CH<br>CL<br>ML or CL<br>ML |
| Saffell: SeB, SeC, SeE | >6 | >6 | 0–8<br>8–47<br>47–72 | Gravelly sandy loam<br>Gravelly sandy clay loam<br>Gravelly sandy loam | GM or SM<br>GM or GC<br>GM |
| Savannah: SfB, SfC | >6 | 2–3 | 0–9<br>9–20<br>20–35<br>35–58<br>58–72 | Fine sandy loam<br>Loam<br>Clay loam<br>Clay loam<br>Sandy clay loam | ML<br>ML or ML-CL<br>CL<br>CL<br>SC or CL |
| *Sherwood: ShC, ShD, SkD<br>For Pickens part of SkD, see Pickens series. | 2–4 | >6 | 0–9<br>9–37 | Fine sandy loam<br>Sandy clay loam | SM or ML<br>SC or CL |
| *Sumter: SmD2, SoD<br>For Oktibbeha part of SoD, see Oktibbeha series. | 2–4 | >6 | 0–29 | Clay, silty clay | CH, CH-MH, or MH |
| Terouge: TeA, TeB | >6 | 0–0.5 | 0–72 | Clay | MH or MH-CH |
| Tiak: TkE | >6 | 1–2 | 0–5<br>5–72 | Fine sandy loam<br>Silty clay and clay | ML<br>CH or MH |
| Toine: To | >6 | 3–5 | 0–7<br>7–13<br>13–55<br>55–72 | Loam<br>Fine sandy loam<br>Sandy clay loam<br>Fine sandy loam | ML<br>SM, CL-ML, or ML<br>SC, CL-ML, or CL<br>SM, CL-ML, or ML |

*in engineering*—Continued

| Classification—Con. | Coarse fraction greater | Percentage less than 3 inches passing sieve— | | | | Permeability | Available | | |
|---|---|---|---|---|---|---|---|---|---|
| AASHO | | No. 4 | No. 10 | No. 40 | No. 200 | | | | |

TABLE 7.—*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. the instructions for referring to other series

| Soil series and map symbols | Suitability as a source of— | | Soil features affecting— |
|---|---|---|---|
| | Topsoil | Road fill | Highway location |
| Adaton: Ad | Poor: poorly drained | Poor: moderate to low traffic-supporting capacity; poorly drained. | Moderate to low traffic-supporting capacity; seasonal high water table; some areas subject to flooding. |
| Angie: AnB, AnC | Poor: high content of clay | Poor: low traffic-supporting | Low traffic-supporting capacity; |

*interpretations of soils*

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

| Soil features affecting—Con. | | | | |
|---|---|---|---|---|
| Winter grading | Farm ponds | | Terraces and diversions | Grassed waterways |
| | Reservoir areas | Embankments | | |
| Seasonal high water table; poorly drained; moderate to low traffic-supporting capacity; some areas subject to flooding. | Soil features generally favorable. | Fair to good slope stability; medium to high compressibility; good to fair resistance to piping and erosion. | Level soil | Soil features generally favorable; level soil. |
| Seasonal high water table; plastic, clayey material in subsoil. | Soil features generally favorable. | Fair slope stability; medium to high compressibility. | Erodible material; excessive slope in some areas. | Erodible material; excessive slope in some areas. |
| Soil features generally favorable. | Moderate permeability | Fair to good slope stability; medium to low permeability when compacted; medium compressibility; poor to fair resistance to piping and erosion. | Soil features generally favorable. | Soil features generally favorable. |
| Seasonal high water table | Soil features generally favorable. | Fair to good slope stability; medium compressibility; poor to fair resistance to piping and erosion. | Soil features generally favorable. | Soil features generally favorable. |
| Clayey material, plastic when wet; shallow to rippable chalk bedrock. | Shallow to rippable chalk bedrock. | Very limited borrow material; fair slope stability; high compressibility. | Shallow to rippable chalk bedrock; plastic, clayey soil that has high shrink-swell potential; difficult to construct and maintain; slopes excessive. | Erodible material; shallow to rippable chalk bedrock; low available water capacity; slopes excessive. |
| Material plastic when wet. | Moderately slow permeability. | Fair to good slope stability; medium to high compressibility; low permeability when compacted. | Soil features generally favorable. | Soil features generally favorable. |
| Seasonal high water table; somewhat poorly drained; plastic, clayey material; subject to flooding. | Soil features generally favorable. | Fair slope stability; high compressibility. | Level soil | Soil features generally favorable; level soil. |
| Seasonal high water table; somewhat poorly drained; plastic, clayey material; subject to flooding. | Soil features generally favorable. | Fair slope stability; high compressibility. | Level soil | Soil features generally favorable; level soil |
| Soil features generally favorable; moderately plastic at a depth of 8 to 26 inches from the surface when wet. | Moderately slow permeability. | Fair to good slope stability; medium to low permeability when compacted; poor to fair resistance to piping and erosion; medium compressibility. | Excessive slope | Excessive slope. |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability as a source of— | | Soil features affecting— |
|---|---|---|---|
| | Topsoil | Road fill | Highway location |
| Marietta: Ma | Fair: moderately well drained | Fair: moderate traffic-supporting capacity; moderately well drained. | Moderate traffic-supporting capacity; seasonal high water table; subject to flooding. |
| Millwood: MIC, MID | Poor: high content of clay below a depth of 7 inches. | Poor: low traffic-supporting capacity; moderate to high shrink-swell potential | Low traffic-supporting capacity; high shrink-swell potential; cut and fill excessive where |

*of soils*—Continued

| Soil features affecting—Con. | | | | |
|---|---|---|---|---|
| Winter grading | Farm ponds | | Terraces and diversions | Grassed waterways |
| | Reservoir areas | Embankments | | |
| Seasonal high water table; | Moderate permeability | Fair to good slope | Level soil | Soil features unfavorable |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability as a source of— | | Soil features affecting— |
|---|---|---|---|
| | Topsoil | Road fill | Highway location |
| Saffell: SeB, SeC, SeE | Poor: high content of gravel; low fertility; low available water capacity. | Good | Cut and fill excessive where slopes are more than 6 percent. |
| Savannah: SfB, SfC | Fair: moderate thickness of suitable material; material below excavated depth some- | Fair: moderate traffic-supporting capacity. | Moderate traffic-supporting capacity; seasonal high water table; cut and fill excessive where slopes are more than 6 percent. |

*of soils*—Continued

| Soil features affecting—Con. | | | | |
|---|---|---|---|---|
| Winter grading | Farm ponds | | Terraces and diversions | Grassed waterways |
| | Reservoir areas | Embankments | | |
| Soil features generally favorable. | Moderately rapid permeability. | Fair slope stability; medium to low permeability when compacted; poor to fair resistance to piping and erosion. | High gravel content; erodible; poor stability in low embankments; excessive slope in some areas. | High gravel content; low fertility; low available water capacity; excessive slope in some areas. |
| Seasonal high water table-- | Soil features generally favorable. | Fair to good slope stability; medium compressibility; poor to fair resistance to piping and erosion. | Soil features generally favorable. | Soil features generally favorable. |
| Soil features generally | Moderate permeability; | Medium compressibility; | Excessive slope in some | Excessive slope in some |

TABLE 8.—*Engineering*

[Tests performed by the Arkansas State Highway

| Soil name and location | Parent material | Arkansas SCS report number S–68–Ark–31 | Depth from surface |
|---|---|---|---|
| | | | *In* |
| Kaufman clay: SW¼SW¼ sec. 5, T. 11 S., R. 27 W. (Modal) | Clayey sediments on flood plains of the Blackland Prairie. | 7–3<br>7–4<br>7–5 | 12–22<br>22–41<br>41–52 |
| Oktibbeha clay: SW¼SE¼NE¼ sec. 34, T. 10 S., R. 27 W. (Modal) | Unconsolidated, clayey, fluvial or marine sediments on Blackland Prairie uplands. | 6–2<br>6–3<br>6–4 | 5–12<br>12–19<br>19–29 |
| Pirum fine sandy loam: NW¼SW¼NE¼ sec. 24, T. 6 S., R. 30 W. (Modal) | Sandstone and shale on Ouachita Mountain uplands. | 3–3<br>3–4<br>3–5 | 11–16<br>16–30<br>30–36 |
| Sumter clay: NE¼NE¼NE¼ sec. 34, T. 11 S., R. 27 W. (Modal) | Chalk and marly clay on Blackland Prairie uplands. | 4–2<br>4–3<br>4–4 | 4–9<br>9–16<br>16–29 |
| Terouge clay: NW¼SE¼SE¼ sec. 33, T. 11 S., R. 27 W. (Modal) | Clayey sediments on flood plains on the Blackland Prairie. | 5–2<br>5–3<br>5–4 | 5–16<br>16–29<br>29–46 |
| Toine loam: SW¼NE¼SE¼ sec. 26, T. 6 S., R. 29 W. (Modal) | Loamy sediments on flood plains and natural levees along drainageways on the Southern Coastal Plain and in the Ouachita Mountains. | 2–4<br>2–5<br>2–6 | 22–37<br>37–52<br>52–63 |

[1] Based on AASHO Designation T–99, Method A *(1)*.

[2] Mechanical analyses according to the AASHO Designation T–88 *(1)*. Results by this procedure frequently may differ some-

*test data*

Department, Division of Materials and Tests]

| Moisture-density data [1] | | Percentage passing sieve [2] | | | Liquid limit | Plasticity index | Classification | |
|---|---|---|---|---|---|---|---|---|
| Maximum dry density | Optimum moisture | No. 10 (2.0 mm) | No. 40 (0.42 mm) | No. 200 (0.074 mm) | | | AASHO [3] | Unified [4] |
| *Lb per cu ft* | *Pct* | | | | *Pct* | | | |
| 100 | 23 | 100 | 99 | 86 | 49 | 28 | A–7–6(25) | CL-CH |
| 103 | 21 | 100 | 99 | 86 | 47 | 22 | A–7–6(20) | CL |
| 103 | 21 | 100 | 99 | 89 | 49 | 29 | A–7–6(26) | CL-CH |
| 91 | 29 | ---------- | 100 | 97 | 72 | 40 | A–7–5(47) | CH or CH-MH |
| 89 | 29 | ---------- | 100 | 97 | 60 | 22 | A–7–5(29) | MH |
| 95 | 26 | ---------- | 100 | 97 | 61 | 29 | A–7–5(35) | MH-CH |
| 118 | 13 | 100 | 98 | 56 | 24 | 7 | A–4(3) | CL-ML |
| 117 | 14 | [5]99 | 98 | 58 | 27 | 9 | A–4(3) | CL |
| 120 | 12 | 100 | 98 | 56 | 23 | 5 | A–4(3) | CL-ML |
| 85 | 31 | 100 | 97 | 93 | 79 | 40 | A–7–5(46) | MH or MH-CH |
| 85 | 31 | ---------- | 100 | 98 | 84 | 50 | A–7–5(60) | CH or CH-MH |
| 88 | 30 | 100 | 99 | 97 | 77 | 42 | A–7–5(52) | CH-MH |
| 91 | 27 | 100 | 99 | 85 | 61 | 26 | A–7–5(36) | MH |
| 86 | 31 | 100 | 98 | 86 | 78 | 45 | A–7–5(45) | CH-MH |
| 89 | 29 | [5]99 | 96 | 86 | 71 | 36 | A–7–5(37) | MH or MH-CH |
| 124 | 10 | 100 | 97 | 51 | 17 | 3 | A–4(2) | CL |
| 120 | 12 | 100 | 98 | 60 | 21 | 6 | A–4(3) | CL-ML |
| 117 | 14 | 100 | 99 | 63 | 24 | 7 | A–4(3) | CL-ML |

analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size

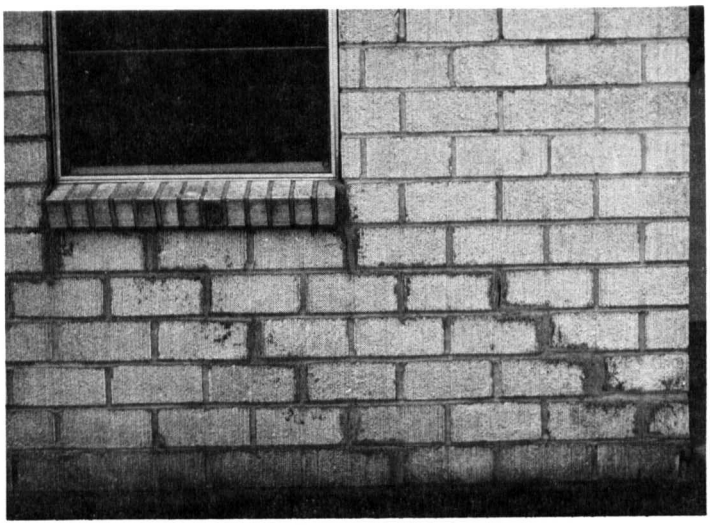


*Figure 12.*—**The foundation of this house failed and the walls cracked because the soil shrinks when dry and swells when wet. The soil is Oktibbeha clay, 3 to 8 percent slopes, eroded.**

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. Slopes of 5 to 10 percent are a moderate limitation, and those of more than 10 percent are a severe limitation. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and its sides or embankments are compacted soil material. It is assumed that the embankment is compacted to medium density and that the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, and slope, and if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Light industry refers to structures that are less

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, a surface free of rocks and coarse fragments, 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 mainly 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; and do not have slopes or stoniness that greatly increases the cost of leveling the sites or of building the access roads.

Play areas are used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

## *Formation and Classification of the Soils*

This section discusses the factors of soil formation, the processes of soil formation, and the classification of the soils in Howard County by higher categories. The classification of soils by higher categories is shown in table 10 on page 66, and laboratory data for some important soil series are given in table 11 on page 68.

### Factors of Soil Formation

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

Climate and living organisms are the active forces in soil formation. Relief, mainly by its influence on runoff and temperature, modifies the effect of climate and living organisms. The parent material also affects

The warm moist climate promotes rapid chemical reactions and rapid soil formation. Abundant rainfall makes a large amount of water available for the leaching of soluble and colloidal materials *(8)*. Plant remains decompose rapidly, and the organic acids thus produced hasten the development of clay minerals and the removal of carbonates. Because the soil freezes only for short periods of time, soil formation continues almost the year round.

removing hardwoods, and planting pure stands of preferred species.

### *Parent material*

In the northern part of the county, the parent material of the soils weathered in folded and fractured, acid sandstone, siltstone, and shale, chiefly of Mississippian age. The soils that formed in the residuum weathered from these rocks are the Pirum, Pickens,

TABLE 9.—*Degree and kind of limitations*

[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. the instructions for referring to other series

| Soil series and map symbols | Dwellings [1] | Septic tank filter fields | Sewage lagoons |
|---|---|---|---|
| Adaton: Ad | Severe: poorly drained; seasonal high water table; some areas subject to flooding; medium bearing strength. | Severe: slow permeability; seasonal high water table; some areas subject to flooding. | Moderate: fair to good material for reservoir sites. |
| Angie: AnB, AnC | Moderate: moderately well drained; seasonal high water table; medium bearing strength; moderate shrink-swell potential in subsoil; slope. | Severe: slow permeability; seasonal high water table. | Slight where slopes are less than 2 percent.<br>Moderate where slopes are 2 to 7 percent.<br>Severe where slopes are more than 7 percent. |

*of soils for town and country planning*

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

| Light industry [1] | Recreation | | |
|---|---|---|---|
| | Camp sites | Picnic areas | Intensive play areas |
| Severe: poorly drained; seasonal high water table; some areas subject to flooding; medium bearing strength. | Severe: poorly drained; seasonal high water table; some areas subject to flooding. | Severe: poorly drained; seasonal high water table. | Severe: poorly drained; seasonal high water table; some areas subject to flooding. |
| Moderate: moderately well drained; moderate shrink-swell potential; seasonal high water table; medium bearing strength; slope. | Moderate: moderately well drained; slow permeability. | Slight | Moderate: moderately well drained; slow permeability. Severe where slopes are more than 6 percent. |
| Moderate: medium bearing strength; slope. | Slight | Slight | Slight where slopes are less than 2 percent. Moderate where slopes are 2 to 6 percent. Severe where slopes are more than 6 percent. |
| Moderate: moderately well drained; seasonal high water table; medium bearing strength; slope. | Moderate: moderately well drained; slow permeability. | Slight | Moderate: moderately well drained; slow permeability. Severe where slopes are more than 6 percent. |
| Severe: low bearing strength; high shrink-swell potential; shallow to bedrock. | Severe: clayey surface layer; poor trafficability; slow permeability; difficult to maintain vegetative cover; | Severe: clayey surface layer; poor trafficability; slope. | Severe: clayey surface layer; poor trafficability; slow permeability; difficult to |

TABLE 9.—*Degree and kind of limitations of*

| Soil series and map symbols | Dwellings[1] | Septic tank filter fields | Sewage lagoons |
|---|---|---|---|
| Muskogee: MuB | Moderate to severe: moderately well drained; seasonal high water table; medium bearing strength; high shrink-swell potential below a depth of 24 inches. | Severe: slow permeability; seasonal high water table. | Moderate: fair to good material for reservoir sites; slope where more than 2 percent. |
| Oktibbeha: OkC2, OkD2 | Severe: seasonal high water table; low bearing strength; high shrink-swell potential; slope; moderately deep to chalk bedrock. | Severe: very slow permeability; slope; moderately deep to chalk bedrock. | Moderate: moderately deep to chalk bedrock; fair to good material for reservoir sites; slope.<br>Severe where slopes are more than 7 percent. |
| Ozan: On | Severe: poorly drained; seasonal high water table; medium | Severe: slow permeability; seasonal high water table; | Moderate: fair material for reservoir sites |

*soils for town and country planning*—Continued

| Light industry [1] | Recreation | | |
|---|---|---|---|
| | Camp sites | Picnic areas | Intensive play areas |
| Moderate: moderately well drained; seasonal high water table; medium bearing strength; high shrink-swell potential below a depth of 24 inches. | Moderate: moderately well drained; slow permeability. | Slight | Moderate: moderately well drained; seasonal high water table; slow permeability; slope. |
| Severe: low bearing strength; high shrink-swell potential; moderately deep to chalk bedrock; slope. | Severe: clayey surface layer; poor trafficability; very slow permeability. | Severe: clayey surface layer; poor trafficability. | Severe: clayey surface layer; poor trafficability; very slowly permeable; slope. |
| Severe: poorly drained; seasonal high water table; medium | Severe: poorly drained; seasonal high water table; some areas | Severe: poorly drained; seasonal high water table | Severe: poorly drained; seasonal high water table; |

TABLE 9.—*Degree and kind of limitations of*

| Soil series and map symbols | Dwellings [1] | Septic tank filter fields | Sewage lagoons |
|---|---|---|---|
| *Sherwood: ShC, ShD, SkD---<br>For Pickens part of SkD, see Pickens series. | Moderate: moderately deep to sandstone bedrock; medium bearing strength.<br>Severe where slopes are more than 6 percent. | Severe: moderately deep to sandstone bedrock; moderate permeability; slope. | Severe: moderately deep to sandstone bedrock; slope; fair material for reservoir sites. |
| *Sumter: SmD2, SoD---------<br>For Oktibbeha part of SoD, see Oktibbeha series. | Severe: low bearing strength; high shrink-swell potential; moderately deep to chalk bedrock; slope. | Severe: slow permeability; slope; moderately deep to chalk bedrock. | Severe: moderately deep to chalk bedrock; fair to good material for reservoir sites; slope. |
| Terouge: TeA, TeB---------- | Severe: somewhat poorly drained; seasonal high water | Severe: seasonal high water table; very slow permeability; | Slight to moderate: good to fair material for reservoir sites; |

*soils for town and country planning*—Continued

| Light industry [1] | Recreation | | |
|---|---|---|---|
| | Camp sites | Picnic areas | Intensive play areas |
| Moderate where slopes are less | Slight where slopes are less than | Slight where slopes are less than | Moderate where slopes are less |

TABLE 10.—*Soil series classified by higher categories*

| Series | Family | Subgroup | Order |
|---|---|---|---|
| Adaton [1] | Fine-silty, mixed, thermic | Typic Ochraqualfs | Alfisols. |
| Angie | Clayey, mixed, thermic | Aquic Paleudults | Ultisols. |
| Blevins | Fine-silty, siliceous, thermic | Typic Paleudults | Ultisols. |
| Cane | Fine-loamy, siliceous, thermic | Typic Fragiudults | Ultisols. |
| Demopolis | Loamy-skeletal, carbonatic, thermic, shallow | Typic Udorthents | Entisols. |
| Greenville [1] | Clayey, kaolinitic, thermic | Rhodic Paleudults | Ultisols. |
| Kaufman [1] | Fine, montmorillonitic, noncalcareous, thermic | Vertic Haplaquolls | Mollisols. |
| Leeper | Fine, montmorillonitic, nonacid, thermic | Chromudertic Haplaquepts | Inceptisols. |
| Luverne [1] | Clayey, mixed, thermic | Typic Hapludults | Ultisols. |
| Marietta, silty subsoil variant. | Fine-silty, mixed, thermic | Fluvaquentic Eutrochrepts | Inceptisols. |
| Millwood | Very fine, montmorillonitic, thermic | Vertic Paleudalfs | Alfisols. |
| Muskogee | Fine-silty, mixed, thermic | Aquic Paleudalfs | Alfisols. |
| Oktibbeha | Very fine, montmorillonitic, thermic | Vertic Hapludalfs | Alfisols. |
| Ozan | Coarse-loamy, siliceous, thermic | Typic Glossaqualfs | Alfisols. |
| Pickens | Loamy-skeletal, mixed, thermic | Lithic Dystrochrepts | Inceptisols. |
| Pirum | Fine-loamy, siliceous, thermic | Typic Hapludults | Ultisols. |
| [illegible] | [illegible] | Typic Paleudults | Ultisols. |

1 percent and rarely more than 2 percent. Most of these areas are subject to occasional or more frequent floods that deposit more sediment.

*Time*

The length of time required for formation of soil depends largely upon the other factors of soil formation. Less time generally is required if the climate is warm and humid, the vegetation is luxuriant, and the parent material is loamy. Generally, older soils show a greater degree of differentiation between horizons.

The soils of the uplands generally have the most strongly developed argillic horizons and are the most mature soils in Howard County. On uplands some soils, such as Pickens soils, contain so little clay and are so shallow to bedrock that they are not likely to develop mature profiles in the near geologic future. Soils of the flood plains are of younger material and are much less mature than most soils of the uplands. Among these are Marietta and Toine soils.

## Processes of Soil Formation

Most soil profiles contain three major horizons—A, B, and C. Some have an R horizon of bedrock. The A horizon is the surface layer. It can be the A1 horizon, which is the horizon of maximum accumulation of organic matter, or the A2 horizon, which is the horizon of maximum leaching of dissolved or suspended materials.

The B horizon is immediately beneath the A horizon. It contains the maximum accumulation of dissolved or suspended materials, such as iron or clay. The B horizon generally is firmer than horizons immediately above and below the surface are evidence of the reduction and loss of iron. Mottles of red, brown, and yellow in some horizons and iron concretions in others indicate the segregation of iron. The iron concretions are made up of segregated iron compounds in complex with organic matter and oxides of manganese or other metals. Gleying has been important in the formation of Adaton and Ozan soils.

Translocation, or downward movement, of clay minerals has contributed to horizon development in most of the soils. The eluviated A2 horizon contains less clay and generally is lighter colored than the B horizon. Clay has accumulated in the B horizons in the form of clay films in pores and on surface peds. In most soils the C horizon contains less clay than the B horizon.

## Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison

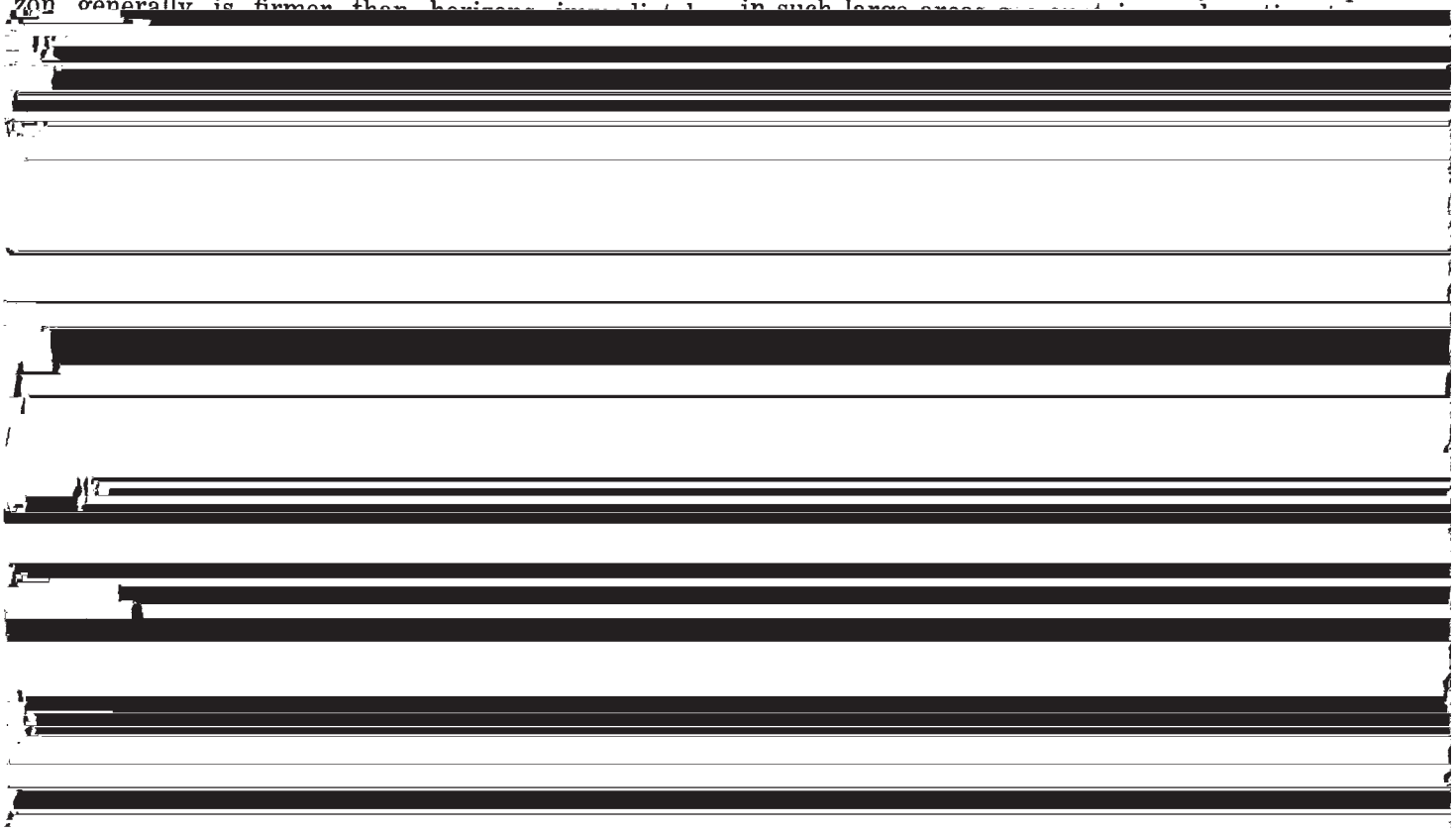


TABLE 11.—*Physical and chemical*

[Analyses made by the University of Arkansas, Fayetteville. Dashes indicate that

| Soil and sample number | Depth from surface | Particle-size distribution | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Horizon | Very coarse sand through medium sand (2.0 to 0.25 mm) | Fine sand (0.25 to 0.10 mm) | Very fine sand (0.10 to 0.05 mm) | Total sand (2.0 to 0.05 mm) | Silt (0.05 to 0.002 mm) | Clay (smaller than 0.002 mm) |
| | *In* | | *Pct* | *Pct* | *Pct* | *Pct* | *Pct* | *Pct* |
| Angie silt loam: S68–Ark–31–31. | 0–7 | A1 | 8 | 9 | 14 | 31 | 48 | 21 |
| | 7–16 | B1 | 5 | 9 | 11 | 25 | 41 | 34 |
| | 16–24 | B21t | 5 | 7 | 11 | 23 | 41 | 36 |
| | 24–42 | B22tg | 4 | 8 | 9 | 21 | 38 | 41 |
| | 42–56 | B23tg | 3 | 5 | 9 | 17 | 37 | 46 |
| | 56–72 | B24tg | 3 | 7 | 8 | 18 | 31 | 51 |
| Blevins loam: S68–Ark–31–23. | 0–7 | A1 | 2 | 9 | 38 | 49 | 48 | 3 |
| | 7–16 | A2 | ---------- | 7 | 30 | 37 | 60 | 3 |
| | 16–22 | B21t | ---------- | 7 | 30 | 37 | 48 | 15 |
| | 22–32 | B22t | ---------- | 5 | 23 | 28 | 54 | 18 |
| | 32–45 | B23t | ---------- | 5 | 27 | 32 | 44 | 24 |
| | 45–54 | B24t | ---------- | 5 | 23 | 28 | 57 | 15 |
| | 54–72 | B25t | 1 | 7 | 33 | 41 | 42 | 17 |
| Cane fine sandy loam: S68–Ark–31–16. | 0–4 | Ap | 11 | 39 | 16 | 66 | 28 | 6 |
| | 4–8 | A12 | 6 | 28 | 9 | 43 | 49 | 8 |
| | 8–14 | B1 | 8 | 25 | 10 | 43 | 40 | 17 |
| | 14–24 | B2t | 6 | 23 | 8 | 37 | 37 | 26 |
| | 24–39 | Bx1 | 6 | 20 | 12 | 38 | 33 | 29 |
| | 39–50 | Bx1 | 4 | 21 | 16 | 41 | 28 | 31 |
| | 50–58 | Bx2 | 4 | 22 | 7 | 33 | 42 | 25 |
| | 58–72 | Bx3 | 8 | 19 | 10 | 37 | 29 | 34 |
| Millwood fine sandy loam: S68–Ark–31–32. | 0–7 | A1 | 3 | 14 | 33 | 50 | 37 | 13 |
| | 7–17 | B31t | 2 | 4 | 11 | 17 | 20 | 63 |
| | 17–30 | B22t | 3 | 3 | 7 | 13 | 24 | 63 |
| | 30–41 | B23t | 2 | 4 | 8 | 14 | 29 | 57 |
| | 41–52 | B24tg | 4 | 4 | 7 | 15 | 29 | 56 |
| | 52–72 | B25t | 2 | 4 | 8 | 14 | 30 | 56 |
| Muskogee silt loam: S68–Ark–31–38. | 0–6 | Ap | 2 | 4 | 25 | 31 | 56 | 13 |
| | 6–12 | B1 | 1 | 1 | 19 | 21 | 55 | 24 |
| | 12–24 | B21t | ---------- | 1 | 13 | 14 | 47 | 39 |
| | 24–32 | B22tg | 1 | 1 | 14 | 16 | 45 | 39 |
| | 32–43 | B23tg | ---------- | 1 | 12 | 13 | 51 | 36 |
| | 43–61 | B24tg | ---------- | 1 | 13 | 14 | 41 | 45 |
| | 61–72 | Cg | ---------- | 1 | 11 | 12 | 43 | 45 |
| Oktibbeha clay: S68–Ark–31–6. | 0–5 | Ap | 18 | 2 | 1 | 21 | 35 | 44 |
| | 5–12 | B21t | ---------- | 1 | 9 | 10 | 29 | 61 |
| | 12–19 | B22t | ---------- | 2 | 10 | 12 | 24 | 64 |
| | 19–29 | B23t | 1 | 1 | 12 | 14 | 28 | 58 |
| | 29–33 | B24t | ---------- | 1 | 16 | 17 | 29 | 54 |
| | 33–42 | B3 | ---------- | 3 | 12 | 15 | 31 | 54 |
| | 42–51 | IICg | 1 | 12 | 15 | 28 | 32 | 40 |
| Ozan fine sandy loam: S68–Ark–31–29. | 0–6 | A1 | 9 | 17 | 15 | 41 | 51 | 8 |
| | 6–15 | A2g | 7 | 17 | 17 | 41 | 51 | 8 |
| | 15–29 | B21tg | 7 | 17 | 16 | 40 | 48 | 12 |
| | 29–38 | B22tg | 7 | 15 | 14 | 36 | 49 | 15 |
| | 38–56 | B23tg | 6 | 14 | 16 | 36 | 48 | 16 |
| | 56–72 | B3g | 8 | 18 | 14 | 40 | 44 | 16 |
| Pirum fine sandy loam: S68–Ark–31–3. | 0–6 | A1 | 13 | 38 | 7 | 58 | 31 | 11 |
| | 6–11 | A2 | 25 | 20 | 8 | 53 | 34 | 13 |
| | 11–16 | B21t | 9 | 30 | 10 | 49 | 27 | 24 |
| | 16–30 | B22t | 10 | 26 | 9 | 45 | 22 | 33 |
| | 30–36 | B23t | 9 | 32 | 7 | 48 | 27 | 25 |

*analyses of selected soils*

no analysis was made or that data resulting from the analysis were insignificant]

| Extractable bases | | | | Extractable acidity | Base saturation | Reaction (soil-water ratio of 1:1) | Organic-matter content | Available phosphorus |
|---|---|---|---|---|---|---|---|---|
| Calcium | Magnesium | Sodium | Potassium | | | | | |
| *Meq per 100 gm of soil* | *Meq per 100 gm of soil* | *Meq per 100 gm of soil* | *Meq per 100 gm of soil* | *Meq per 100 gm of soil* | *Pct* | *pH* | *Pct* | *Parts per million* |
| 6.9 | 1.3 | 0.2 | 0.2 | 8.3 | 51 | 5.8 | 2.2 | 5 |
| 3.8 | 1.1 | .2 | .2 | 12.9 | 29 | 4.9 | .7 | 5 |
| 2.4 | .9 | .2 | .2 | 16.2 | 19 | 4.8 | .4 | 3 |
| 2.6 | .9 | .3 | .2 | 16.3 | 20 | 5.0 | .3 | 4 |
| 3.4 | .9 | .5 | .2 | 19.6 | 20 | 5.0 | .3 | 3 |
| 7.4 | 1.5 | .9 | .3 | 20.5 | 33 | 5.1 | .3 | 3 |
| 1.1 | 1.0 | .1 | .1 | 3.0 | 43 | 5.3 | 1.2 | 7 |
| .5 | .2 | .1 | .1 | 2.6 | 26 | 5.0 | .4 | 7 |
| 3.1 | 1.1 | .1 | .3 | 2.7 | 63 | 5.4 | .2 | 8 |
| 3.9 | 1.3 | .1 | .4 | 2.7 | 68 | 5.5 | .2 | 5 |
| 4.0 | 1.5 | .1 | .5 | 4.3 | 59 | 5.6 | .2 | 2 |
| .9 | .7 | .1 | .2 | 7.3 | 21 | 5.0 | .1 | 2 |
| .5 | .5 | .2 | .2 | 11.7 | 11 | 4.9 | .1 | 2 |
| 1.4 | .2 | .1 | .1 | 2.0 | 47 | 5.7 | .2 | 8 |
| 2.0 | .3 | .1 | .1 | 2.4 | 51 | 5.9 | .2 | 7 |
| 1.1 | .6 | .1 | .1 | 4.2 | 31 | 4.9 | .1 | 5 |
| .5 | 1.2 | .2 | .2 | 8.0 | 21 | 4.8 | .1 | 5 |
| .3 | .6 | .3 | .2 | 9.0 | 13 | 5.0 | .1 | 3 |
| .2 | .5 | .1 | .2 | 9.7 | 9 | 5.0 | .1 | 3 |
| .2 | .6 | .1 | .2 | 10.2 | 10 | 4.8 | .1 | 3 |
| .2 | .6 | .1 | .2 | 10.8 | 9 | 4.7 | .1 | 3 |
| 2.2 | .6 | .1 | .1 | 7.1 | 30 | 5.0 | 1.5 | 10 |
| 17.3 | 2.9 | .3 | .3 | 15.9 | 57 | 5.2 | .8 | 7 |
| 9.4 | 1.6 | .4 | .3 | 23.5 | 33 | 4.9 | .5 | 4 |
| 7.5 | 1.1 | .4 | .2 | 23.2 | 28 | 5.0 | .3 | 3 |
| 12.4 | 1.5 | .7 | .3 | 20.8 | 42 | 5.0 | .3 | 3 |
| 15.1 | 1.9 | .9 | .3 | 17.4 | 51 | 4.8 | .2 | 3 |
| 3.6 | .5 | .2 | .1 | 5.0 | 47 | 5.8 | 1.9 | 8 |
| 3.9 | .7 | .2 | .1 | 8.1 | 38 | 5.0 | .3 | 4 |
| 4.4 | 1.0 | .3 | .2 | 15.1 | 28 | 4.8 | .4 | 5 |
| 3.2 | .8 | .4 | .2 | 17.0 | 21 | 4.8 | .3 | 4 |
| 4.4 | .8 | .4 | .2 | 19.2 | 23 | 4.8 | .2 | 4 |

TABLE 11.—*Physical and chemical*

| Soil and sample number | Depth from surface | Particle-size distribution | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Horizon | Very coarse sand through medium sand (2.0 to 0.25 mm) | Fine sand (0.25 to 0.10 mm) | Very fine sand (0.10 to 0.05 mm) | Total sand (2.0 to 0.05 mm) | Silt (0.05 to 0.002 mm) | Clay (smaller than 0.002 mm) |
| | *In* | | *Pct* | *Pct* | *Pct* | *Pct* | *Pct* | *Pct* |
| Ruston fine sandy loam: S68–Ark–31–19. | 0–6 | Ap | 10 | 36 | 10 | 56 | 42 | 2 |
| | 6–21 | B21t | 8 | 21 | 10 | 39 | 34 | 27 |
| | 21–31 | B22t | 8 | 24 | 7 | 39 | 37 | 24 |
| | 31–40 | B22t | 10 | 27 | 14 | 51 | 33 | 16 |
| | 40–52 | B23t | 9 | 33 | 9 | 51 | 32 | 17 |
| | 52–64 | B24t | 19 | 34 | 15 | 68 | 12 | 20 |
| | 64–72 | B3 | 23 | 38 | 6 | 67 | 17 | 16 |
| Sherwood fine sandy loam: S68–Ark–31–24. | 0–4 | A11 | 11 | 42 | 18 | 71 | 26 | 3 |
| | 4–9 | A12 | 10 | 43 | 16 | 69 | 28 | 3 |
| | 9–22 | B21t | 13 | 31 | 12 | 56 | 22 | 22 |
| | 22–37 | B22t | 8 | 32 | 13 | 53 | 20 | 27 |
| Terouge clay: S68–Ark–31–8. | 0–6 | Ap | 3 | 1 | 1 | 5 | 27 | 68 |
| | 6–16 | A11 | 1 | 1 | 1 | 3 | 22 | 75 |
| | 16–31 | A11 | 1 | 1 | 1 | 3 | 22 | 75 |
| | 31–44 | A12 | 1 | 1 | 1 | 3 | 22 | 75 |
| | 44–58 | A12 | 1 | 1 | 1 | 3 | 35 | 62 |
| | 58–72 | AC | 1 | 1 | 1 | 3 | 21 | 76 |
| Toine loam: S68–Ark–31–17. | 0–7 | Ap | 3 | 6 | 19 | 28 | 65 | 7 |
| | 7–13 | A12 | 2 | 29 | 22 | 53 | 37 | 10 |
| | 13–31 | B21t | 2 | 23 | 12 | 37 | 43 | 20 |
| | 31–44 | B22t | 2 | 11 | 13 | 26 | 55 | 19 |
| | 44–55 | B23t | 1 | 10 | 18 | 29 | 53 | 18 |
| | 55–72 | B3 | 4 | 37 | 20 | 61 | 26 | 13 |

*analyses of selected soils*—Continued

| Extractable bases | | | | Extractable acidity | Base saturation | Reaction (soil-water ratio of 1:1) | Organic-matter content | Available phosphorus |
|---|---|---|---|---|---|---|---|---|
| Calcium | Magnesium | Sodium | Potassium | | | | | |
| Meq per 100 | Meq per 100 | Meq per 100 | Meq per 100 | Meq per 100 | | | | |

Alfisols, and Ultisols. Entisols are young mineral soils that do not have genetic horizons or have only the beginning of such horizons.

Inceptisols are mineral soils that generally occur on young, but not recent, land surfaces. Horizons have definitely started to form in these soils.

Mollisols are friable soils that have a mollic epipedon, a diagnostic horizon that is a thick, dark-colored layer at the surface. This horizon is much like a surface layer that has formed under grass. It has moderate to strong structure, and it has base saturation of 50 percent or more. These soils are dominantly saturated with bivalent cations and have argillic or cambic horizons. Argillic or cambic horizons are diagnostic horizons that form below the soil surface. An argillic horizon is one in which illuvial silicate clay has accumulated. This horizon is called a natric horizon if it contains an appreciable amount of exchangeable sodium and has prismatic or columnar structure. A cambic horizon is a layer in which changes have been sufficient to give rise to soil structure, liberate iron, form silicate clay minerals, obliterate most evidence of the original rock structure, or some combination of these changes.

Alfisols are soils that have argillic or natric horizons with accumulated iron and aluminum. Alfisols have a base saturation of more than 35 percent.

Ultisols are highly weathered and strongly developed, and they have a base saturation of less than 35 percent.

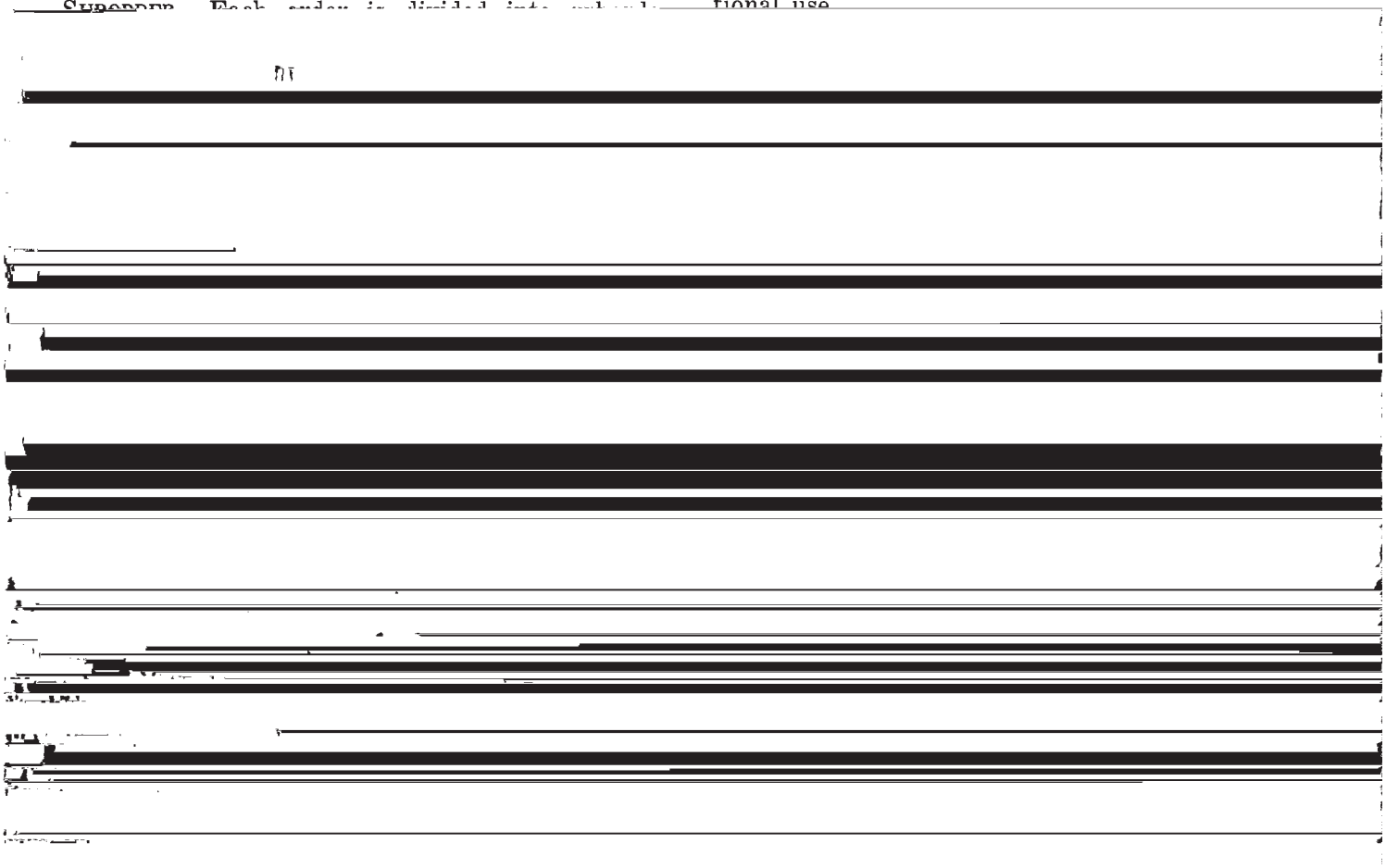
Suborder. Each order is divided into subor-

properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is *Typic Haplaquents* (a typical Haplaquent).

FAMILY.—Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and other features that are used to differentiate families. An example is the coarse-loamy, siliceous, acid, thermic family of Typic Haplaquents.

## Physical and Chemical Analyses

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



mation of the cation-exchange capacity of the soil. Base saturation percent was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium and multiplying by 100.

## *Literature Cited*

and less than 40 percent silt.

**Clay film.** A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

**Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

**Consistence, soil.** The feel of the soil and the ease with which

hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

**Gleyed soil.** A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

*O horizon.*—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

*A horizon.*—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the

| | *pH* | | *pH* |
|---|---|---|---|
| Extremely acid | Below 4.5 | Neutral | 6.6 to 7.3 |
| Very strongly acid | 4.5 to 5.0 | Mildly alkaline | 7.4 to 7.8 |
| Strongly acid | 5.1 to 5.5 | Moderately alkaline | 7.9 to 8.4 |
| Medium acid | 5.6 to 6.0 | Strongly alkaline | 8.5 to 9.0 |
| Slightly acid | 6.1 to 6.5 | Very strongly alkaline | 9.1 and higher |

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

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

**Sand.** As a soil separate, individual rock or mineral fragments that range from 0.05 to 2.0 millimeters in diameter. Most sand grains consist of quartz, but the sand may be of any mineral composition. As a textural class, 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

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

**Terrace** (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine

*clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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

**Topsoil.** A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

**Water table.** The highest part of the soil or underlying rock

## GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in the tables as follows:

Acreage and extent, table 2, page 8.
Predicted yields, table 3, page 34.
Woodland, table 4, page 36.
Wildlife, table 5, page 42.
Engineering uses of the soils, tables 6, 7, and 8, pages 46 through 57.
Town and country planning, table 9, page 60.

| Map symbol | Mapping unit | Described on page | Capability unit | Woodland group |
|---|---|---|---|---|
| | | | Symbol | Symbol |
| Ad | Adaton silt loam | 8 | IIIw-1 | 2w9a |
| AnB | Angie silt loam, 1 to 3 percent slopes | 9 | IIIe-1 | 2o7a |
| AnC | Angie silt loam, 3 to 8 percent slopes | 9 | IVe-1 | 2o7a |
| BlB | Blevins loam, 1 to 3 percent slopes | 10 | IIe-1 | 3o1 |
| BlC | Blevins loam, 3 to 8 percent slopes | 10 | IIIe-2 | 3o1 |
| CaC | Cane fine sandy loam, 3 to 8 percent slopes | 11 | IIIe-2 | 3o7a |
| DeD3 | Demopolis silty clay, 3 to 12 percent slopes, severely eroded | 11 | VIe-1 | 4d3c |
| GrC | Greenville loam, 3 to 8 percent slopes | 12 | IIIe-2 | 3o1 |
| Ka | Kaufman clay | 13 | ------ | 1w6 |
| | Occasionally flooded | -- | IIw-1 | ---- |
| | Frequently flooded | -- | IVw-1 | ---- |
| Le | Leeper silty clay | 14 | ------ | 1w6 |
| | Occasionally flooded | -- | IIw-1 | ---- |
| | Frequently flooded | -- | IVw-1 | ---- |
| LuE | Luverne fine sandy loam, 8 to 20 percent slopes | 15 | VIe-2 | 3c2 |
| Ma | Marietta silt loam, silty subsoil variant | 16 | ------ | 1w8 |
| | Occasionally flooded | -- | IIw-2 | ---- |
| | Frequently flooded | -- | IVw-2 | ---- |

| Map symbol | Mapping unit | Described on page | Capability unit | Woodland group |
|---|---|---|---|---|
| SoD | Sumter-Oktibbeha association, rolling 1/ | 29 | VIe-3 | ---- |
| | Sumter soil | -- | ------ | 4c2c |
| | Oktibbeha soil | -- | ------ | 3c8 |
| TeA | Terouge clay, 0 to 1 percent slopes | 30 | ------ | 1w6 |
| | Occasionally flooded | -- | IIw-1 | ----- |
| | Frequently flooded | -- | IVw-1 | ---- |
| TeB | Terouge clay, 1 to 3 percent slopes | 30 | IIe-4 | 4c2c |
| TkE | Tiak soils, 8 to 20 percent slopes | 31 | VIIe-1 | 3c2 |
| To | Toine loam | 32 | ------ | 2o7 |
| | Occasionally flooded | -- | IIw-2 | ---- |
| | Frequently flooded | -- | IVw-2 | ---- |

1/ The delineations are much larger and the composition of these units is more variable than other mapping units in the county. Mapping has been controlled well enough for the anticipated use of the soils.

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