SOIL SURVEY OF

Lawrence County, Arkansas

United States Department of Agriculture
Soil Conservation Service
In cooperation with

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

Major fieldwork for this soil survey was completed in the period 1964–72. Soil names and descriptions were approved in 1973. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1973. This survey was made cooperatively by the Soil Conservation Service and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Lawrence County Conservation District.

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

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

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

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

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification and woodland group of each. It also shows the page where each soil is described and the page for the pasture and hayland group and range site in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the tables in this publication. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

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

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

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

Ranchers and others can find, under "Range," groupings of the soils according to their suitability for range, and also the names of many of the plants that grow on each range site.

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

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

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

Newcomers in Lawrence County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also

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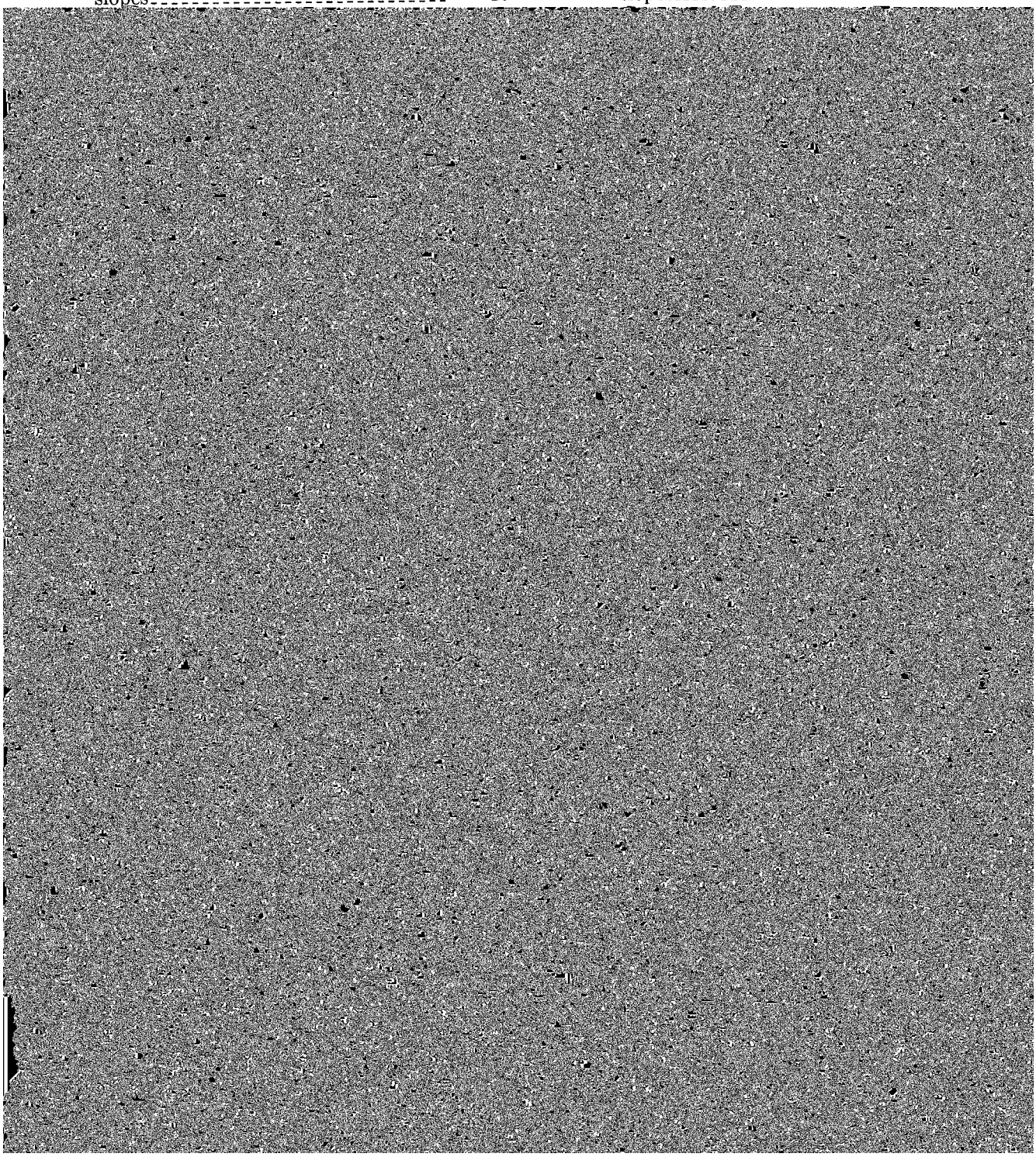

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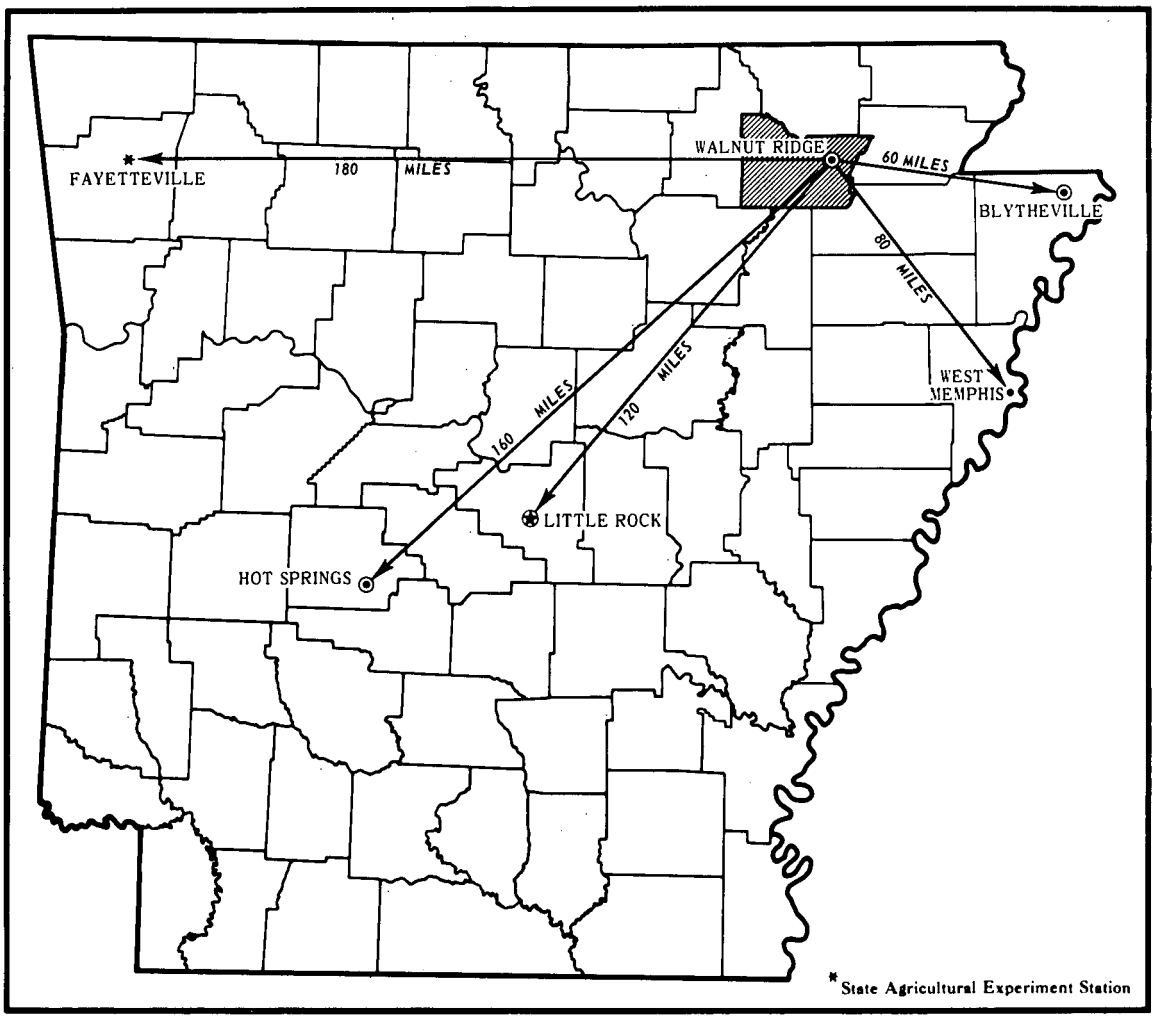


Location of Lawrence County in Arkansas.

Soil Survey of Lawrence County, Arkansas

BY WARREN A. GORE, JAMES H. BROWN, AND RICHARD T. FIELDER

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

LAWRENCE COUNTY is in northeast Arkansas (see facing page). It is irregular in shape, and ranges from about 26½ to 34 miles wide. The maximum length is about 25 miles. The county is bounded on the east by Greene and Craighead Counties, and on the south by Craighead, Jackson, and Independence Counties. Sharp County is on the west, and Sharp, Randolph, and Greene Counties bound it on the north. The Cache River forms the county boundary on the east side. Spring and Black Rivers form part of the county boundary on the north side. According to United States census reports, the approximate land area is 377,536 acres, or about 590 square miles.

In 1970, the population was about 16,320. Walnut Ridge, the county seat and main trading center, had a population of 3,718. Other smaller trade centers, where farm marketing facilities are available and small factories are located, are Hoxie, Sedgwick, Black Rock, and Imboden. Some of the manufacturing plants are located in an industrial area about 5 miles north of Walnut Ridge. Except for the small industries, sand-and-gravel dredging, and crushing limestone, most of the businesses provide farm services.

General Nature of the County

to about 275 feet atop natural levees near College City in the northern part of the county.

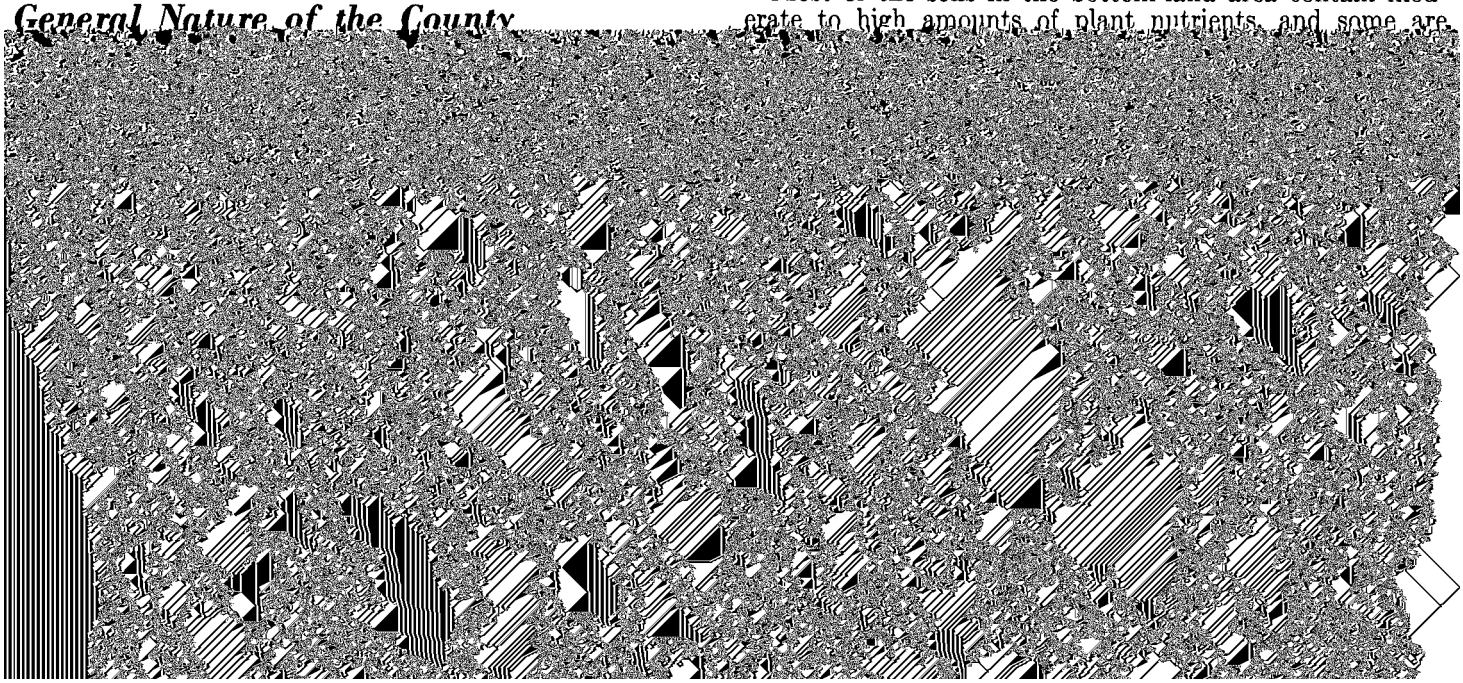
Farming

Farming in Lawrence County began on soils with good natural drainage on natural levees above the flood plains of the rivers and on the hills in the western part of the county. Cotton was the main cash crop. Unless too steep or too stony, most of the better drained soils were cleared for cotton production. The steep, stony, or wetter soils were left in woodland.

Farming is still the principal means of livelihood, but cropping systems have become more diversified. Since acreage allotments were placed on cotton, its importance has declined. As machinery has replaced livestock as a source of power, corn and other feed crops have also declined in importance within the bottom-land area.

In the hilly area, forage crops of pasture and hay have replaced cotton. Beef cattle, dairy cattle, swine, chickens, and timber now provide most of the farm income. Some livestock farmers grow truck crops for supplemental income.

Most of the soils in the bottom-land area contain moderate to high amounts of plant nutrients, and some are



According to the U.S. Census of Agriculture, the acreages of principal crops and pasture in 1964 and 1969 were as follows:

Crop:	*1964*	*1969*
Soybeans (harvested for beans)	105,075	136,889
Cotton	18,481	17,336
Corn	5,274	1,281
Wheat	5,824	6,600
Grain sorghum	58	2,550
Other small grain (includes rice)	8,580	11,000
Hay	7,611	7,114
Pasture (all types)	56,524	55,390

Also according to the U.S. Census of Agriculture, the number of livestock in 1964 and 1969 was as follows:

Livestock:	*1964*	*1969*
All cattle and calves	14,511	13,059
Milk cows	650	274
Hogs and pigs	4,166	3,702
Chickens (3 months old or older)	39,685	20,354

According to the 1969 census, about 80 percent of the county was in farms. The rest consisted of wooded tracts, cities and builtup areas, and transportation facilities.

Farms in Lawrence County are decreasing in number and

It is intermittently navigable and used locally by sand and gravel barges. The flood plain of this river is the approximate boundary between the Ozark Highland to the west and the Southern Mississippi Valley Alluvium to the east. From the Ozark Highlands, the channels of the Spring River and Strawberry River meander across this flood plain before discharging into the Black River.

The Black, Spring, and Strawberry Rivers provide recreational facilities for fishing, boating, and waterfowl hunting. The Black River yields sand and gravel, fish, and mussel shells in commercial quantities. The many brakes, creeks, lakes, and sloughs in the flood plain also provide excellent fishing and hunting and are important sources of wood crops.

The flood plain along the Black River is generally flat except for a few undulating areas in the river bends. Slopes seldom exceed 1 percent except on the sides of low ridges and escarpments where they are as much as 3 percent. Local differences in elevations are minor, except where insular areas of materials, normally in deposits farther eastward, rise 10 to 20 feet above the flood plain.

The surface water drains from the area through artificial drains and the natural drains that follow the course of abandoned river channels. There is a good supply of ground water for irrigation.

The alluvial sediment on the Black River flood plain is 50 or more feet thick and becomes thicker eastward throughout the county (*8*). It is a mixture of minerals from through-

ridges predominantly range from 12 to 30 percent. Surface water falls as much as 500 feet before reaching the levels of the Spring and Strawberry Rivers by way of such streams as Cooper, Harding, Jeff, Machine, Stennitt, and Wells Creeks. Streams flowing through the uplands have steep gradients, particularly in their upper reaches, and runoff is rapid. Floodwaters rise and recede quickly on the flood plains along the creeks and rivers.

The country rock in this area is cherty limestone or limestone, in places interbedded with sandstone and siltstone

Climate

Lawrence County is in the northeast quadrant of Arkansas. Temperatures within the Ozark Highland average a few degrees cooler most of the year. The nearly treeless, predominantly cultivated plain provides little hindrance to windflow. Surface wind velocity may be somewhat greater than in the more rugged, wooded terrain.

The climate of Lawrence County, similar to all of Arkansas, is one of generally warm summers and mild winters, but the

extremes are below zero for the 3 winter months. In contrast, summers normally have 60 or more days with temperatures of 90° F. or higher, mainly in July and August. Summer temperatures can be expected to reach 100° or higher for a few days in some years, but such high temperatures are not expected every year. Minimum summer temperatures are usually in the 65° to 75° range. The average growing season is about 217 days. From late in May to early in September, only a few cold fronts reach the area, and rarely do they bring dry air masses into the county.

The precipitation, which averages a little more than 46 inches per year, is generally adequate for most crops. It is fairly evenly distributed throughout the year. March, April, and May are the wettest months, with a normal of about 13 inches of precipitation. August through October is the driest season, but even then about 9 inches of rainfall can be expected in a normal year. Warm frontal systems or those associated with wintery low pressure systems approaching from the southern plains or the Gulf of Mexico are the most reliable sources of moisture. A single storm can bring as much as 2 to 5 inches of precipitation. Snowfall averages about 4 to 6 inches per year and is a negligible source of moisture. Normally snow melts within a day or two. Frequently it melts within hours, and sometimes it melts as it falls. Sleet and freezing rain are infrequent, but can cause serious damage to evergreen trees and shrubs. Otherwise, ice is of little consequence except as it disrupts transportation and utility service.

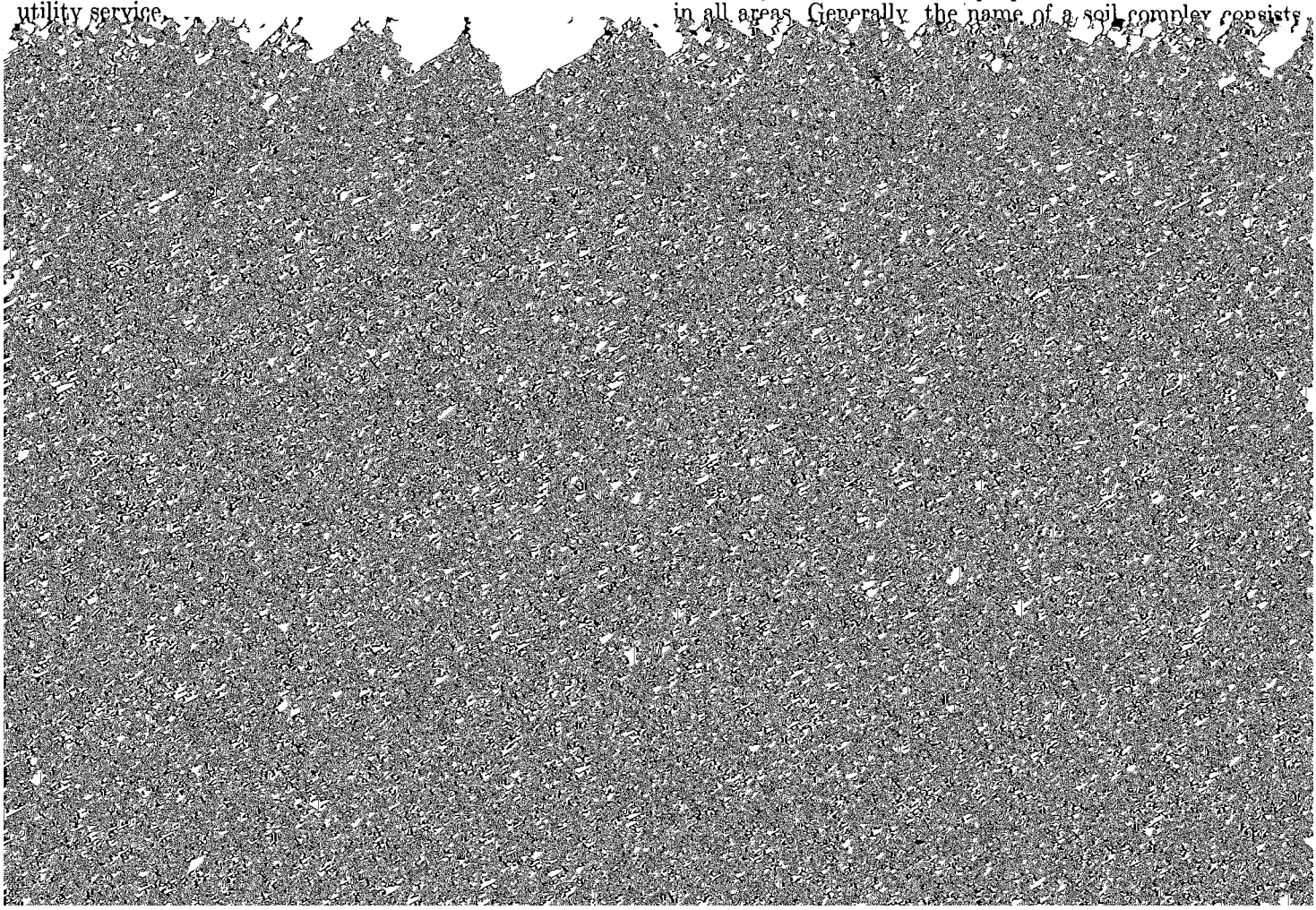
ences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Agnos stony silt loam, 3 to 12 percent slopes, is one of several phases within the Agnos series.

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

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

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

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists



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

1. *Agnos-Gepp-Ventris association*

Well drained and moderately well drained, gently sloping to moderately steep, deep and moderately deep, cherty and stony loamy soils

This association is in the extreme northwestern part of the county. It is on highly dissected, dominantly cherty limestone hills. It consists of narrow valleys and adjacent moderately steep to steep hillsides that have narrow, gently sloping to moderately sloping ridges. Agnos soils are on the

30 percent mainly Captina, Tonti, Portia, and Ventris soils and Rock outcrop.

Boden soils are well drained. The surface layer is brown gravelly sandy loam, and the subsurface layer is strong brown

Portia soils are well drained. The surface layer is brown fine sandy loam, and the subsurface layer is yellowish brown fine sandy loam. The upper part of the subsoil is strong brown fine sandy loam; the part part is strong brown and

the association. Beef-cattle production is the main enterprise. Most farms are operated by the owner, many of which hold part-time jobs off the farm.

On most of this association, limitations are severe for residences, other buildings, highways, and other nonfarm

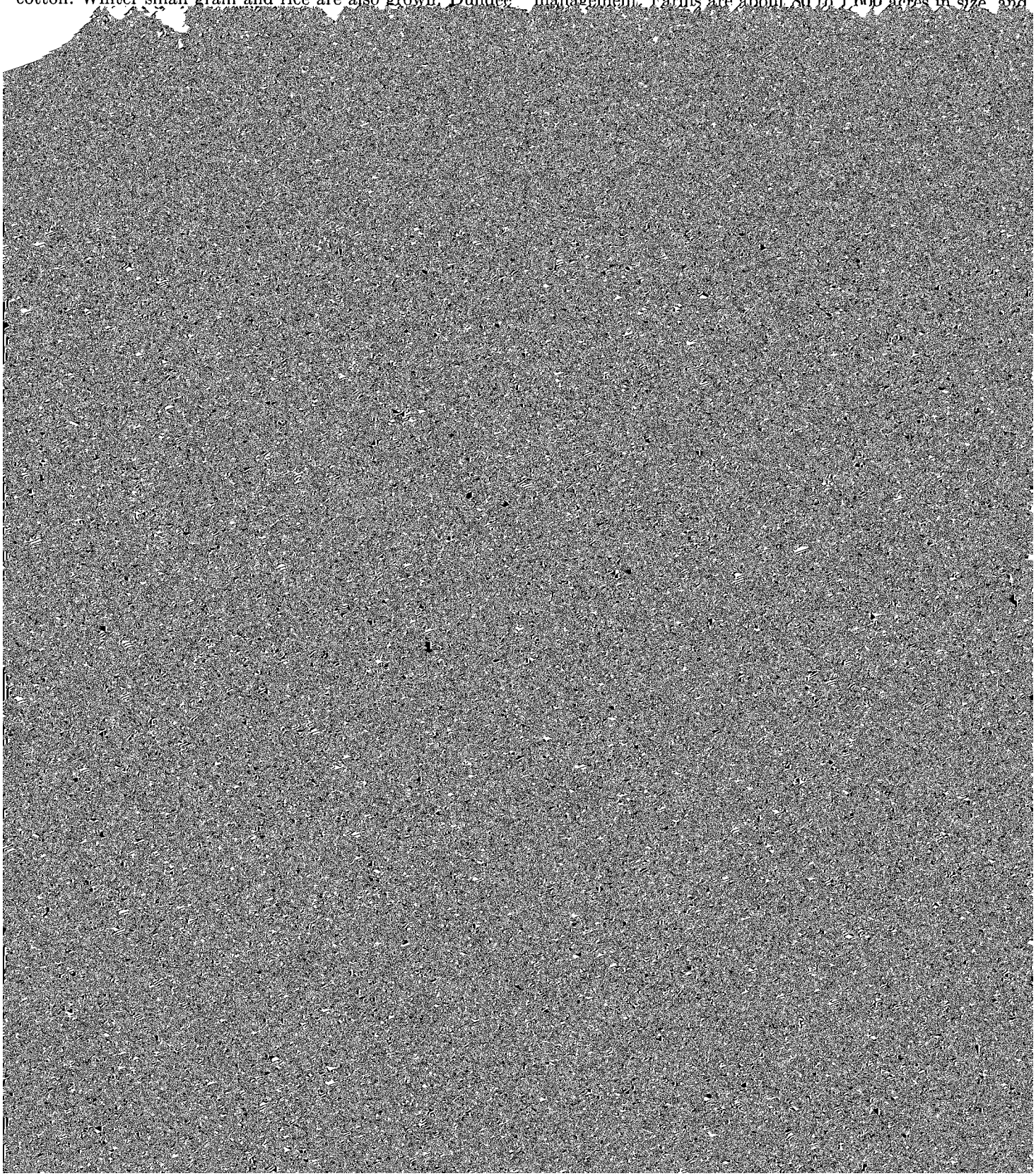
taries, during the period it flowed west of Crowley Ridge (*6*). Some of the sediments have been reworked by wind.

Almost all of this association is used for cultivated crops. Cotton is the main crop.

4. Pocket-Baylah association

This association is generally well suited to cultivated crops. The main crops are soybeans, grain sorghum, and cotton. Winter small grain and rice are also grown. Dundee

Grain sorghum, cotton, and winter small grain are other important crops. The soils need surface drainage for efficient management. Farms are about 80 to 1,600 acres in size, and



worm holes and castings; about 15 percent, by volume, chert fragments ¼ inch to 3 inches in diameter; strongly acid; gradual wavy boundary.

B21t—8 to 21 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds and in pores; few medium and fine roots; few pores; few chert fragments; extremely acid; clear wavy boundary.

B22t—21 to 36 inches; yellowish brown (10YR 5/8) clay; common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure parting to weak fine angular blocky; firm; continuous clay films on faces of peds; few medium roots; few chert fragments; very strongly acid; gradual wavy boundary.

B3—36 to 50 inches; about equally mottled yellowish brown (10YR 5/8) light gray (10YR 7/2) and red (10R 4/8) clay; weak medium subangular blocky structure; firm; patchy clay films lining root channels and in vertical crevices; few medium roots; few chert fragments; very strongly acid; gradual wavy boundary.

C—50 to 72 inches; strong brown (7.5YR 5/8) clay; common medium distinct yellowish red (5YR 4/8) mottles; massive; very firm; very strongly acid.

The A1 horizon is very dark grayish brown, dark brown, or brown. The A2 horizon ranges from pale brown to brown. In places there is a 3- to 5-inch Ap horizon that is brown or dark yellowish brown cherty silt loam. Stones are on and in the A horizon in places. Chert content of the A horizon ranges from 15 to 25 percent by volume. The B horizon is at a depth of 6 to 12 inches. The B22t horizon is strong brown or yellowish brown clay or silty clay. The B3 horizon, which is lacking in places, is clay or silty clay and is mottled in shades of brown, gray, red, and yellow. The C horizon is at a depth of 30 to 60 inches.

The A horizon is medium acid or strongly acid. The B horizon is strongly acid to extremely acid.

Agnos soils are associated with Boden, Clarksville, Gepp, and Ventris soils. They have less sand throughout the A and B horizons than Boden soils and have fewer chert fragments and more clay in the B horizon than Clarksville soils. They have a thinner B2t horizon than Gepp soils. They have more chert fragments on the surface and are deeper over bedrock than Ventris soils.

AcC—Agnos cherty silt loam, 3 to 8 percent slopes. This gently sloping soil is on hillcrests and adjacent hillsides. Areas range from 20 to 100 acres in size. This soil has the profile described as representative of the series. Included in mapping are spots of Boden and Gepp soils and a soil that is similar to this Agnos soil but is only 36 to 48 inches deep over bedrock.

This soil is poorly suited to farming. It is difficult to till because the surface layer is cherty. Runoff is rapid, and the erosion hazard is very severe. If management is good and terraces and contour cultivation are used, sown crops that suited to woodland, wildlife habitat, range, or pasture. Runoff is rapid, and the erosion hazard is severe.

Most of the acreage is used for woodland. Only a few small tracts have been cleared and are used for pasture or range. Suitable pasture plants are bahiagrass, bermudagrass, tall fescue, annual lespedeza, and sericea lespedeza. Capability unit VIe-1; pasture and hayland group 8C; woodland group 4o7; range site Clay Break Limestone.

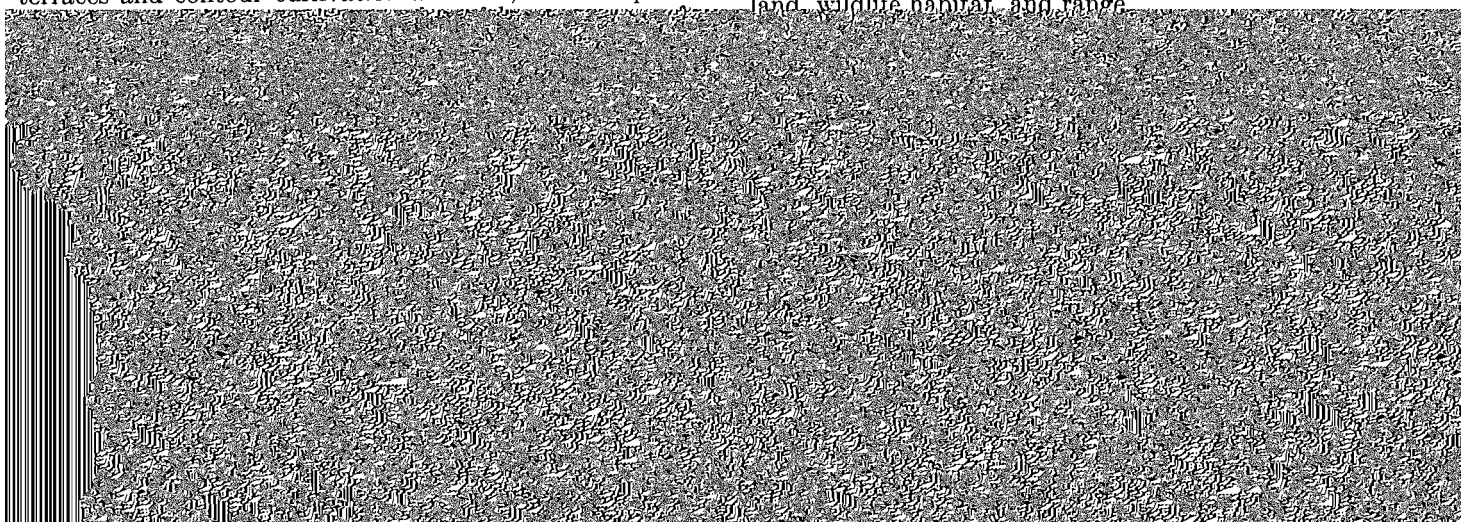
AgD—Agnos stony silt loam, 3 to 12 percent slopes. This gently sloping and moderately sloping soil is on hillcrests and hillsides. Areas range from 20 to 200 acres in size. The profile of this soil is similar to the one described as representative of the series, but the surface layer is stony. Angular chert fragments 6 to 36 inches in diameter are at intervals of 3 to 25 feet on the surface. Included in mapping were spots of Boden and Gepp soils and a soil that is similar to this Agnos soil but is only 36 to 48 inches deep over bedrock.

This soil is generally not suitable for cultivation. The surface stones restrict the use of farm equipment and make pasture management difficult. Runoff is rapid, and the erosion hazard is severe. The soil is best suited to woodland, wildlife habitat, or range.

Most of the acreage of this soil is woodland. A few small areas have been cleared and are used for range and pasture. Bahiagrass, bermudagrass, tall fescue, annual lespedeza, and sericea lespedeza are among the suitable pasture plants. Capability unit VIs-2; pasture and hayland group 8C; woodland group 4x8; range site Clay Break Limestone.

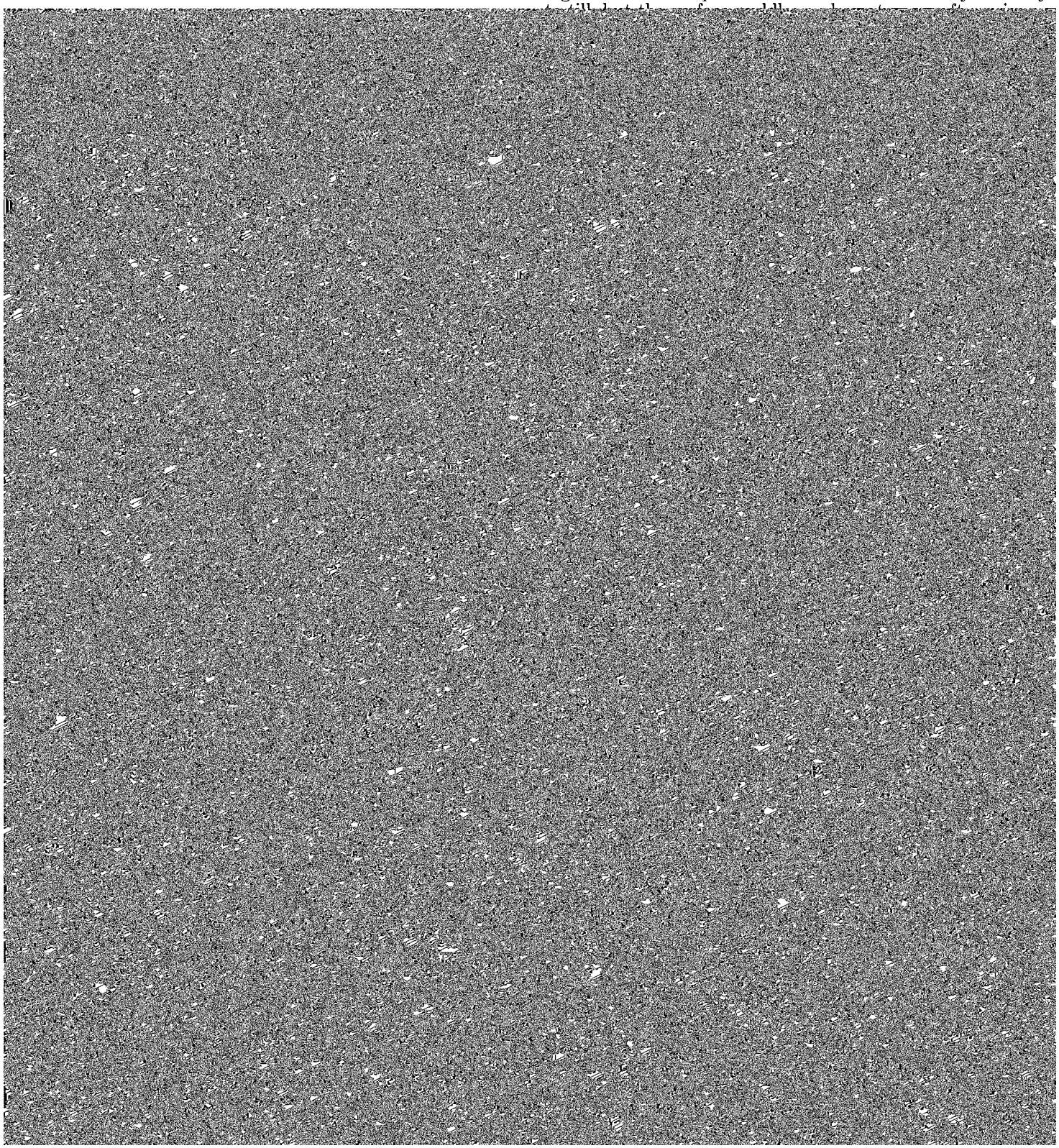
AnE—Agnos soils, 12 to 25 percent slopes. This moderately steep mapping unit is on sharp ridges and adjacent hillsides. It consists of Agnos soil; soils that are similar to the Agnos soil but have a thin, yellowish-red layer in the subsoil; and soils that are 50 to 60 inches deep over limestone and are less acid than the Agnos soil in the layer immediately above the limestone. The profile of the Agnos soil is similar to the one described as representative of the series, but the surface soil is stony. Angular chert fragments 6 to 36 inches in diameter are at intervals of 3 to 20 feet on the surface. Areas range from 20 to more than 400 acres in size. Included in mapping are a few spots of Boden, Clarksville, Gepp, and Ventris soils and soils similar to Agnos soils.

This mapping unit is not suited to cultivated crops and is poorly suited to pasture. The stones and slope severely restrict the use of farm equipment. Runoff is rapid, and the erosion hazard is very severe. The unit is best suited to woodland, wildlife habitat, and range.



underlying material is grayish brown, stratified silt loam and fine sandy loam to a depth of 72 inches or more.

Amagon soils are moderate to high in natural fertility. Permeability is slow, and the available water capacity is high. The soils respond well to fertilization. They are easy



tall fescue, and white clover are among the suitable pasture plants. Capability unit IIIw-1; pasture and hayland group 2B; woodland group 1w6; not in a range site.

Beulah Series

The Beulah series consists of somewhat excessively drained, undulating soils on the higher parts of older natural levees and on dunes of windblown sediments high in content of sand along creeks and abandoned river channels. These soils formed in stratified loamy and sandy sediments. The native vegetation is hardwoods and an understory of vines and canes.

In a representative profile the surface layer is brown sandy loam about 10 inches thick. The subsoil is brown and yellowish brown fine sandy loam 26 inches thick. The underlying material is yellowish brown loamy sand to a depth of 72 inches or more.

Beulah soils are moderate in natural fertility. Permeability is moderately rapid, and the available water capacity is medium to low. The soils respond well to fertilization. They are easy to till and can be cultivated within a wide range of moisture content. In places a plowpan has formed. This pan restricts root penetration and movement of water through the soil. The soils warm early in spring and can be planted early.

These soils are suited to most crops grown in the county. Most of the acreage is cultivated.

Representative profile of Beulah sandy loam, undulating, in a moist cultivated area in SE¼SW¼SE¼ sec. 30, T. 17 N., R. 1 E.

Ap—0 to 10 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; clear wavy boundary.

B21—10 to 26 inches; brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; few pores; strongly acid; clear smooth boundary.

B22—26 to 36 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; few pores; very strongly acid; clear wavy boundary.

C—36 to 72 inches; yellowish brown (10YR 5/4) loamy sand; single grained; very friable; very strongly acid.

The B22 horizon is brown or yellowish brown. The soils range from medium acid to very strongly acid in unlimed areas.

Beulah soils are associated with Bosket, Dubbs, and Patterson soils. They have more sand in the B horizon than Bosket and Dubbs soils. They are browner throughout than Patterson soils.

Boden Series

The Boden series consists of well drained, gently sloping to moderately steep soils on hilltops and hillsides in the uplands. These soils formed in a thin layer of gravelly loamy material and the underlying clayey material weathered from shale, siltstone, and sandstone. The native vegetation is hardwoods.

In a representative profile the surface layer is brown gravelly sandy loam about 5 inches thick. The subsurface layer is strong brown gravelly sandy loam 2 inches thick. The upper 4 inches of the subsoil is yellowish red fine sandy loam; the next 12 inches is red clay; the next 9 inches is mottled red, yellowish red, and yellowish brown clay; and the lower 10 inches is red and yellowish brown sandy clay. The underlying material is mottled red and yellowish brown sandy clay loam that has streaks of light gray and yellowish brown. It is 8 inches thick. Bedrock is at a depth of 50 inches.

Boden soils are low in natural fertility. Permeability is moderately slow, and the available water capacity is medium. The soils respond well to fertilization. Because the surface layer is gravelly, it is somewhat difficult to till.

If erosion control is adequate, some areas are suitable for cultivation. Some are too steep and gravelly for cultivated crops and are used mainly for pasture, range, wildlife habitat, and woodland.

Representative profile of Boden gravelly sandy loam, 8 to 12 percent slopes, in a moist wooded area in NE¼NW¼NW¼ sec. 5, T. 15 N., R. 3 W.

O1—½ inch to 0; partly decomposed plant material.

A1—0 to 5 inches; brown (10YR 4/3) gravelly sandy loam that has flecks of yellowish brown (10YR 5/4); weak medium and fine subangular blocky structure; very friable; common fine roots; common wormholes; very strongly acid; clear wavy boundary.

A2—5 to 7 inches; strong brown (7.5YR 5/6) gravelly sandy loam; weak medium subangular blocky structure; very friable; common medium and fine roots; few pores; few wormholes and castings; strongly acid; clear wavy boundary.

B1—7 to 11 inches; yellowish red (5YR 5/8) fine sandy loam; weak medium subangular blocky structure; friable; common medium and fine roots; few pores; 5 percent gravel as much as 1 inch in diameter; strongly acid; clear wavy boundary.

B21t—11 to 23 inches; red (2.5YR 5/8) clay; moderate and strong medium angular blocky structure; firm; continuous distinct clay films on faces of peds; few medium and fine roots; few pores; few gravel as much as 1 inch in diameter; very strongly acid; clear wavy boundary.

B22t—23 to 32 inches; mottled yellowish red (5YR 5/8), red

Figure 2.—**Peanuts is a relatively new crop to the county. Beulah sandy loam, undulating, is well suited to this crop.**

is a 4- to 7-inch, brown or dark yellowish brown Ap horizon. The B1 horizon, which is lacking in places, is yellowish red or strong brown fine sandy loam or sandy clay loam. The B2t horizon is red or yellowish red sandy clay or clay, and it is mottled with yellowish brown in the lower part. The B3t horizon is sandy clay loam or sandy clay, and it is dominantly the same color as the B2t horizon. The C horizon is sandy loam or sandy clay loam mottled in shades of red and brown.

The soils are mainly strongly acid or very strongly acid in unlimed areas. Bedrock is at a depth of 40 to 60 inches.

Boden soils are associated with Agnos, Captina, Gepp, and Portia soils. They have a redder B horizon than Agnos soils and a thinner B horizon than Gepp and Portia soils. They have more clay in the B horizon than Captina soils and do not have a fragipan.

BnC—Boden gravelly sandy loam, 3 to 8 percent slopes. This gently sloping soil is on rounded hilltops and adjacent hillsides at the higher elevations. Areas range from 20 to 200 acres in size. Included in mapping are spots of Agnos, Captina, Gepp, and Portia soils and a few small areas where stones are on the surface. Also included is a soil that is similar to the Boden soil, but the subsoil extends to a depth of more than 60 inches and the clay content does not decrease with depth.

This soil is suited to farming, but the gravelly surface makes cultivation of row crops somewhat difficult. Runoff is moderate, and the erosion hazard is severe. Under good management that includes terraces and contour cultivation, clean-tilled crops that leave large amounts of residue can be safely cultivated year after year in the less sloping areas. More intensive management is needed as slope increases.

Broadcast or drilled crops, such as winter small grain, are best suited, but such row crops as soybeans and sorghums are grown. Truck crops, such as okra, green beans, strawberries, cucumbers, and melons, are also suited. Fruit crops, such as apples, peaches, and pears, are grown. The soil is best suited to pasture, range, woodland, or wildlife habitat. Bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza are suitable pasture plants. Capability unit IIIe-3; pasture and hayland group 8A; woodland group 4o7; range site Loamy Upland.

BnD—Boden gravelly sandy loam, 8 to 12 percent slopes. This moderately sloping soil is on rounded hilltops and hillsides that are mostly at the higher elevations. Areas range from 20 to more than 300 acres in size. This soil has the profile described as representative of the series. Included in mapping are spots of Agnos, Gepp, and Portia soils; a few narrow creek valleys; and small areas where stones are on the surface. Also included were a few small areas of soils that are similar to this Boden soil, but the subsoil extends to a depth of more than 60 inches and the clay content does not decrease with depth.

This soil is poorly suited to cultivated crops. The slope and gravelly surface layer make tillage difficult. Runoff is rapid, and the erosion hazard is very severe. Under good

Figure 3.—**Watermelons is a truck crop suited to Beulah sandy loam, undulating.**

management that includes terraces and contour cultivation, clean-tilled crops that leave large amounts of residue can be safely grown in rotation with grasses and legumes part of the time.

Winter small grain is the best suited crop. The soil is best suited to pasture, range, woodland, or wildlife habitat. Bermudagrass, bahiagrass, orchardgrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza are suitable pasture plants. Capability unit IVe-3; pasture and hayland group 8A; woodland group 4o7; range site Loamy Upland.

BnE—Boden gravelly sandy loam, 12 to 20 percent slopes. This moderately steep soil is on sharp ridges and dissected hillsides. Areas range from 20 to more than 200 acres in size. Included in mapping are spots of Agnos and Gepp soils and a few small areas where stones are on the surface. Also included is a soil that is similar to this Boden soil, but the subsoil extends to a depth of more than 60 inches and the clay content does not decrease with depth.

This soil is not suited to cultivated crops and is poorly suited to pasture. The slope restricts the use of some farm equipment. Runoff is rapid, and the erosion hazard is very severe. The soil is best suited to woodland, range, and wildlife habitat.

Most of the acreage is woodland of red oak, white oak, hickory, and post oak. In open areas, the soil produces moderate amounts of forage from native grasses and forbs. Bermudagrass, bahiagrass, weeping lovegrass, annual lespedeza, and sericea lespedeza are suitable pasture plants. Capability unit VIe-2; pasture and hayland group 8B; woodland group 4o7; range site Loamy Upland.

Bosket Series

The Bosket series consists of well drained, level and undulating soils on older natural levees along creeks and abandoned river channels. These soils formed in stratified beds of dominantly loamy alluvial sediments and some windblown sediments high in content of sand. The native vegetation is mixed hardwoods and an understory of vines and canes.

In a representative profile the surface layer is about 8 inches of dark brown fine sandy loam over 6 inches of brown fine sandy loam. The upper 16 inches of the subsoil is brown loam, and the lower 7 inches is brown fine sandy loam. The underlying material is yellowish brown loamy sand to a depth of 72 inches or more.

Bosket soils are moderate in natural fertility. Permeability is moderate, and the available water capacity is medium. The soils respond well to fertilization. They are easy to till and can be cultivated throughout a wide range of moisture

content. In places a plowpan has formed. This pan restricts root penetration and movement of water through the soil.

These soils are well suited to most crops grown in the county. Most of the acreage is cultivated.

Representative profile of Bosket fine sandy loam, undulating, in a moist cultivated area in NE¼NW¼SE¼ sec. 27, T. 17 N., R. 1 W.

Ap—0 to 8 inches; dark brown (7.5YR 3/2) fine sandy loam; weak fine and medium subangular blocky structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

A3—8 to 14 inches; brown (10YR 4/3) fine sandy loam; common fine faint dark brown mottles; weak medium subangular blocky structure; very friable; few fine roots; strongly acid; clear smooth boundary.

B21t—14 to 30 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; continuous distinct clay films on faces of peds; clay bridges on sand grains; few fine roots; few pores; few black stains on faces of peds; strongly acid; gradual wavy boundary.

B22t—30 to 37 inches; brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; patchy distinct clay films on faces of some peds; clay bridges on sand grains; few black stains and specks; strongly acid; clear smooth boundary.

IIC—37 to 72 inches; yellowish brown (10YR 5/4) loamy sand that has uncoated sand grains and specks in shades of yellow and brown; single grained; very friable; strongly acid.

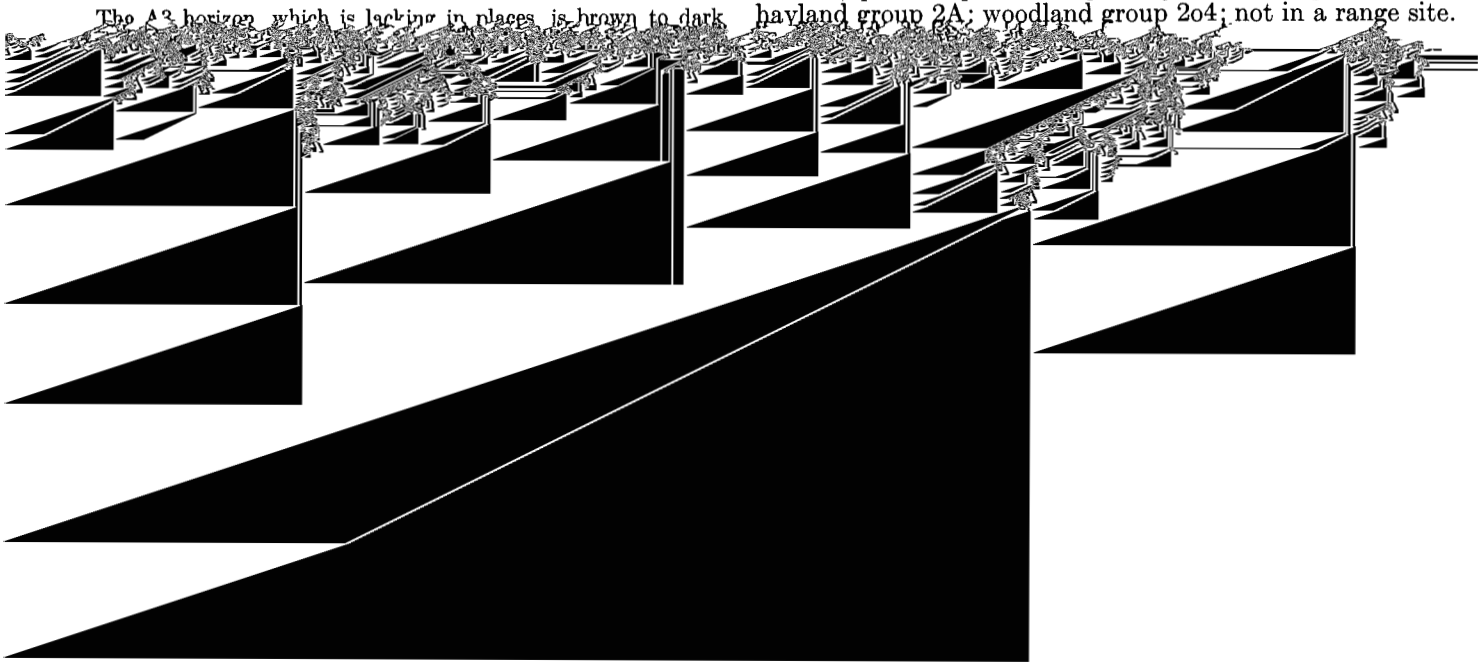
The A3 horizon, which is lacking in places, is brown to dark yellowish brown. The upper part of the B2t horizon ranges from loam to sandy clay loam, and the lower part ranges from fine sandy loam to sandy clay loam. The C horizon is brown or yellowish brown fine sandy to loamy sand. It is at a depth of 30 to 50 inches. The soils range from slightly acid to strongly acid.

Bosket soils are associated with Beulah, Dubbs, McCrory, and Tuckerman soils. They have more clay in the B horizon than Beulah soils, and they have more sand in the A and B horizons than Dubbs soils. They are browner throughout than McCrory and Tuckerman soils. In contrast with McCrory soils, they do not have a horizon that is high in content of sodium.

BoA—Bosket fine sandy loam, 0 to 1 percent slopes. This level soil is on the higher parts of natural levees along creeks and abandoned river channels. Areas range from 20 to 200 acres in size. Included in mapping are spots of Beulah, Dubbs, McCrory, and Tuckerman soils.

This soil is well suited to farming. It is easy to till and can be cultivated throughout a wide range of moisture content. It warms early in spring, and crops can be planted early. Under good management, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Cotton and soybeans are the main crops. Grain sorghum, winter small grain (fig. 4), corn, and peanuts are other suitable crops. Green beans, okra, sweet corn, strawberries, potatoes, tomatoes, and melons are suitable truck crops. Bermudagrass, bahiagrass, tall fescue, and white clover are suitable pasture plants. Capability unit I-1; pasture and hayland group 2A; woodland group 2o4; not in a range site.



BoB—Bosket fine sandy loam, undulating. This soil is in alternating areas of long, narrow swales and low ridges that rise 1 foot to 6 feet above the swales. It is generally on the tops and sides of natural levees. Slopes are 0 to 3 percent. Areas are irregular in shape and range from 20 to 300 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few narrow escarpments, small areas where slopes are more than 3 percent, and spots of Beulah, Dubbs, McCrory, and Tuckerman soils.

The soil is suited to farming. It is easy to till and can be cultivated throughout a wide range of moisture content. It warms early in spring, and crops can be planted early. The erosion hazard is moderate on the steeper parts of ridges. If the soil is bare in spring, the soil blowing hazard is moderate. Under good management, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Cotton and soybeans are the main crops. Grain sorghum, corn, peanuts, and winter small grain are other suitable crops. Okra, green beans, potatoes, tomatoes, sweet corn, melons, and strawberries are suitable truck crops. Bermudagrass, bahiagrass, tall fescue, and white clover are among the suitable pasture plants. Capability unit IIe-1; pasture and hayland group 2A; woodland group 2o4; not in a range site.

Calhoun Series

5/4) mottles and common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; patchy faint clay films on faces of peds; tongues of A2 horizon, 1 inch to 2½ inches wide, are throughout the horizon at 10- to 15-inch intervals; few fine roots; few pores; few dark concretions and accretions; very strongly acid; gradual wavy boundary.

B22tg—19 to 33 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; continuous distinct clay films on faces of peds and in pores; light brownish gray (10YR 6/2) silt-filled cracks between vertical faces of some peds; few roots and red stained root channels; few pores; few dark concretions and accretions; very strongly acid; abrupt smooth boundary.

B23tg—33 to 41 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; firm; continuous distinct clay films on faces of peds; common weblike black stains on peds; few roots and root channels; few dark accretions; strongly acid; clear wavy boundary.

B24tg—41 to 50 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; firm; continuous distinct clay films on faces of peds; few black stains; common dark accretions; neutral; gradual wavy boundary.

Cg—50 to 72 inches; gray (5Y 5/1) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few dark accretions; few pores; neutral.

The Ap horizon is grayish brown, dark grayish brown, or brown. The A2g horizon is gray or light brownish gray. The B horizon is gray or grayish brown silt loam or silty clay loam. The C horizon is

slopes, in a moist idle field in SW¼SW¼NW¼ sec. 6, T. 17 N., R. 2 W.

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; many

green beans are suitable truck crops. Most acreage of this soil is suited to pasture and hay (fig. 5). Bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza are suitable pasture plants. Capability

Figure 5.—**Captina silt loam, 1 to 3 percent slopes, is well suited to forage crops, such as Coastal bermudagrass.**

Clarksville soils are low in natural fertility. Permeability is moderately rapid, and the available water capacity is low. The root zone is very cherty. Droughtiness is a severe limitation. The response to fertilization is poor.

These soils are generally not suited to cultivated crops. They are best suited to pasture, range, wildlife habitat, and woodland. Only a small acreage has been cleared. The rest is woodland.

Representative profile of Clarksville cherty silt loam, 8 to 12 percent slopes, in a moist wooded area in NW¼NW¼SW¼ sec. 6, T. 17 N., R. 3 W.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) cherty silt loam; weak fine granular structure; very friable; common fine roots; few wormholes and castings; about 50 percent chert fragments as much as 6 inches in diameter; slightly acid; clear smooth boundary.

A2—2 to 8 inches; yellowish brown (10YR 5/4) cherty silt loam; few fine distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few wormholes and castings; few dark stains on faces of peds; about 50 percent chert fragments as much as 6 [illegible] few fine pores; about 50 percent chert fragments as much as 6 inches in diameter; slightly acid; clear wavy boundary.

B21t—22 to 46 inches; strong brown (7.5YR 5/6) cherty silty clay loam; many fine and medium distinct yellowish red (5YR 4/8) mottles; weak fine and medium subangular blocky structure; firm; continuous distinct clay films on faces of peds; few fine roots; few pores; common red stains on chert fragments; about 40 percent chert fragments as much as 6 inches in diameter; strongly acid; clear wavy boundary.

B22t—46 to 60 inches; variegated yellowish brown (10YR 5/8), red (2.5YR 4/8), and light gray (10YR 7/1) silty clay; moderate medium subangular blocky structure parting to weak fine angular blocky; firm; continuous distinct clay films on faces of peds; few fine roots; 10 percent chert fragments as much as 6 inches in diameter; very strongly acid; clear wavy boundary.

B3t—60 to 72 inches; variegated yellowish brown (10YR 5/6), red (2.5YR 4/8), and light gray (10YR 7/1) silty clay; moderate medium subangular blocky structure; firm; broken distinct clay films on faces of peds; few pieces of weathered siltstone and sandstone; very strongly acid.

The A1 horizon ranges from pale brown to very dark grayish [illegible]

and the erosion hazard is very severe. The soil is best suited to pasture, range, woodland, or wildlife habitat. Bahiagrass, tall fescue, weeping lovegrass, bermudagrass, annual lespedeza, and sericea lespedeza are suitable pasture plants. Capability unit VIIs-3; pasture and hayland group 8H; woodland group 4f8; range site Chert Hills.

Crowley Series

The Crowley series consists of poorly drained, level soils

Figure 7.—**Crowley silt loam, 0 to 1 percent slopes, is poorly drained. Surface drains are needed if it is used for crops.**

CoA—Crowley silt loam, 0 to 1 percent slopes. This level soil is at higher elevations of broad flats. Areas range from 20 to more than 300 acres in size. Included in mapping are a few narrow escarpments and spots of Calhoun, Foley, Hillemann, and Jackport soils.

This soil is suited to farming, but excess water is a severe hazard. Fieldwork is delayed several days after a rain unless surface drains are installed. Under good management that includes adequate drainage (fig. 7), clean-tilled crops that leave large amounts of residue can be safely grown year after year. Depth to the subsoil should be determined before

doned river channels. These soils formed in stratified beds of loamy sediments. The native vegetation is bottom-land hardwoods and an understory of vines, canes, and shrubs.

In a representative profile the surface layer is brown silt loam about 8 inches thick. The upper 4 inches of the subsoil is brown silt loam; the next 15 inches is brown silty clay loam; and the lower 18 inches is brown, mottled silt loam. The underlying material is light brownish gray, mottled very fine sandy loam to a depth of 72 inches or more.

Dubbs soils are high in natural fertility. Permeability is moderate, and the available water capacity is high. The

pores; few fine dark concretions; medium acid; clear smooth boundary.

B21t—12 to 27 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; continuous distinct clay films on faces of peds and in pores; peds partly coated with silt; few fine roots; few pores; few fine dark concretions; strongly acid; gradual wavy boundary.

B22t—27 to 45 inches; brown (7.5YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; patchy distinct clay films on faces of peds; vertical faces of some peds coated with yellowish brown (10YR 5/4) silt; common pores; few dark concretions; few red stains; very strongly acid; gradual wavy boundary.

C—45 to 72 inches; light brownish gray (2.5Y 6/2) very fine sandy loam; common coarse prominent brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few weblike black stains on faces of some peds; few pores; few dark concretions and accretions; very strongly acid.

The B1 horizon, which is lacking in places, is mainly brown or yellowish brown. The B2t horizon is brown, strong brown, or yellowish brown, and in some pedons the lower part is mottled in

DeA—Dubbs silt loam, 0 to 1 percent slopes. This level soil is on the higher parts of natural levees. Areas range from 10 to 200 acres in size. Included in mapping are a few undulating areas; small spots of Amagon, Bosket, and Dundee soils; and small areas where the surface layer is fine sandy loam.

This soil is well suited to farming (fig. 8). It warms early in spring, and crops can be planted early. If management is good, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Cotton and soybeans are the main crops. Grain sorghum, corn, peanuts, and winter small grain are other suitable crops. Truck crops, such as green beans, okra, tomatoes, sweet corn, strawberries, and potatoes, can be grown. Bermudagrass, bahiagrass, and white clover are suitable pasture plants. Capability unit I-1; pasture and hayland group 2A; woodland group 2o4; not in a range site.

DeB—Dubbs silt loam, 1 to 3 percent slopes. This soil is mainly on the tops and sides of natural levees in

and Dundee soils; and small areas where the surface layer is fine sandy loam.

This soil is suited to farming. The erosion hazard is moderate in the steeper areas. The soil warms early in spring and can be planted early. If management is good, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Cotton and soybeans are the main crops. Corn, grain sorghum, peanuts, and winter small grain are other suitable

is silt loam or silty clay loam. The B3 horizon is grayish brown, light brownish gray, or gray silt loam, silty clay loam, or fine sandy loam. The C horizon is gray or light brownish gray fine sandy loam, silt loam, silty clay loam, or silty clay. These soils are medium acid to very strongly acid in unlimed areas.

Dundee soils are associated with Amagon, Dubbs, and Sharkey soils. They are browner in the upper part of the B horizon than Amagon soils and lack an A2g horizon. They are grayer throughout the B horizon than Dubbs soils. They are browner and have less clay in the B horizon than Sharkey soils.

surface layer. The next 31 inches is olive gray silty clay loam. The lower part is olive gray, mottled silt loam to a depth of 72 inches or more.

Foley soils are moderate in natural fertility. Permeability is slow, and the available water capacity is medium. Because the content of sodium and magnesium is high in the lower part of the subsoil, the effective rooting depth is limited. The soils are easy to till, but the surface puddles and crusts over after rain.

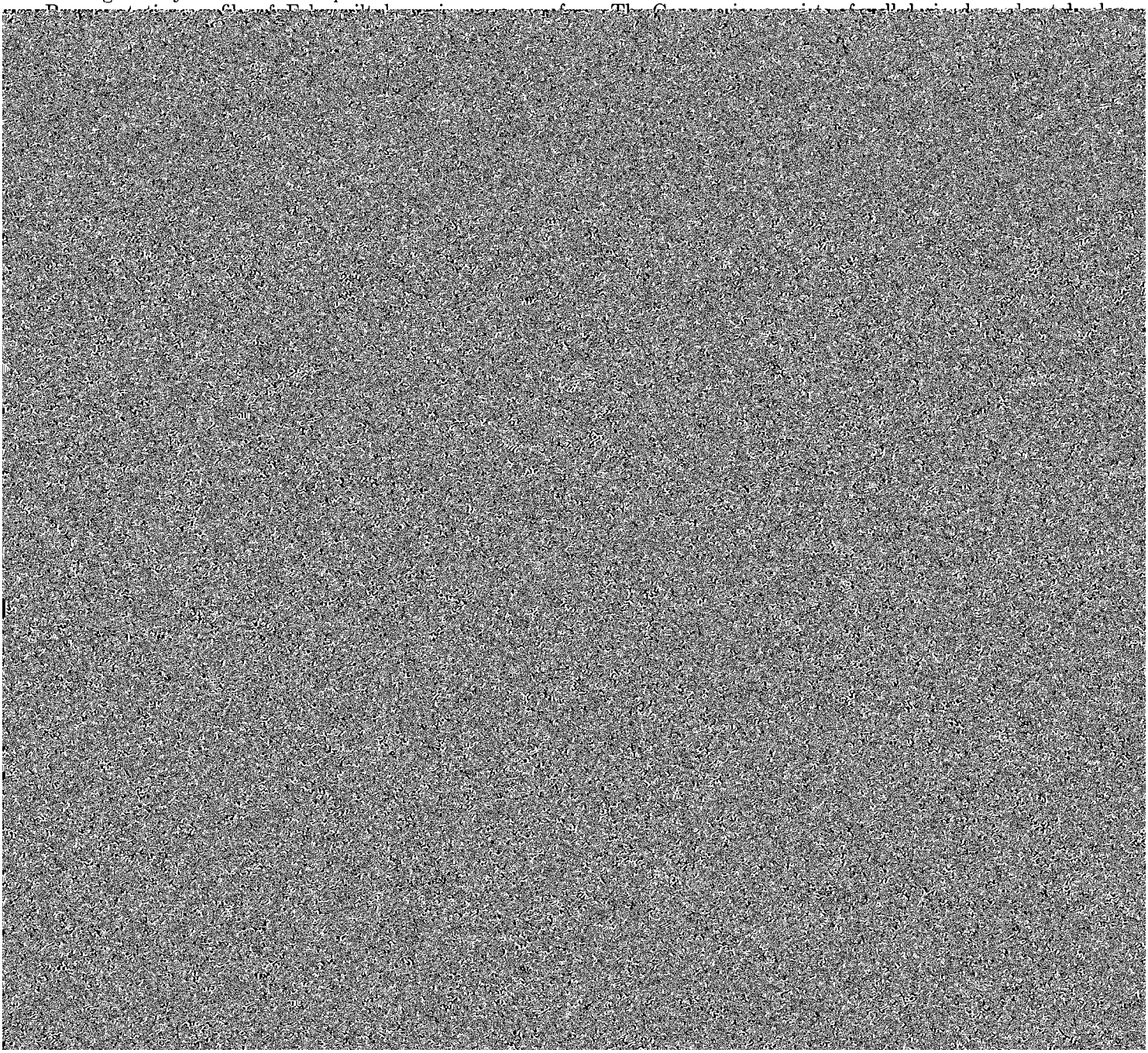
If drained and well managed, these soils are suited to most crops grown in the county. Most of the acreage is cultivated.

The Foley soils in Lawrence County are mapped only with Calhoun or Lafe soils. Areas that are dominantly Lafe soils are generally idle or used for pasture.

that leave large amounts of residue can be safely grown year after year. If the unit is graded and smoothed, depth to the sodium-affected layer should be determined before cuts are made. If sodium-affected material is too near to the surface, productivity is impaired.

Soybeans and grain sorghum are the main crops. Rice and cotton also are suitable. Winter small grain can be grown if surface drainage is adequate. Bermudagrass, bahiagrass, tall fescue, and white clover are suitable pasture plants. Capability unit IIIw-3; pasture and hayland group 8F; woodland group 3w9; not in a range site.

Gepp Series



The A1 horizon is dark grayish brown or very dark grayish brown. The A2 horizon is brown or yellowish brown. In cultivated areas, the Ap horizon is brown or grayish brown. In places the B1 horizon is lacking. The B2t horizon is red or yellowish red, and the lower part is mottled in shades of brown and gray. The B3t horizon is dominantly red or strong brown and is mottled with gray and yellowish brown.

Chert fragments in the A horizon range from 25 to 55 percent by volume and from 10 to 30 percent by volume in the B1 horizon. The A horizon is slightly acid to strongly acid, and the B horizon is strongly acid or very strongly acid.

Gepp soils are associated with Agnos, Boden, Clarksville, and Ventris soils. They are redder throughout than Agnos and Ventris soils. They lack the cherty B horizon of Clarksville soils. They have a thicker B horizon and less sand and more chert in the A horizon than Boden soils.

GpD—Gepp cherty silt loam, 8 to 12 percent slopes. This moderately sloping soil is mainly on toe slopes and hilltops. Areas range from 10 to 100 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few spots of Agnos, Boden, Clarksville, and Ventris soils.

This soil is poorly suited to cultivated crops. Runoff is rapid, and the erosion hazard is very severe. The soil is suited to sown crops, such as winter small grain and legumes, if erosion is controlled.

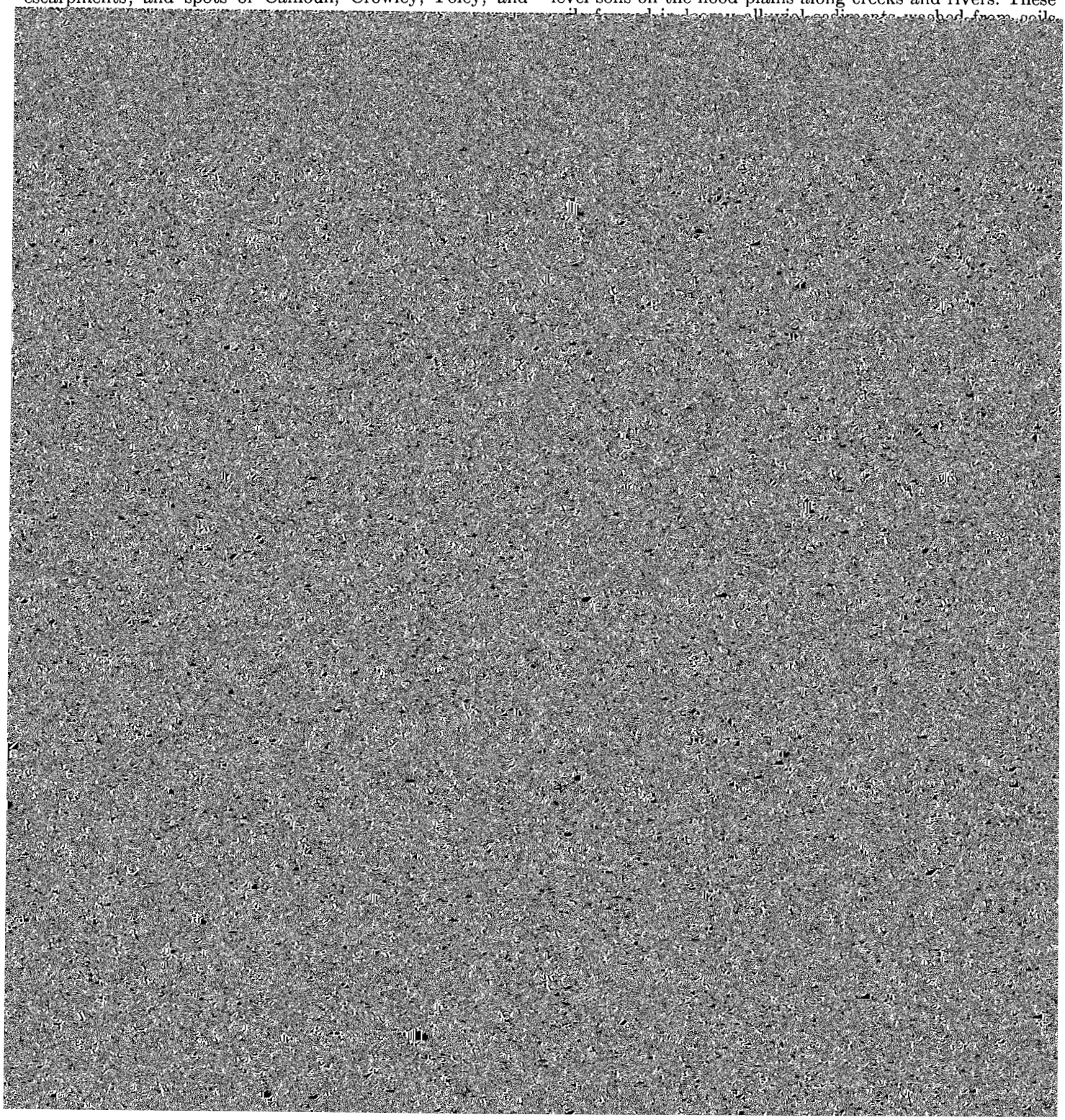
This soil is best suited to pasture, range, wildlife habitat, or woodland, and most of the acreage is used for those purposes. Bermudagrass, bahiagrass, tall fescue, orchardgrass, white clover, alfalfa, sericea lespedeza, and annual lespedeza are suitable pasture plants. Capability unit IVe-3; pasture and hayland group 8A; woodland group 3o7; range site Loamy Upland.

GpE—Gepp cherty silt loam, 12 to 20 percent slopes. This moderately steep soil is on sharp ridges and hillsides. Areas range from 10 to more than 300 acres in size. Included in mapping are spots of Agnos, Boden, Clarksville, and Ventris soils and a few small areas where coarse cherty fragments are on the surface.

and are used for forage crops or pasture. A few small low [illegible] loamy eolian or alluvial sediments [illegible]

Crowley and Jackport soils. They are more acid in the B2t horizon than Foley soils and commonly have a red, mottled subhorizon in the B2t horizon that is lacking in Foley and Calhoun soils.

Hn—Hillemann silt loam. This level soil is at the higher elevations on broad flats. The slope is less than 1 percent. Areas range from 10 to 150 acres in size. Included in mapping are a few areas where slope is 1 to 3 percent; a few narrow escarpments; and spots of Calhoun, Crowley, Foley, and



are suitable pasture plants. Capability unit IIw-2; pasture and hayland group 8F; woodland group 3w9; not in a range site.

Hontas Series

The Hontas series consists of moderately well drained, level soils on the flood plains along creeks and rivers. These

Representative profile of Hontas silt loam in an area of Hontas soils, frequently flooded, in a moist cultivated area in NW¼SW¼NW¼ sec. 22, T. 16 N., R. 3 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few fine roots; few fine concretions; slightly acid; clear smooth boundary.

A12—7 to 11 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few wormholes and castings; few pores; slightly acid; clear smooth boundary.

B21—11 to 15 inches; brown (10YR 4/3) silt loam; common medium faint brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure;

Capability unit IVw-1; pasture and hayland group 2A; woodland group 2w7; not in a range site.

Jackport Series

The Jackport series consists of poorly drained, level soils in abandoned backswamps. These soils formed in beds of dominantly clayey sediments. The native vegetation is hardwoods, mainly water-tolerant oaks.

In a representative profile the surface layer is 8 inches of dark grayish brown silty clay that is mottled in the lower 3

Hillemann soils. They have a finer textured A horizon than those soils. They lack the A2 horizon that is typical of Crowley soils. They have more clay in the B horizon than Calhoun, Foley, and Hillemann soils.

Ja—Jackport silty clay. This level soil is in broad depressions. Slopes are generally less than 1 percent. Areas range from 20 to more than 500 acres in size. Included in mapping are spots of Calhoun, Crowley, Foley, and Hillemann soils. Also included are irrigated areas where the upper part of the subsoil is slightly acid or neutral.

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

Soybeans is the main crop. Rice and grain sorghum are other suitable crops (fig. 11). Winter small grain can be grown if surface drainage is adequate. Bermudagrass, tall fescue, and white clover are suitable pasture plants. Capa-

eolian or alluvial sediments that are high in content of silt. The native vegetation is a sparse stand of drought-tolerant trees and forbs and an understory of grasses (fig. 12).

In a representative profile the surface layer is brown silt loam about 7 inches thick. The subsurface layer is grayish brown, mottled silt loam 3 inches thick. The upper 10 inches of the subsoil is yellowish brown, mottled silt loam, and the lower 15 inches is brown, mottled silt loam. The underlying material is light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Lafe soils are low in natural fertility. Permeability is very slow, and the available water capacity is low. The response to fertilization is poor.

Because of the high content of sodium and magnesium, at toxic levels to most plants, these soils are poorly suited to cultivated crops. They are best suited to pasture and wildlife habitat.

The Lafe soils in this county are mapped with Foley soils.

Representative profile of Lafe silt loam in a moist cultivated area of Lafe-Foley complex, 0 to 1 percent slopes, in

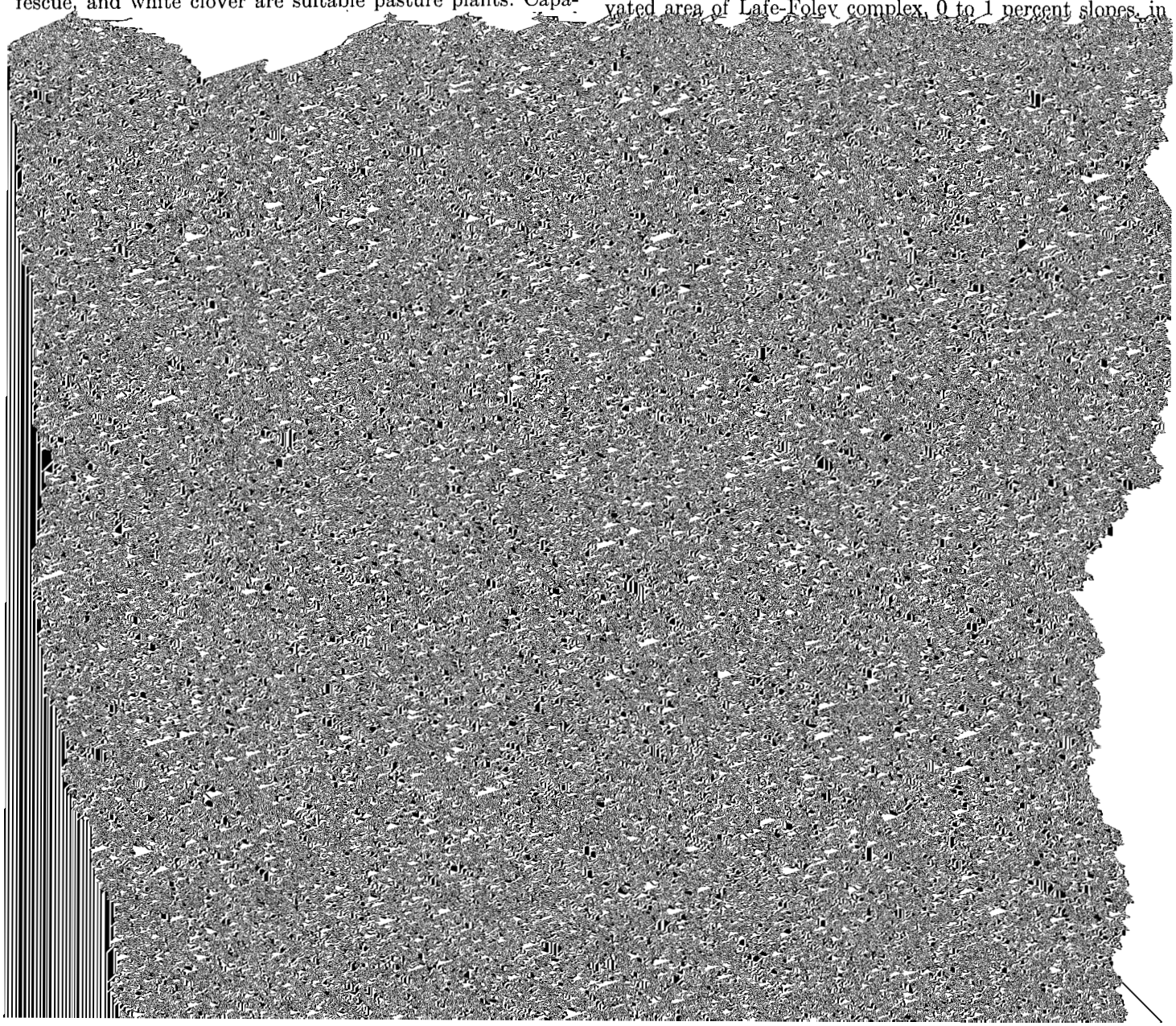


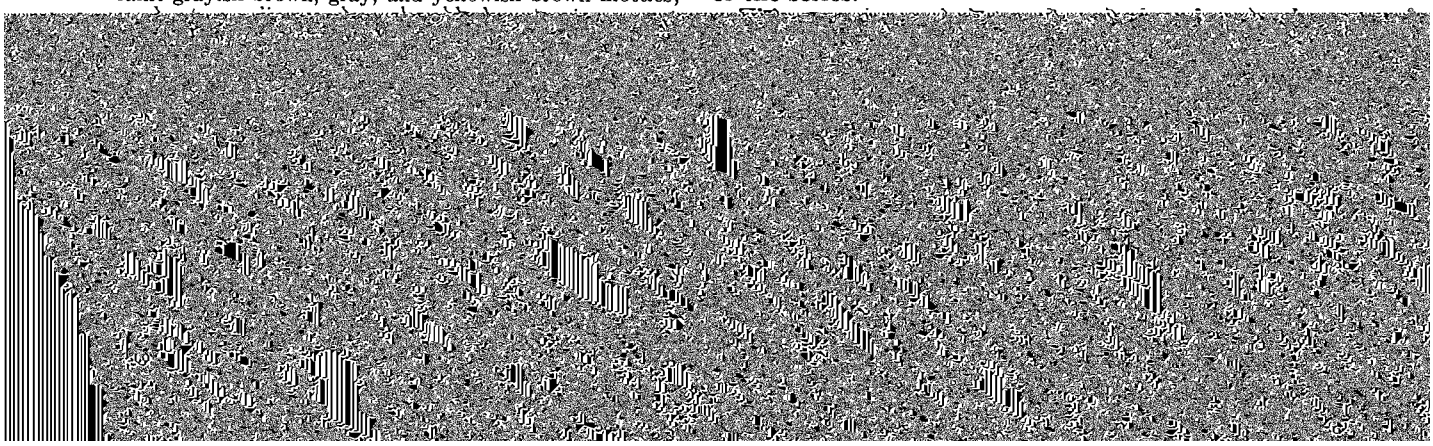
Figure 12.—**Native vegetation on Lafe silt loam in an area of Lafe-Foley complex, 0 to 1 percent slopes.**

angular blocky structure; friable; few fine roots; common pores; few dark concretions; medium acid; clear smooth boundary.

B21t—10 to 20 inches; yellowish brown (10YR 5/4) silt loam; common fine faint grayish brown (10YR 5/2), dark grayish brown (10YR 4/2), and gray (10YR 6/1) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; continuous distinct clay films on faces of peds; pale brown silt coatings on prism faces; few pores; few medium roots; few dark concretions; moderately alkaline; clear wavy boundary.

B22t—20 to 35 inches; brown (10YR 5/3) silt loam; common fine faint grayish brown, gray, and yellowish brown mottles; concentration of sodium and magnesium is nearer the surface than in those soils.

LfA—Lafe-Foley complex, 0 to 1 percent slopes. This level mapping unit is on broad flats. Individual areas range from 20 to more than 300 acres in size and are 25 to 75 percent Lafe soil and 25 to 75 percent Foley soil. About 55 percent of the total acreage is Lafe silt loam, 35 percent is Foley silt loam, and 10 percent is spots of Calhoun silt loam. The profile of the Lafe soil is the one described as representative of the series.



life habitat. Bermudagrass and annual lespedeza are the best suited pasture plants. Capability unit IVs-1; pasture and hayland group 8E; woodland group 5t0; range site Alkali Flats.

Loring Series

The Loring series consists of moderately well drained, gently sloping and moderately sloping soils on hillcrests, hillsides, and valleysides in the uplands. These soils formed in loamy windblown sediments high in content of silt. The native vegetation is hardwoods.

In a representative profile the surface layer is dark yellowish brown silt loam about 4 inches thick. The upper 6 inches of the subsoil is strong brown silt loam, and the next 9 inches is yellowish brown silty clay loam. Below this is a firm, brittle fragipan. The upper 33 inches of the pan is strong brown, mottled and streaked silty clay loam, and the lower part is brown silt loam to a depth of 72 inches or more.

Loring soils are moderate in natural fertility. Permeability is moderately slow, and the available water capacity is high. The firm, brittle fragipan slows the movement of water

undisturbed areas the A1 horizon is dark grayish brown and is 1 inch to 3 inches thick. If present, the A12 horizon is brown or yellowish brown silt loam and is 0 to 5 inches thick. The B2t horizon is strong brown, brown, or yellowish brown silt loam or silty clay loam. The Bx horizon is at a depth of 18 to 26 inches. It is strong brown, brown, and yellowish brown silt loam or silty clay loam and is mottled in shades of gray, brown, and red. The A horizon is slightly acid to strongly acid, and the B horizon is medium acid or strongly acid.

Loring soils are associated with Captina and Portia soils. They have more than 35 percent base saturation within 30 inches beneath the top of the fragipan, and Captina soils have less than 35 percent base saturation within this depth. They have less sand throughout than Portia soils.

LoC2—Loring silt loam, 3 to 8 percent slopes, eroded. This gently sloping soil is on hillcrests and hillsides. Areas range from 20 to more than 200 acres in size. There are a few rills and shallow gullies. The profile of this soil is the one described as representative of the series. Included in mapping are a few spots of Captina and Portia soils and a few, small, severely eroded areas.

This soil is suited to farming, but runoff is medium to rapid and the erosion hazard is severe. Under good management that includes contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be safely grown

In a representative profile the surface layer is dark grayish brown fine sandy loam about 8 inches thick. The subsurface layer is gray, mottled fine sandy loam about 4 inches thick. The upper 8 inches of the subsoil is dark gray, mottled fine sandy loam; the next 12 inches is dark gray loam; and the lower 12 inches is dark gray, mottled fine sandy loam. The underlying material is grayish brown loamy fine sand to a depth of 72 inches or more.

McCrory soils are moderate in natural fertility. Permeability is slow, and the available water capacity is medium. The soils respond well to fertilization. They are easy to till and can be cultivated within a wide range of moisture content.

If drained and well managed, these soils are suited to most crops grown in the county. Most of the acreage is cultivated.

Representative profile of McCrory fine sandy loam in a moist cultivated area in NW¼NE¼NW¼ sec. 36, T. 17 N., R. 1 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine and medium granular structure; very friable; few fine roots; few dark concretions; strongly acid; abrupt smooth boundary.

A2g—8 to 12 inches; gray (10YR 6/1) fine sandy loam; common medium faint light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; common pores; few fine dark concretions; strongly acid; clear wavy boundary.

B1g—12 to 20 inches; dark gray (10YR 4/1) fine sandy loam; common fine faint dark grayish brown mottles; weak coarse prismatic structure; friable; light brownish gray (10YR 6/2) coatings on vertical faces of peds; few fine

hazard. Some areas are flooded occasionally, but rarely between June and January. Fieldwork is delayed several days after a rain unless surface drains are installed. Under good management that includes adequate drainage, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

Soybeans and grain sorghum are the main crops, and cotton also is suited. Winter small grain is grown where surface drainage is adequate, but the crop may be damaged by flooding at lower elevations during some years. Bermudagrass, bahiagrass, tall fescue, annual lespedeza, and white clover are suitable pasture plants. Capability unit IIIw-3; pasture and hayland group 8F; woodland group 3w6; not in a range site.

Patterson Series

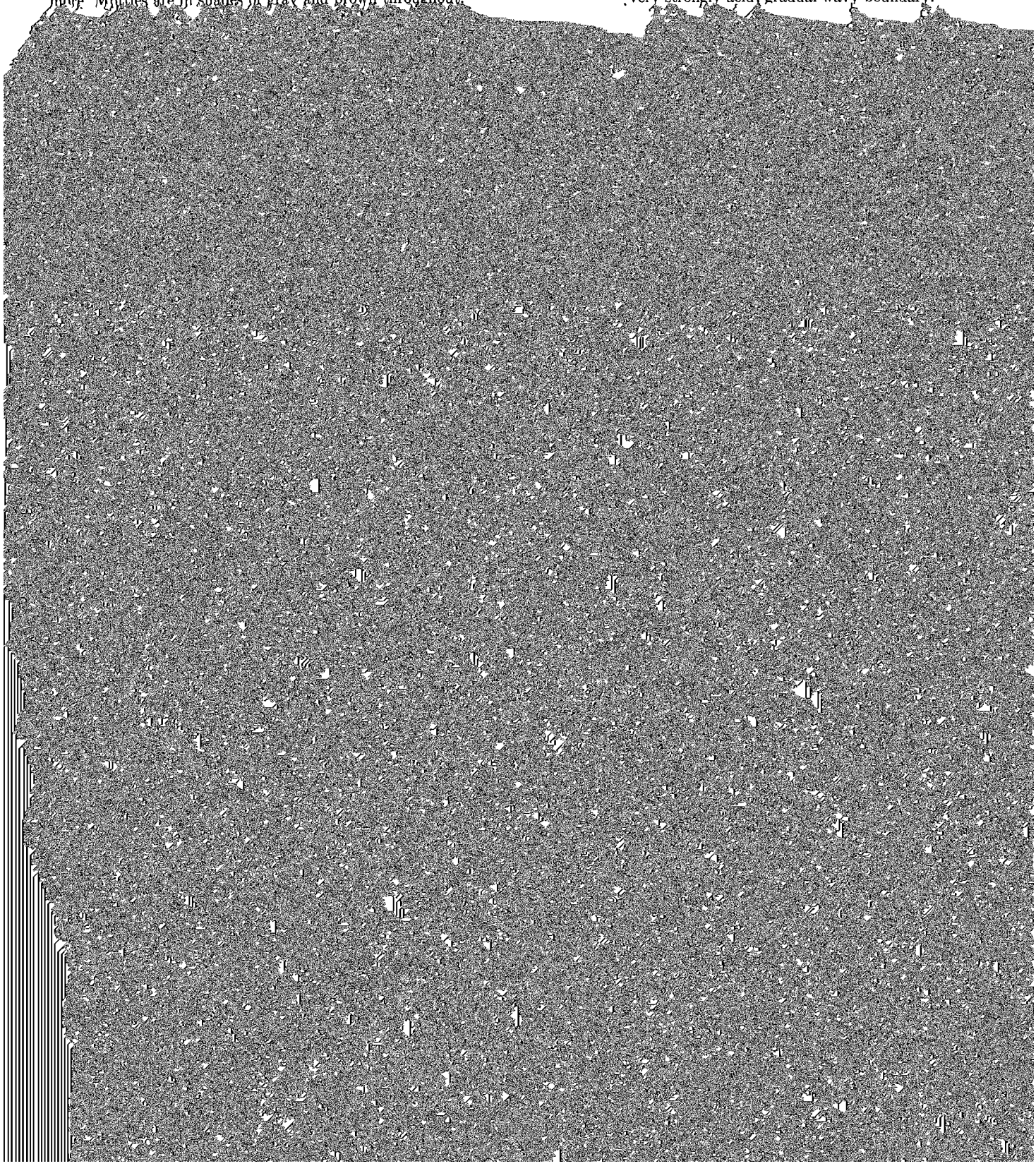
The Patterson series consists of somewhat poorly drained, level soils in depressions in natural levees. These soils formed in loamy alluvial sediments. The native vegetation is hardwoods.

In a representative profile the surface layer is dark grayish brown fine sandy loam about 11 inches thick. The subsoil is grayish brown, mottled fine sandy loam 21 inches thick. The underlying material is gray, mottled loamy fine sand, fine sandy loam, and loamy sand to a depth of 72 inches or more.

Patterson soils are moderate in natural fertility. Permeability is moderately rapid, and the available water capacity is medium to low. The soils respond well to fertilization. The

The A horizon ranges from dark grayish brown to brown. The B horizon is grayish brown or dark grayish brown. In places there is a IIC or buried horizon of finer texture at a depth of 40 inches or more. Mottles are in shades of gray and brown throughout.

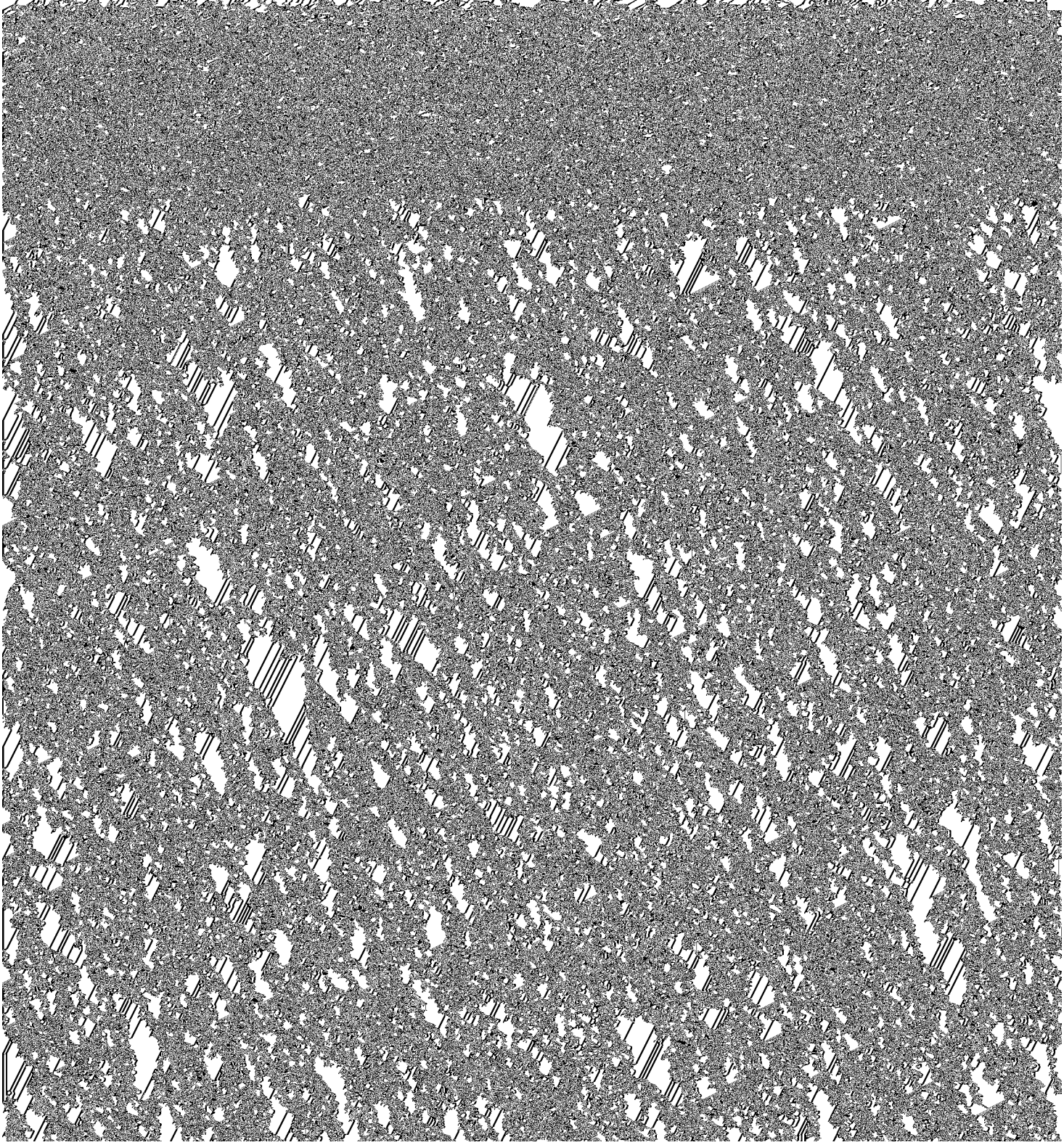
prominent clay films on faces of peds; few fine roots; few pores; few fine black concretions; few thin strong brown silt coats on peds; few animal holes; few chert fragments; very strongly acid; gradual wavy boundary.



material weathered from sandstone, siltstone, shale, and other sediments. The native vegetation is hardwoods.

In a representative profile the surface layer is brown fine sandy loam about 3 inches thick. The subsurface layer is yellowish brown fine sandy loam 3 inches thick. The upper 5 inches of the subsoil is strong brown fine sandy loam; the

PoC—Portia fine sandy loam, 3 to 8 percent slopes. This gently sloping soil is on hillcrests and hillsides. Areas range from 10 to 200 acres in size. The profile of this soil is the one described as representative of the series. Included in mapping are a few small areas where slopes are as much as 12 percent; narrow creek bottom lands; and spots of



is gray, mottled clay; and the lower 26 inches is dark gray, hillsides. These soils formed in loamy material weathered

of the series. Included in mapping are a few small areas where slopes are less than 3 percent; spots of Captina and Clarksville soils; and a soil that is similar to this Tonti soil but has clay at a depth of 40 to 72 inches, below the fragipan.

This soil is suited to farming, but the surface layer is cherty and is difficult to till. Runoff is moderate, and the erosion hazard is severe. Under good management that includes terraces and contour cultivation, clean-tilled crops that leave large amounts of residue can be safely grown year after year in the less sloping areas. Conservation must be intensified as slope increases.

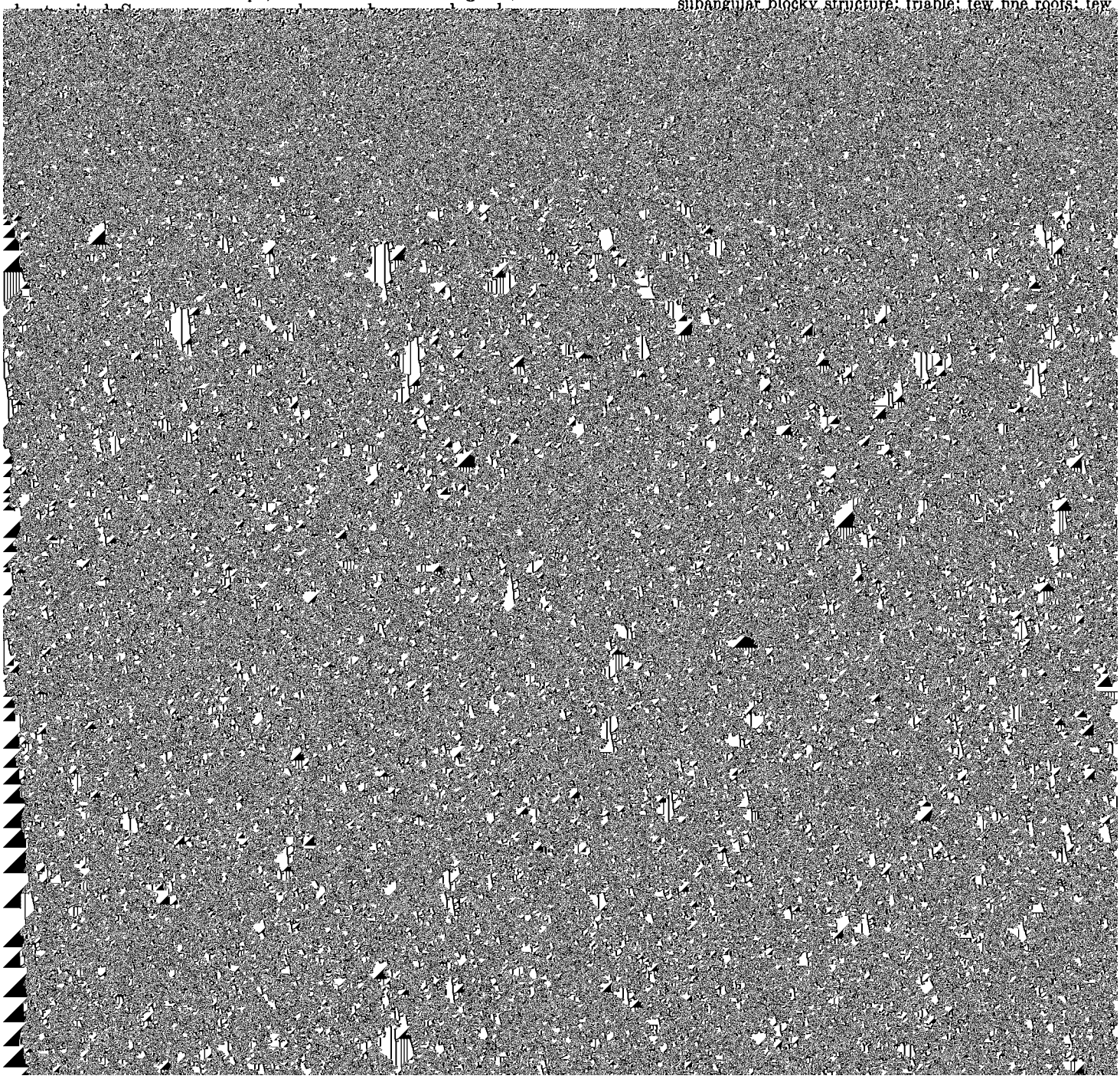
Broadcast or drilled crops, such as winter small grain, are

If drained and well managed, these soils are suited to most crops grown in the county. Most of the acreage is cultivated. The rest is used for pasture and woodland.

Representative profile of Tuckerman fine sandy loam in a moist cultivated area in the NE¼SE¼NE¼ sec. 7, T. 15 N., R. 1 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine and medium granular structure; very friable; few fine roots; few fine dark concretions; medium acid; abrupt smooth boundary.

B1g—8 to 12 inches; gray (10YR 5/1) fine sandy loam; few fine faint brown and dark brown mottles; moderate medium subangular blocky structure; friable; few fine roots; few



Ventris Series

The Ventris series consists of moderately well drained, gently sloping to steep soils on hilltops, hillsides, and benches. These soils formed in a thin layer of loamy material and the underlying clayey material weathered from limestone or mixed limestone and shale. The native vegetation is hardwoods.

In a representative profile the surface layer is very dark grayish brown silty clay loam about 4 inches thick. The subsoil is light olive brown, mottled clay about 24 inches thick. The upper 9 inches is mottled with yellowish red and yellowish brown, and the lower 15 inches is mottled with light brownish gray and gray. Bedrock is at a depth of about 28 inches.

Ventris soils are moderate in natural fertility, but are low in productivity. The surface layer is thin, and in places rock crops out. These limitations and the clayey subsoil restrict root penetration and movement of water through the soil. Permeability is very slow, and the available water capacity is medium.

These soils are generally not suitable for cultivation. They are best suited to pasture, range, wildlife habitat, and woodland. Only a small acreage is cleared. The rest is wooded.

Representative profile of Ventris silty clay loam, in a moist wooded area of Ventris-Rock outcrop complex, 12 to 30 percent slopes, in NE¼NE¼SW¼ sec. 18, T. 18 N., R. 2 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silty clay loam; common fine faint brown mottles; weak fine subangular blocky structure; friable; many wormholes and castings; many fine roots; about 10 percent, by volume, limestone and chert fragments as much as 6 inches in diameter; neutral; clear smooth boundary.

B21t—4 to 13 inches; light olive brown (2.5Y 5/4) clay; many medium distinct yellowish brown (10YR 5/8) and yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure parting to weak fine angular blocky structure; firm; continuous distinct clay films on faces of peds; few wormholes in upper part filled with material from the horizon above; common fine roots; few small chert fragments; slightly acid; gradual smooth boundary.

B22t—13 to 26 inches; light olive brown (2.5Y 5/6) clay; few medium faint light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few slickensides; common pressure faces; few fine roots; common fine soft black accretions; mildly alkaline; clear wavy boundary.

B3—26 to 28 inches; mottled light olive brown (2.5Y 5/6) and gray (10YR 6/1) clay; weak medium subangular blocky structure; firm; few medium roots; few chert and limestone fragments; mildly alkaline; abrupt wavy boundary.

R—28 inches; bedrock.

The A horizon is very dark grayish brown to dark brown. In places there is a 1- to 4-inch A2 horizon that is dark grayish brown silt loam or silty clay loam. Stones are on and in the surface layer in [illegible] yellowish brown [illegible]

to Ventris soil but has a red subsoil. Areas range from 10 to 100 acres in size.

This mapping unit generally is not suited to cultivated crops and is poorly suited to improved pasture. The surface stones and outcrops of rock restrict the use of farm equipment, and most of the acreage is droughty. The unit is best suited to native grass pasture, wildlife habitat, and woodland. Most of the acreage is woodland of eastern redcedar and poor-quality upland oaks. Capability unit VIIs-1; pasture and hayland group 8K; woodland group 5x2; range site Clay Break Limestone.

VrF—Ventris-Rock outcrop complex, 12 to 30 percent slopes. This moderately steep and steep mapping unit is on hillsides. It is 40 percent Ventris silty clay loam, 25 percent Rock outcrop, and 35 percent Agnos and Gepp soils and a soil that is similar to the Ventris soil but has a red subsoil. The profile of the Ventris soil is the one described as representative of the series. Areas range from 10 to 100 acres in size.

This mapping unit is not suited to cultivated crops and is poorly suited to improved pasture. The slope, surface stones, and Rock outcrop severely restrict the use of farm equipment, and part of the acreage is droughty. The unit is best suited to native grass pasture, wildlife habitat, and woodland. Most of the acreage is woodland of eastern redcedar or poor-quality upland oaks. Capability unit VIIs-1; pasture and hayland group 8D; woodland group 5x2; range site Clay Break Limestone.

Use and Management of the Soils

This part of the survey relates to the use, suitability, and limitations of the soils for crops, pasture and hayland, wildlife habitat, woodland, range, engineering, town and country planning, and recreation.

Crops[2]

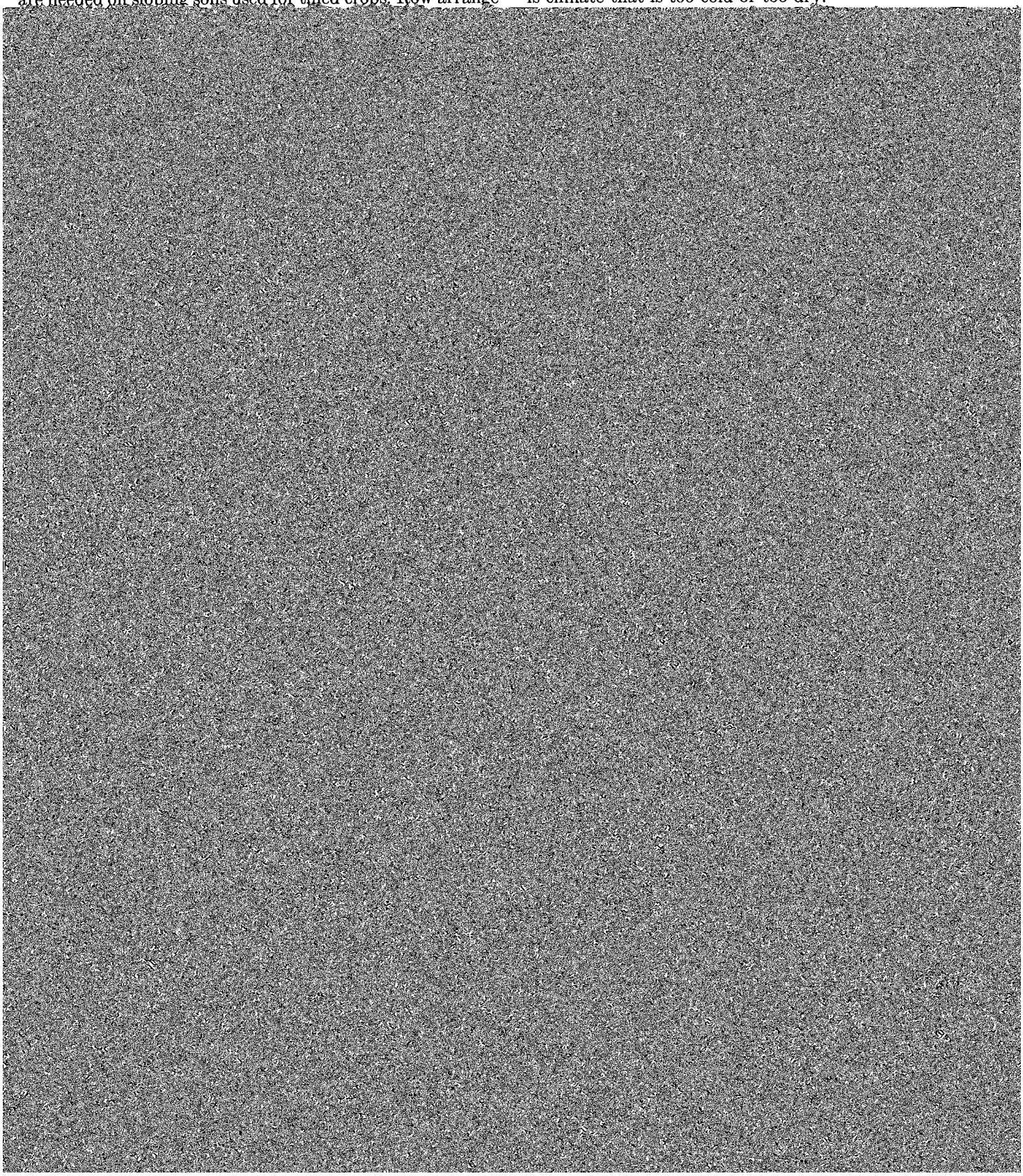
This section describes management of the soils of Lawrence County for crops and explains the system of capability grouping used by the Soil Conservation Service. It also provides a table showing predicted yields of the principal crops under improved management.

In the upland part of the county, most cleared areas are used for forage for livestock, mainly beef cattle. Scattered farms grow small acreages of truck crops, orchard crops, and berries; field corn; and small grain, soybeans, and sorghum.

On the bottom land, most of the acreage is cleared and used for such crops as corn, cotton, grain sorghum, rice, soybeans, and winter small grain. Peanuts and watermelons

Contour cultivation, vegetated waterways, and terraces are needed on sloping soils used for tilled crops. Row arrange-

droughty, or stony; and *c* indicates that the chief limitation is climate that is too cold or too dry.



Unit IIIw–2.—Level, poorly drained, deep loamy soils that have a predominantly clayey subsoil; on broad flats.

Unit IIIw–3.—Level, poorly drained, deep loamy soils that have a high content of sodium in the middle and lower part of the subsoil; on broad flats.

Unit IIIw–4.—Level, poorly drained, deep clayey soils in active and abandoned back swamps.

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

Subclass IVe.—Soils subject to very severe erosion if they are cultivated and not protected.

Unit IVe–1.—Moderately sloping, moderately well drained, deep loamy soils that have a fragipan; on uplands.

Unit IVe–2.—Moderately sloping, well drained, deep loamy soils on uplands.

Unit IVe–3.—Moderately sloping, well drained, deep loamy soils that have a predominantly clayey subsoil; on uplands.

Unit IVe–4.—Gently sloping, well drained, deep loamy soils that have a predominantly clayey subsoil; on uplands.

Subclass IVw.—Soils subject to frequent flooding in winter and spring unless protected.

Unit IVw–1.—Level, well drained and moderately well drained, deep loamy soils on bottom land.

Subclass IVs.—Soils very severely limited by low available water capacity.

Unit IVs–1.—Level, poorly drained to somewhat poorly drained, deep loamy soils that have a high content of sodium at variable depths in the subsoil; on broad flats.

Class V.—Soils subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat. (None in Lawrence County.)

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

Subclass VIe.—Soils severely limited by rapid runoff and erosion hazard unless a protective cover is maintained.

Unit VIe–1.—Moderately sloping, well drained, deep loamy soils that have a predominantly clayey subsoil; on uplands.

Unit VIe–2.—Moderately steep, well drained, deep loamy soils that have a predominantly clayey subsoil; on uplands.

Subclass VIs.—Soils severely limited by surface stones, low available water capacity, and risk of erosion unless a protective cover is maintained.

Unit VIs–1.—Moderately sloping, somewhat excessively drained, deep loamy soils that are cherty throughout; on uplands.

Unit VIs–2.—Gently sloping and moderately sloping, deep loamy soils that have stones on the surface and have a clayey subsoil; on uplands.

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

Subclass VIIs.—Soils very severely limited by surface stones, slope, and risk of erosion unless a protective cover is maintained.

Unit VIIs–1.—Gently sloping to steep, moderately well drained, moderately deep loamy soils that have stones on the surface and a clayey subsoil; on uplands. Most areas are intermingled with Rock outcrop.

Unit VIIs–2.—Moderately steep to steep, well drained, deep loamy soils that have stones on the surface and have a clayey subsoil; on uplands.

Unit VIIs–3.—Moderately steep, somewhat excessively drained, deep loamy soils that are cherty throughout; on uplands.

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

Predicted Yields

The predicted yields of principal crops shown in table 3 are based mainly on data supplied by farmers, soil scientists, agronomists, and others who have knowledge of yields in the county and on information based on research data. These predicted average yields per acre are obtained by farmers at the level of management that tends to produce the highest economic return.

Crops other than those shown in table 3 are grown in the county, but the acreage is small or reliable yield data are not available. Not included in table 3 are soils that are mainly in urban development.

The predicted yields given in table 3 can be expected under the following management:

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

Pasture and Hay[3]

General guidelines for managing soils for pasture and hay are described in this section. The soils in the county are assigned to 12 pasture and hayland groups, and each group is described. The pasture and hayland group for each soil in the county is given at the end of each mapping unit description. For detailed information about management, refer to the section "Descriptions of the Soils."

A large part of the upland in Lawrence County is used for pasture and hay. The trend in this part of the county has been to convert cropland to forage crops. More tracts of woodland are being cleared each year for production of forage.

Tall fescue and bermudagrass are the principal base grasses grown. They are well suited to most soils of the county. On many farms tall fescue is the only permanent grass grown.

[3] W. Wilson Ferguson, conservation agronomist, Soil Conservation Service, helped prepare this section.

TABLE 3.—*Predicted average yields per acre of principal crops*

[The yields listed can be obtained under improved management. Absence of a figure indicates that the crop is not suited to or is not commonly grown on the soil]

Soil	Cotton	Rice	Soybeans	Wheat	Grain sorghum	Bahia-grass	Hybrid bermuda-grass	Common bermuda-grass	Tall fescue
	Lb of lint	*Bu*	*Bu*	*Bu*	*Cwt*	*AUM* [1]	*AUM* [1]	*AUM* [1]	*AUM* [1]
Agnos cherty silt loam, 3 to 8 percent slopes				25		5.5		5.0	5.0
Agnos cherty silt loam, 8 to 12 percent slopes						5.0		4.5	4.5
Agnos stony silt loam, 3 to 12 percent slopes						4.5		4.0	4.0
Agnos soils, 12 to 25 percent slopes						4.0		3.5	3.5
Amagon silt loam	650	120	35		50			7.5	9.0
Beulah sandy loam, undulating	550		30	45	45		10.0	7.0	7.0
Boden gravelly sandy loam, 3 to 8 percent slopes				25		5.5		5.0	5.0
Boden gravelly sandy loam, 8 to 12 percent slopes						5.0		4.5	4.5
Boden gravelly sandy loam, 12 to 20 percent slopes						5.0		4.5	4.5
Bosket fine sandy loam, 0 to 1 percent slopes	800		40	50	60		12.0	10.0	10.0
Bosket fine sandy loam, undulating	750		35	50	60		12.0	10.0	10.0
Captina silt loam, 1 to 3 percent slopes			20	25	30	8.5	8.0	6.5	8.0
Captina silt loam, 3 to 8 percent slopes				30		7.5	7.0		7.0
Captina silt loam, 8 to 12 percent slopes						6.5	6.0		6.0
Clarksville cherty silt loam, 8 to 12 percent slopes						4.5		4.0	5.0
Clarksville cherty silt loam, 12 to 20 percent slopes						4.5		4.0	5.0
Crowley silt loam, 0 to 1 percent slopes	475	130	30		50	6.0	8.0	5.5	6.5
Dubbs silt loam, 0 to 1 percent slopes	850		40	45	60		12.0	9.0	10.0
Dubbs silt loam, 1 to 3 percent slopes	800		35	40	60		12.0	9.0	10.0
Dundee silt loam, 0 to 1 percent slopes	750	120	40	40	60		9.0		9.0
Dundee silt loam, gently undulating	750		35	35	60		9.0		9.0
Foley-Calhoun complex, 0 to 1 percent slopes	650	120	30	30	45	6.5		6.0	8.0
Gepp cherty silt loam, 8 to 12 percent slopes						6.5	6.5	5.5	5.5
Gepp cherty silt loam, 12 to 20 percent slopes						5.5	5.5	5.0	5.0
Healing silt loam, frequently flooded			30		50		10.0		7.5
Hillemann silt loam	600	120	35	40	50			7.0	7.0
Hontas soils, frequently flooded			30		45		8.5		7.5
Jackport silty clay	550	130	35		50			7.0	8.0
Lafe-Foley complex, 0 to 1 percent slopes	350	80	20	25	35	4.0		3.5	
Loring silt loam, 3 to 8 percent slopes, eroded				35		7.0	8.0	6.5	6.5
Loring silt loam, 8 to 12 percent slopes, eroded						7.0	7.5	6.0	6.5
McCrory fine sandy loam	650	120	30	40	45			6.0	8.0
Patterson fine sandy loam	550		30	30	45		8.0		8.0
Peridge silt loam, 3 to 8 percent slopes, eroded				45	50	8.0	7.5		7.5
Portia fine sandy loam, 3 to 8 percent slopes				35	45	7.5	7.0		7.0
Portia fine sandy loam, 8 to 12 percent slopes						6.5	6.0		6.0
Sharkey silty clay	650	130	35		50			6.5	9.0
Tonti cherty silt loam, 3 to 8 percent slopes				35		7.5	7.0		7.0
Tonti cherty silt loam, 8 to 12 percent slopes						6.5	6.0		6.0
Tuckerman fine sandy loam	700		30		45			7.5	9.0
Ventris-Rock outcrop complex, 3 to 12 percent slopes						4.5			
Ventris-Rock outcrop complex, 12 to 30 percent slopes						3.5			

[1] Animal-unit-months. The figures represent the number of months that 1 acre will provide grazing for 1 animal (1,000 pounds live weight), or the

ally droughty soil on uplands. It has a predominantly clayey subsoil. It is very slowly permeable and moderately well drained. Management for forage production is difficult. Surface stones and Rock outcrop restrict the use of conventional farm equipment. The soil has a low or moderately low

in their natural environment, but they can be planted and developed through wildlife management. Typical are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and silverberry.

Coniferous trees are cone-bearing trees and shrubs that

TABLE 4.—*Suitability of soils for elements*

Series name and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Agnos:				
AcC	Fair	Good	Good	Good
AcD	Fair	Good	Good	Good
AgD	Poor	Fair	Good	Good
AnE	Poor	Fair	Good	Good
Amagon: Ao	Fair	Fair	Fair	Fair

of wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous trees	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Fair	Good	Good	Fair	Fair	Good.
Poor	Very poor	Very poor	Fair	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Poor	Poor	Poor	Good	Good	Poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Fair	Good	Fair	Good	Good.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Fair	Fair	Good	Good	Fair.
Fair	Good	Good	Fair	Fair	Good.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Poor	Very poor	Fair	Good	Very poor.
Good	Good	Good	Good	Good	Good.
Good	Poor	Poor	Fair	Good	Poor.
Not rated	Good	Good	Fair	Fair	Good.
Poor	Poor	Good	Very poor	Poor	Fair.
Good	Very poor	Very poor	Good	Good	Very poor.
Not rated	Good	Fair	Fair	Good	Fair.
Good	Fair	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Not rated	Good	Good	Fair	Good	Good.
Fair	Poor	Very poor	Good	Fair	Very poor.
Fair	Very poor	Very poor	Good	Fair	Very poor.
Not rated	Good	Fair	Fair	Fair	Fair.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.

TABLE 5.—*Potential productivity*

Soil series and map symbols	Woodland group	Important trees	Potential productivity: Estimated site index [1]	Potential productivity: Understory vegetation (medium canopy)
Agnos:				
AcC, AcD	4o7	Red oak	60	Little bluestem, big bluestem, indiangrass, wildrye, beaked panicum, low panicum, other grasses, legumes, and forbs.
		Eastern redcedar	40	
		Loblolly pine	65	
				Total, favorable years
				Total, unfavorable years
AgD, AnE	4x8	Shortleaf pine	60	Little bluestem, big bluestem, indiangrass, wildrye, beaked panicum, low panicum, other grasses, legumes, and forbs.
				Total, favorable years
				Total, unfavorable years
Amagon: Ao	1w6	Eastern cottonwood	100	Switchgrass, eastern gamagrass, beaked panicum, redtop panicum, Virginia wildrye, sedges and rushes, and other shrubs.
		Willow oak	100	
		Nuttall oak	100	
		Water oak	100	
		Cherrybark oak	90	
		Green ash	80	
		Sweetgum	100	
				Total, favorable years
				Total, unfavorable years
Beulah: BeB	2o4	Eastern cottonwood	100	Switchgrass, little and big bluestem, indiangrass, eastern gamagrass, Virginia wildrye, beaked panicum, sedges, other grasses, and other shrubs.
		Cherrybark oak	90	
		Nuttall oak	90	
		Water oak	90	
		Willow oak	----------	
		American sycamore	----------	
				Total, favorable years
				Total, unfavorable years
Boden: BnC, BnD, BnE	4o7	Red oak	65	Little and big bluestem, indiangrass, wildrye, beaked panicum, low panicum, native lespedeza, perennial sunflowers, farkelberry, sedges, and other forbs and shrubs.
		Eastern redcedar	40	
		Black walnut	----------	
		Shortleaf pine	60	

of woodland and forage

Potential productivity—Continued	Management problems			Trees suitable for planting
Estimated yields of forage	Erosion hazard	Equipment limitations	Seedling mortality	
Lbs per acre				
	Slight	Slight	Slight	Shortleaf pine, eastern redcedar, loblolly pine.
2,500 1,500	Slight	Moderate	Slight to moderate	Shortleaf pine, eastern redcedar, loblolly pine.
2,500 1,500	Slight	Severe	Moderate	Eastern cottonwood, cherrybark oak, Nuttall oak, Shumard oak, water oak, willow oak, sweetgum, American sycamore.
4,000 3,000	Slight	Slight	Slight	Eastern cottonwood, cherrybark oak, Nuttall oak, Shumard oak, water oak, willow oak, American sycamore, black walnut, yellow poplar.
4,000 3,000	Slight	Slight	Slight	Shortleaf pine, loblolly pine, eastern redcedar; and on north and east slopes in coves and at slope bases, black walnut, black locust, and red oak.
3,500 1,800				

TABLE 5.—*Potential productivity of*

Soil series and map symbols	Woodland group	Important trees	Potential productivity	
			Estimated site index [1]	Understory vegetation (medium canopy)
Dundee: DvA, DvB	2w5	Eastern cottonwood	100	Switchgrass, eastern gamagrass, Virginia wildrye, broadleaf uniola, beaked panicum, redtop panicum, velvet panicum, other
		Cherrybark oak	103	
		Water oak	94	
		Sweetgum	98	
				Total, favorable years
				Total, unfavorable years
[illegible]	3w9	Sweetgum	70	Switchgrass, beaked panicum, velvet panicum,

woodland and forage—Continued

Potential productivity—Continued	Management problems			Trees suitable for planting
Estimated yields of forage	Erosion hazard	Equipment limitations	Seedling mortality	
Lbs per acre				
	Slight	Moderate	Slight	Eastern cottonwood, cherrybark oak, water oak, sweetgum, Nuttall oak, Shumard oak.
2,500 1,800				
	Slight	Severe	Moderate	Sweetgum, American sycamore, loblolly pine, Nuttall oak, water oak.
2,000 1,200				
	Slight	Slight	Slight	Black walnut, loblolly pine, shortleaf pine, red oak.
3,000 1,500				
	Slight	Slight	Slight	Shortleaf pine, red oak, white oak, American sycamore, eastern cottonwood, black walnut, black locust.
4,000 3,000				
	Slight	Moderate	Moderate	Sweetgum, loblolly pine, cherrybark oak, water oak, Shumard oak, Nuttall oak.
3,000 1,500				
	Slight	Moderate	Moderate	Shortleaf pine, loblolly pine, eastern cottonwood, American sycamore, Shumard oak, sweetgum.
3,500 2,000				
	Slight	Severe	Moderate	Green ash, eastern cottonwood, Nuttall oak, willow oak, sweetgum, American sycamore, water oak, cherrybark oak.
3,000 2,000				
	Slight	Slight	Severe	None.
1,500 500				
	Slight	Slight	Slight	Loblolly pine, yellow poplar, red oak, black walnut, shortleaf pine, redcedar.
2,500 1,000				
	Slight	Severe	Moderate	Sweetgum, American sycamore, green ash, swamp chestnut oak, Nuttall oak, water oak.
3,000 1,800				
	Slight	Moderate	Moderate	Green ash, cherrybark oak, Nuttall oak, water oak, willow oak, sweetgum, American sycamore.
2,500 1,800				

TABLE 5.—*Potential productivity of*

Soil series and map symbols	Woodland group	Important trees	Potential productivity	
			Estimated site index [1]	Understory vegetation (medium canopy)
Peridge: PeC2	3o7	Shortleaf pine	70	Indiangrass, switchgrass, big and little bluestem, wildryes, beaked panicum, low panicum, other shrubs, grasses, and forbs.
		Red oak	70	
		Eastern redcedar	----------	Total, favorable years
		Black walnut	----------	Total, unfavorable years
		White oak	----------	
		White ash	----------	
		Black cherry	----------	
		Black locust	----------	
		Loblolly pine	----------	
Portia: PoC, PoD	3o7	Sweetgum	80	Little and big bluestem, indiangrass, wildrye, beaked panicum, low panicum, sedges, perennial sunflowers, native lespedeza, asters, sumac, huckleberry.
		Loblolly pine	75	
				Total, favorable years
				Total, unfavorable years
[illegible]	2w6	Green ash	85	Switchgrass, eastern gamagrass, wildryes, broadleaf

woodland and forage—Continued

Potential productivity—Continued	Management problems			Trees suitable for planting
Estimated yields of forage	Erosion hazard	Equipment limitations	Seedling mortality	
Lbs per acre				
2,500 1,000	Slight	Slight	Slight	Shortleaf pine, loblolly pine, black walnut, black locust, red oak, white ash, eastern redcedar, yellow poplar.
3,000 1,500	Slight	Slight	Slight	Loblolly pine, shortleaf pine, yellow poplar, black walnut, black locust, red oak, redcedar.
3,000 2,000	Slight	Severe	Moderate	Eastern cottonwood, American sycamore, sweetgum, bald cypress, green ash, cherrybark oak, Nuttall oak, Shumard oak, water oak, swamp chestnut oak.
3,000 1,800	Slight	Slight	Slight	Shortleaf pine, loblolly pine, eastern redcedar; and on north and east slopes in coves and on lower slopes bases, black walnut, black locust, red oak.
3,000 1,800	Slight	Severe	Moderate	Green ash, eastern cottonwood, sweetgum, American sycamore, cherrybark oak, Nuttall oak, water oak, willow oak, baldcypress.
2,000 1,000	Slight	Moderate	Moderate	Shortleaf pine, loblolly pine, eastern redcedar.
2,000 1,000	Moderate	Moderate to severe	Moderate to severe	Shortleaf pine, loblolly pine, eastern redcedar.

trees suited to the soil. These are the trees that woodland managers generally favor in intermediate or improvement cuttings.

Potential productivity is indicated by site index. The site index is the average height of dominant trees, in feet, at age 30 for cottonwood; at age 35 for sycamore; at age 25 for planted pines; and at age 50 for all other species or types.

grasses, legumes, forbs, and low shrubs that grow under a medium, or 36 to 55 percent, canopy and the yields of all understory vegetation within reach of livestock and game animals. Yields are expressed in pounds of air-dry forage per acre. Where yield data are not available, the important forage-producing species are listed in approximate order of productivity.

losses are small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitations reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. *Slight* indicates that equipment use is not limited to kind or time of year. A rating of *moderate* indicates a seasonal limitation or need for modification in methods or equipment. *Severe* limitations indicate the need for specialized equipment or management.

Seedling mortality ratings indicate the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. A *slight* rating indicates that expected mortality is less than 25 percent. A *moderate* rating indicates a 25 to 30 percent loss; and *severe* indicates more than a 50 percent loss of seedlings.

In the last column of table 5 is a list of trees suitable for planting in commercial wood production.

Range[6]

Different kinds of soil vary in their capacity to produce grass and other plants for grazing. Soils that produce about the same kinds and amounts of forage, if the range is in similar condition, make up a range site.

Range sites differ in their ability to produce vegetation. The soils of any one range site produce about the same kind of climax vegetation. Climax vegetation is the stabilized plant community that reproduces itself and does not change so long as the environment remains unchanged. Throughout the woodland and the savanna, the climax vegetation consists of the plants that were growing there when the region was first settled. If cultivated crops are not grown, the most produc-

Potential forage production depends on the range site. Current forage production depends on the range condition and the moisture available to plants during their growing season.

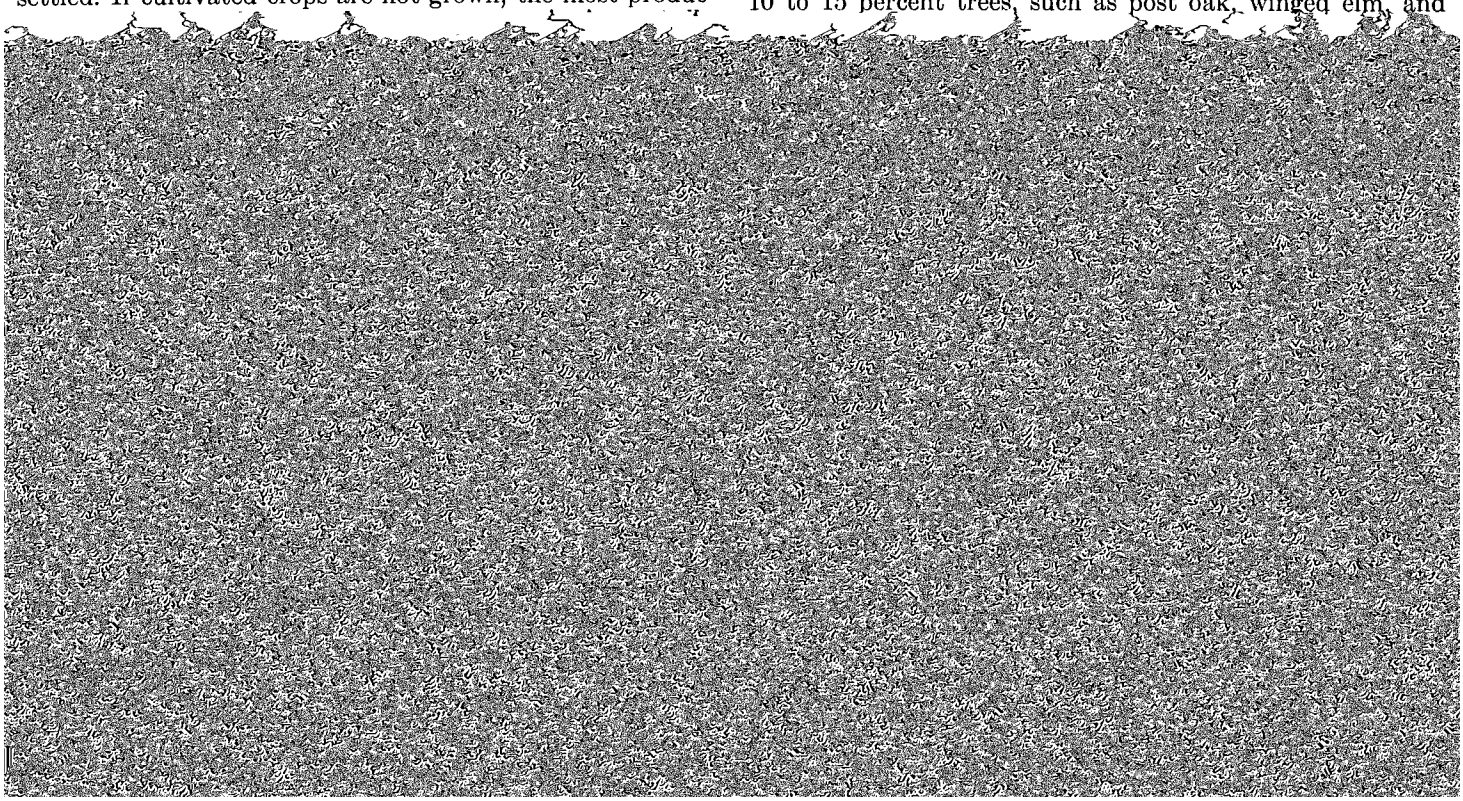
A primary objective of good range management is to keep range in excellent or good condition. If this is done, water is conserved, yields are improved, and the soils are protected. The problem is recognizing important changes in the kind of cover on a range site. These changes take place gradually and can be misinterpreted or overlooked. Growth encouraged by heavy rain can lead to the conclusion that the range is in good condition, when actually the cover is weedy and the long-term trend is toward lower production. On the other hand, some range that has been closely grazed for short periods, under the supervision of a careful manager, can have a degraded appearance that temporarily conceals its quality and ability to recover.

On the following pages the range sites of Lawrence County are described, the climax plants and principal invaders on the sites are named, and the potential annual yield of air-dry herbage is estimated for each site in excellent condition. The range site is designated for each soil in the county at the end of each mapping unit description.

ALKALI FLATS

This site occurs as broad silt loam flats. Vegetation ranges from stunted poor growth oaks and associated trees to open grass-forb areas. The soils are somewhat poorly drained and poorly drained. At times excess water ponds until it evaporates because percolation is poor. The soils are extremely hard when dry and very firm when moist. They are also droughty. The root zone is shallow, and the available water capacity is low. The subsoil contains high concentrations of sodium and magnesium.

If this site is in excellent condition, the plant cover is about 10 to 15 percent trees, such as post oak, winged elm, and



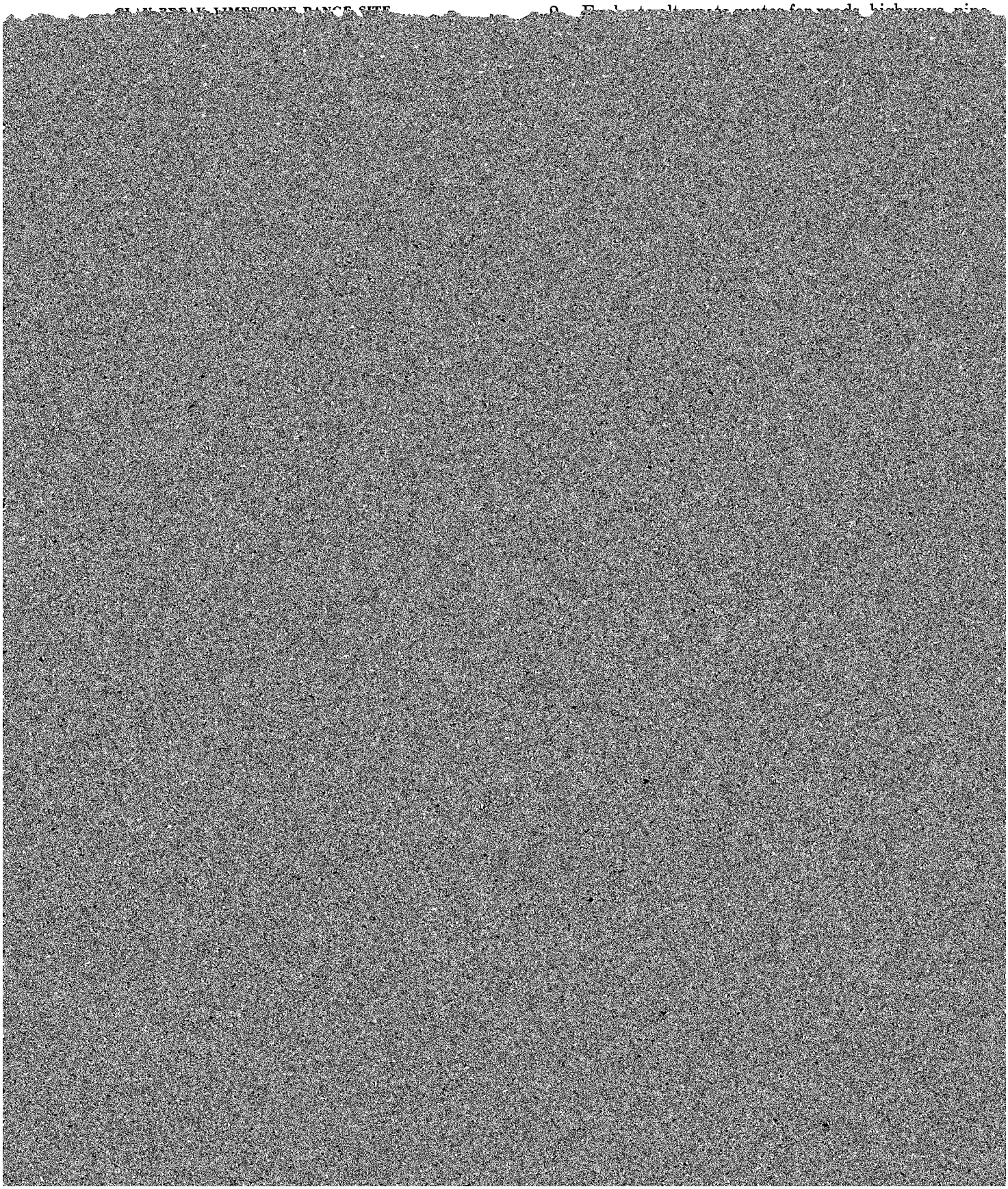


TABLE 6.—*Estimated engineering*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such mapping units symbol > means more than;

Soil series and map symbols	Depth to—		Depth from surface	USDA texture	Classification		Coarse fraction greater than 3 inches	Percentage less than 3 inches passing sieve—	
	Bedrock	Seasonal high water table			Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)
	In	*In*	*In*						
Agnos: AcC, AcD, AgD, AnE.	>72	>6	0–8	Cherty silt loam	ML, SM	A–4	0–25	55–85	50–80
			8–72	Clay	CH, MH	A–7	0	95–100	95–100
Amagon: Ao	>72	0–1	0–7	Silt loam	CL, ML, CL–ML	A–4	0	--------	100
			7–21	Silt loam	CL, CL–ML	A–4, A–6	0	--------	100
			21–40	Silty clay loam	CL	A–6, A–7	0	--------	100
			40–72	Loam and silt loam	CL, CL–ML	A–4, A–6	0	--------	100
Beulah: BeB	>72	>6	0–10	Sandy loam	SM	A–2, A–4	0	--------	100
			10–36	Fine sandy loam	SM, ML	A–2, A–4	0	--------	100
			36–72	Loamy sand	SM	A–2, A–4	0	--------	100
Boden: BnC, BnD, BnE.	>40	>6	0–7	Gravelly sandy loam	GM, SM	A–2, A–4	0–5	65–85	60–80
			7–11	Fine sandy loam	SM, SM–SC	A–2, A–4	0–5	85–95	80–95
			11–32	Clay	CL, CH	A–6, A–7	0	90–100	90–100
			32–42	Sandy clay	CL, SC	A–2, A–4, A–6	0–20	80–95	75–95
			42–50	Sandy clay loam	CL, CL–ML, SC, SM–SC	A–2, A–4	0	95–100	90–100
Bosket: BoA, BoB.	>72	>6	0–14	Fine sandy loam	SM	A–2, A–4	0	--------	100
			14–30	Loam	CL, CL–ML, SC, SM–SC	A–4, A–6	0	--------	100
			30–37	Fine sandy loam	SM	A–4, A–2	0	--------	100
			37–72	Loamy sand	SM	A–2	0	--------	100
Calhoun Mapped only with Foley soils.	>72	1–2	0–13	Silt loam	CL, ML, CL–ML	A–4	0	--------	100
			13–50	Silty clay loam and silt loam.	CL	A–6	0	--------	100
			50–72	Silt loam	CL, CL–ML	A–4, A–6	0	--------	100
Captina: CaB, CaC, CaD.	>72	2–3	0–5	Silt loam	ML, CL–ML	A–4	0	--------	95–100
			5–22	Silty clay loam	CL	A–4	0	--------	95–100
			22–72	Silt loam and silty clay loam.	CL, CL–ML	A–4, A–6	0	90–100	60–100
Clarksville: CeD, CeE.	>72	>6	0–8	Cherty silt loam	GM	A–1, A–2	5–20	35–55	30–40
			8–46	Cherty silt loam and cherty silty clay loam.	GC	A–2, A–4, A–6	10–25	35–60	30–35
			46–72	Silty clay	MH, CH	A–7	0–5	85–100	85–100
Crowley: CoA	>72	½–1½	0–9	Silt loam	CL, ML, CL–ML	A–4	0	--------	100
			9–39	Silty clay	CL, CH	A–7	0	--------	100
			39–72	Silty clay loam	CL, CH	A–6, A–7	0	--------	100
Dubbs: DeA, DeB.	>72	>6	0–8	Silt loam	CL, CL–ML	A–4	0	--------	100
			8–45	Silt loam and silty clay loam.	CL	A–6, A–7	0	--------	100
			45–72	Very fine sand	ML, CL–ML	A–4	0	--------	100
Dundee: DvA, DvB.	>72	1–2	0–7	Silt loam	ML, CL–ML	A–4	0	--------	100
			7–25	Silt loam	CL, CL–ML	A–6 or A–7	0	--------	100
			25–32	Fine sandy loam	SM, SM–SC, ML, CL–ML	A–2, A–4	0	--------	100
			32–72	Silty clay loam	CL	A–6, A–7	0	--------	100

properties of soils

may have different properties and limitations, and for this reason it is necessary to follow the instructions in the first column of this table. The the symbol < means less than]

Percentage less than 3 inches passing sieve—Continued		Liquid limit	Plasticity index	Permeability [1]	Available water capacity	Reaction	Shrink-swell potential	Risk of corrosion to—	
No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
		Pct		*In per hr*	*In per in of soil*	*pH*			
45–75	40–70	----------	[2] NP	0.6–2.0	0.10–0.14	5.1–6.0	Low	Low	Moderate.
95–100	90–100	55–65	20–35	<0.06	0.12–0.18	4.0–5.5	High	High	High.
95–100	85–95	<30	NP–10	0.6–2.0	0.16–0.24	4.5–6.0	Low	High	High.
95–100	85–95	25–40	7–18	0.2–0.6	0.16–0.24	4.5–6.0	Low	High	High.
95–100	85–95	30–45	11–25	0.06–0.2	0.18–0.22	4.5–6.0	Moderate	High	High.
80–100	60–95	15–30	1–15	0.2–0.6	0.15–0.24	5.1–7.3	Low	High	Moderate.
75–100	25–45	----------	NP	2.0–6.0	0.10–0.14	4.5–6.0	Low	Low	Moderate.
85–100	25–60	----------	NP	2.0–6.0	0.11–0.15	4.5–6.0	Low	Low	Moderate.
65–100	15–45	----------	NP	>6.0	0.06–0.10	4.5–6.0	Low	Low	Moderate.
30–45	25–35	<20	NP	0.6–6.0	0.07–0.12	4.5–5.5	Low	Low	High.
75–90	30–45	<25	NP–7	0.6–2.0	0.11–0.15	4.5–5.5	Low	Low	High.
85–95	55–80	35–55	15–30	0.2–0.6	0.12–0.18	4.5–5.5	Moderate	High	High.
65–90	35–70	25–40	10–20	0.6–2.0	0.14–0.18	4.5–5.5	Moderate	Low	High.
75–90	35–70	20–30	5–10	0.6–2.0	0.12–0.17	4.5–5.5	Low	Low	High.
80–100	30–45	<20	NP–3	2.0–6.0	0.11–0.15	5.1–6.5	Low	Low	Moderate.
90–100	45–65	25–40	5–17	0.6–2.0	0.15–0.20	5.1–6.5	Low	Low	Moderate.
80–100	30–45	<20	NP–3	2.0–6.0	0.11–0.15	5.1–6.5	Low	Low	Moderate.
65–85	15–30	<20	NP–3	>6.0	0.06–0.10	5.1–6.5	Low	Low	Moderate.
100	95–100	<30	NP–10	0.2–0.6	0.21–0.24	4.5–6.0	Low	High	Moderate.
100	95–100	30–40	12–18	0.06–0.2	0.18–0.24	4.5–5.5	Low to moderate.	High	Moderate to high.
100	95–100	25–35	5–15	0.2–0.6	0.21–0.24	5.1–7.3	Low	High	Moderate.
90–100	80–95	<25	NP–5	0.6–2.0	0.16–0.24	5.0–6.5	Low	High	Moderate.
[illegible]	[illegible]	[illegible]	[illegible]	0.6–2.0	0.18–0.22	4.5–5.5	Low to	High	Moderate to

TABLE 6.—*Estimated engineering*

Soil series and map symbols	Depth to—		Depth from surface	USDA texture	Classification		Coarse fraction greater than 3	Percentage less than 3 inches passing sieve—	

properties of soils—Continued

Percentage less than 3 inches passing sieve—Continued		Liquid limit	Plasticity index	Permeability [1]	Available water capacity	Reaction	Shrink-swell potential	Risk of corrosion to—	
No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
		Pct		*In per hr*	*In per in of soil*	*pH*			
95–100	85–95	25–45	5–20	0.6–2.0	0.16–0.24	5.6–7.3	Low	High	Low to moderate.
95–100	90–100	30–50	11–30	0.2–0.6	0.16–0.24	5.6–7.3	Moderate	High	Low to moderate.
95–100	90–100	40–60	20–40	0.06–0.2	0.10–0.15	6.6–9.0	Moderate	High	Low.

TABLE 6.—*Estimated engineering*

Soil series and map symbols	Depth to—		Depth from surface	USDA texture	Classification		Coarse fraction greater than 3 inches	Percentage less than 3 inches passing sieve—	
	Bedrock	Seasonal high water table			Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)
	In	*In*	*In*						
Sharkey: Sh	>72	0–1	0–9	Silty clay	CH	A–7	0	--------	100
			9–54	Clay and silty clay	CH	A–7	0	--------	100
			54–72	Silty clay	CH	A–7	0	--------	100
Tonti: ToC, ToD	>50	>6	0–9	Cherty silt loam	ML	A–4	0–5	70–90	70–90
			9–20	Cherty silty clay loam	CL, ML, CL–ML	A–4, A–6	0–5	70–85	65–85
			20–55	Cherty silty clay loam	CL, ML, CL–ML, GC, SC, SM–SC, GM—GC	A–4, A–6, A–2	0–5	15–70	15–70
Tuckerman: Tu	>72	0–1	0–8	Fine sandy loam	ML, SM	A–4, A–2	0	--------	100
			8–42	Fine sandy loam and loam.	ML, CL–ML, SM, SM–SC	A–4, A–6	0	--------	100
			42–72	Loamy fine sand	ML, SM	A–2, A–4	0	--------	100
*Ventris: VrD, VrF.	>20	>6	0–4	Silt clay loam	CL	A–4, A–6	3–30	60–95	60–95
Rock outcrop part too variable to rate.			4–28	Clay	CH, MH	A–6, A–7	0–5	80–95	80–95

[1] These values should not be confused with the coefficient "K" used by engineers.
[2] NP means nonplastic.

divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The estimated AASHTO classification for all soils mapped in the survey area is shown in table 6.

Soil properties significant in engineering

Several estimated soil properties significant in engineering are given in table 6. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 6.

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

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years. The depths given in table 6 are the depths to a seasonal perched water table that is separated from the permanent water table by an impervious layer or a dry zone.

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 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

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. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 6.

Permeability is the quality that enables a soil to transmit water or air. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 6 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

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

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

properties of soils—Continued

Percentage less than 3 inches passing sieve—Continued		Liquid limit	Plasticity index	Permeability [1]	Available water capacity	Reaction	Shrink-swell potential	Risk of corrosion to—	
No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
		Pct		*In per hr*	*In per in of soil*	*pH*			
100	95–100	51–70	25–45	<0.06	0.14–0.18	5.1–7.3	High	High	Low.
100	95–100	55–85	30–50	<0.06	0.12–0.18	5.6–7.8	High	High	Low.
100	95–100	51–70	25–45	<0.06	0.14–0.18	6.6–7.8	High	High	Low.
65–85	60–70	----------	NP	0.6–2.0	0.15–0.20	4.5–5.5	Low	Moderate	Moderate to high.
60–80	55–75	20–40	5–15	0.6–2.0	0.14–0.19	4.5–5.5	Low	Moderate	Moderate to high.
15–65	15–60	20–40	5–20	0.06–0.2	0.04–0.12	4.5–5.5	Low	Moderate	Moderate to high.
85–95	30–65	<20	NP–3	0.06–2.0	0.11–0.15	5.1–6.0	Low	High	Moderate.
85–95	40–65	<25	NP–7	0.6–2.0	0.11–0.20	5.1–6.0	Low	High	Moderate.
60–95	20–55	----------	NP	2.0–6.0	0.07–0.11	5.1–6.0	Low	High	Moderate.
55–95	50–95	20–35	8–20	0.6–2.0	0.12–0.20	5.6–7.3	Low to moderate.	High	Low.
80–95	75–95	51–75	20–40	<0.06	0.10–0.18	5.6–7.8	High	High	Low.

[3] These soils are subject to flooding.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks when dry or swells when wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Corrosion, as used in table 6, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion on uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. The rate of corrosion on concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion

summarize suitability of the soils for all listed purposes other than for drainage of crops and pasture, irrigation, pond reservoir areas, embankments, and terraces and diversions. For these particular uses, table 7 lists those soil features not to be overlooked in planning, installation, and maintenance. Specific values should not be assigned to the ratings of bearing capacity given in table 7.

Soil suitability is expressed as *good*, *fair*, and *poor*.

Following are explanations of some of the columns in table 7.

Sand and gravel are used in great quantities in many kinds of construction. Because these materials of suitable quality are of limited quantity in Lawrence County, the soils are not rated as possible sources.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material, as in preparing a seedbed; the natural fertility of the so

TABLE 7.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such mapping units

Soil series and map symbols	Suitability as source of—		Soil features affecting—
	Topsoil	Road fill	Pond reservoir areas
Agnos: AcC, AcD, AgD, AnE	Poor: coarse fragments; surface stones on AgD and AnE; slopes of more than 12 percent on AnE.	Poor: high shrink-swell; low bearing strength.	Features generally favorable
Amagon: Ao	Poor: poorly drained	Poor: poorly drained; low bearing strength.	Features generally favorable; seasonal high water table.
Beulah: BeB	Good	Fair: excessive fines; good below a depth of 36 inches.	Moderately rapid permeability
Boden: BnC, BnD, BnE	Poor: coarse fragments; slopes of more than 12 percent on BnE.	Poor: moderate shrink-swell; low bearing strength.	Moderately slow permeability; moderately deep or deep to bedrock.
Bosket: BoA, BoB	Good	Fair: low bearing strength	Rapid permeability below a depth of 37 inches.
Calhoun. Mapped only with Foley soils.	Poor: poorly drained	Poor: poorly drained; moderate to low bearing strength.	Features generally favorable; seasonal high water table.
Captina: CaB, CaC, CaD	Fair: somewhat plastic material within 5 inches of surface; material below a depth of 22 inches somewhat difficult to reclaim.	Fair: low bearing strength	Features generally favorable
Clarksville: CeD, CeE	Poor: coarse fragments; slopes more than 12 percent on CeE.	Good to fair: high to moderate bearing strength; excavated area difficult to reclaim.	Moderately rapid permeability
Crowley: CoA	Poor: poorly drained; clayey below a depth of 9 inches.	Poor: poorly drained; low bearing strength; high shrink-swell potential.	Features generally favorable; seasonal high water table.
Dubbs: DeA, DeB	Good to a depth of 12 inches; fair throughout remainder of profile.	Fair: moderate bearing strength	Moderate permeability
Dundee: DvA, DvB	Good	Fair: moderate bearing strength; somewhat poorly drained.	Moderately slow permeability; seasonal high water table.
*Foley: FcA. For Calhoun part, see Calhoun series.	Poor: poorly drained; high sodium content in subsoil; difficult to reclaim.	Poor: poorly drained; moderate to low bearing strength; high sodium content in subsoil; difficult or impossible to reclaim.	Features generally favorable; seasonal high water table.

interpretations

may have different properties and limitations, and for this reason it is necessary to follow the instructions in the first column of this table carefully]

Soil features affecting—Continued			
Embankments, dikes, and levees	Drainage of crops and pasture	Irrigation	Terraces and diversions
Medium to low strength; fair to poor compaction characteristics.	Well drained; slope	Slow intake rate; very slow permeability; high available water capacity; rapid runoff.	Some slopes steeper than 8 percent; erodible; very slow permeability; difficult to vegetate terrace channel; subsoil material in terrace embankment likely to crack when dry; terraces may fail.
Poor to fair compaction characteristics and stability; medium to high compressibility; unstable slopes.	Poorly drained; seasonal high water table; slow permeability; ponding on surface.	Slow intake rate; high available water capacity.	Level soil; practice not applicable.
Fair compaction characteristics; moderate permeability when compacted; subject to piping and erosion.	Somewhat excessively drained	Moderate to rapid intake rate; medium to low available water capacity.	Undulating soil on bottom land; practice not applicable.
Medium to low strength; fair to poor compaction characteristics; subject to piping unless well mixed	Well drained; slope	Moderate intake rate; moderately slow permeability; medium available water capacity	Some slopes steeper than 8 percent; erodible; moderately slow permeability; difficult to [illegible]

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features affecting—
	Topsoil	Road fill	Pond reservoir areas
Gepp: GpD, GpE	Poor: coarse fragments; slope more than 12 percent in GpE.	Poor: moderate shrink-swell potential; low bearing strength.	Moderate permeability
Healing: Hc	Good	Fair: moderate bearing strength	Moderate permeability
Hillemann: Hn	Fair to poor: 16 inches of good material underlain with poor material high in sodium and difficult to reclaim.	Poor: moderate to low bearing strength; low to moderate shrink-swell potential.	Features generally favorable; seasonal high water table.
Hontas: Ho	Good	Fair: moderate bearing strength	Moderate permeability
Jackport: Ja	Poor: poorly drained; plastic, clayey material.	Poor: low bearing strength; high shrink-swell potential; plastic, clayey material	Features generally favorable; seasonal high water table.

interpretations—Continued

Soil features affecting—Continued			
Embankments, dikes, and levees	Drainage of crops and pasture	Irrigation	Terraces and diversions
Medium to low strength; fair to poor compaction characteristics.	Well drained; slope	Slow intake rate; high available water capacity; rapid runoff.	Steep slopes.
Medium to low strength; medium compressibility; fair to good compaction characteristics; medium to low permeability when compacted; subject to piping.	Well drained	Moderate intake rate; moderate permeability; medium to high available water capacity; subject to frequent flooding.	Level soil; practice not applicable.

TABLE 7.—*Engineering*

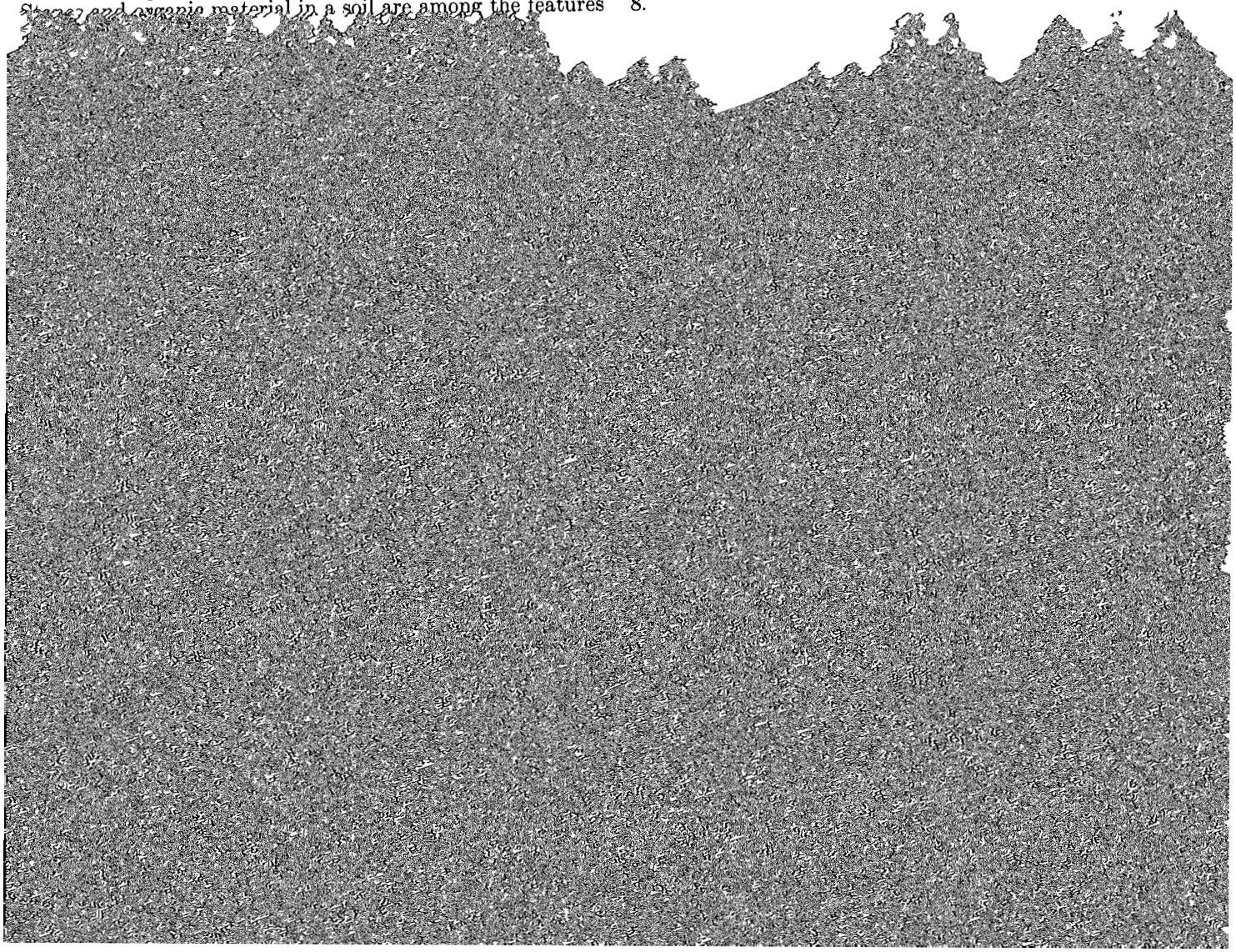
Soil series and map symbols	Suitability as source of—		Soil features affecting—
	Topsoil	Road fill	Pond reservoir areas
Tuckerman: Tu	Poor: poorly drained	Poor: poorly drained; moderate bearing strength.	Poorly drained; seasonal high water table.
*Ventris: VrD, VrF. For Rock outcrop part, see Rock outcrop.	Poor: stones and coarse fragments in thin surface layer; material below is plastic, clayey; excavated area difficult to reclaim.	Poor: stony surface; bedrock at a depth of 20 to 40 inches; low bearing strength; high shrink-swell potential; excavated area difficult or impossible to reclaim.	Bedrock at a depth of 20 to 40 inches.

Soils suitable as pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Stones and organic material in a soil are among the features

soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* indicates soil properties so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Following are explanations of some of the columns in table 8.



interpretations—Continued

Soil features affecting—Continued			
Embankments, dikes, and levees	Drainage of crops and pasture	Irrigation	Terraces and diversions
[illegible]	[illegible]	[illegible]	[illegible]

TABLE 8.—*Degree and kind of limitation*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such mapping

Soil series and map symbols	Dwellings without basements [1]	Shallow excavations	Local roads and streets [1]
Agnos: AcC, AcD, AgD, AnE	Severe: low bearing strength; small and large stones; some slopes more than 15 percent; moderate to high shrink-swell.	Severe: small and large stones; clayey below a depth of about 8 inches.	Severe: low traffic-supporting capacity; small and large stones; some slopes more than 15 percent; moderate to high shrink-swell.
Amagon: Ao	Severe: poorly drained; low bearing strength; moderate to low shrink-swell; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; low traffic-supporting capacity.
Beulah: BeB	Slight	Severe: sandy below a depth of 36 inches; sidewalls unstable.	Slight
Boden: BnC, BnD, BnE	Severe: low bearing strength; slopes more than 15 percent in some areas; moderate to low shrink-swell.	Moderate if slope is less than 15 percent; severe if more than 15 percent.	Severe: low traffic-supporting capacity; slopes more than 15 percent in some areas; bedrock at a depth of 40 to 60 inches.
Bosket: BoA, BoB	Slight	Severe: sandy material below a depth of 37 inches; sidewalls unstable.	Moderate: moderate traffic-supporting capacity.
Calhoun Mapped only with Foley soils.	Severe: poorly drained; slow permeability; moderate to low shrink-swell; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; low traffic-supporting capacity.
Captina: CaB, CaC, CaD	Moderate: low bearing strength; low shrink-swell potential.	Moderate: somewhat difficult to excavate with hand tools.	Moderate: low traffic-supporting capacity.
Clarksville: CeD, CeE	Moderate if slope is less than 15 percent; severe if more than 15 percent.	Severe: small stones; slopes more than 15 percent in some areas.	Moderate if slope is less than 15 percent; severe if more than 15 percent.
Crowley: CoA	Severe: poorly drained; high shrink-swell potential in subsoil; seasonal high water table.	Severe: poorly drained	Severe: low traffic-supporting capacity; high shrink-swell potential in subsoil.

for town and country planning

units may have different properties and limitations, and for this reason it is necessary to follow the instructions in the first column of this table]

Light industry [1]	Septic tank absorption fields	Sewage lagoons [2]	Sanitary landfill (trench type) [3]
Severe: low bearing strength; small and large stones; some slopes more than 8 percent; moderate to high shrink-swell.	Severe: slow percolation rate; large stones on some areas: some slopes more than 15 percent.	Moderate: large and small stones. Severe if slope is more than 7 percent.	Severe: clayey below a depth of about 8 inches; large stones on some areas; low traffic-supporting capacity.
Severe: poorly drained; low strength; moderate to low shrink-swell; seasonal high water table.	Severe: poorly drained; slow percolation rate.	Slight	Severe: poorly drained; low traffic-supporting capacity.
Slight	Slight[4]	Severe: moderately rapid permeability.	Severe: rapid permeability below a depth of 36 inches.
Severe: low bearing strength; slopes more than 8 percent in some areas; bedrock at a depth of 40 to 60 inches; low shrink-swell.	Severe: slow percolation rate; bedrock at a depth of 40 to 60 inches.	Moderate: bedrock at a depth of 40 to 60 inches. Severe if slope is more than 7 percent.	Severe: bedrock at a depth of 40 to 60 inches; low traffic-supporting capacity.
Slight	Slight[4]	Moderate: moderate permeability. Severe if slope is more than 7 percent.	Severe: rapid permeability below a depth of 37 inches; moderate traffic-supporting capacity.
Severe: poorly drained; moderate to low shrink-swell; seasonal high water table.	Severe: slow percolation rate; seasonal high water table.	Moderate: seasonal high water table.	Severe: poorly drained; seasonal high water table; moderate traffic-supporting capacity.
Moderate: low bearing strength. Severe if slope is more than 7 percent: low shrink-swell potential.	Severe: slow percolation rate	Moderate: if slope is less than 7 percent; severe if more than 7 percent.	Severe: low traffic-supporting capacity.

TABLE 8.—*Degree and kind of limitation*

Soil series and map symbols	Dwellings without basements [1]	Shallow excavations	Local roads and streets [1]
*Lafe: LfA. For Foley part, see Foley series.	Severe: somewhat poorly drained; seasonal high water table; low bearing strength; difficult to establish vegetation because of high content of sodium and magnesium in subsoil.	Severe: somewhat poorly drained; seasonal high water table.	Severe: somewhat poorly drained; low traffic-supporting capacity.
Loring: LoC2, LoD2	Moderate: moderate bearing strength. Severe if slope is more than 15 percent.	Moderate: seasonal high water table.	Moderate: moderate traffic-supporting capacity.
McCrory: Mc	Severe: poorly drained; seasonal high water table; low bearing strength.	Severe: poorly drained	Severe: poorly drained; low traffic-supporting capacity.
Patterson: Pa	Severe: somewhat poorly drained; seasonal high water table; low bearing strength.	Severe: somewhat poorly drained; seasonal high water table.	Severe: somewhat poorly drained; moderate traffic-supporting capacity.

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Light industry [1]	Septic tank absorption fields	Sewage lagoons [2]	Sanitary landfill (trench type) [3]
Severe: somewhat poorly drained; low bearing strength; seasonal	Severe: somewhat poorly drained; very slow percolation	Slight	Moderate: somewhat poorly drained; low traffic-supporting

TABLE 9.—*Degree and kind of limitation for recreation*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow the instructions in the first column of this table carefully]

Soil series and map symbols	Camp areas	Playgrounds	Picnic areas	Paths and trails
Agnos: AcC, AcD, AgD, AnE.	Severe: very slow permeability; slopes of more than 15 percent in some areas; small stones on AcC and AcD; large stones on AgD and AnE.	Severe: very slow permeability; slopes of more than 15 percent in some areas; small stones on AcC and AcD; large stones on AgD and AnE.	Moderate where slopes are 2 to 15 percent; small stones. Severe where slopes are more than 15 percent; large stones on AgD and AnE.	Moderate: small stones on AcC and AcD. Severe: large stones on AgD and AnE.
Armagon: Ao	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.
Beulah: BeB	Slight	Slight: moderate where slopes are more than 2 percent.	Slight	Slight.
Boden: BnC, BnD, BnE	Slight where slopes are less than 8 percent; moderate where 8 to 15 percent; severe where more than 15 percent.	Moderate: small stones. Severe where slopes are more than 6 percent.	Slight where slopes are less than 8 percent; moderate where 8 to 15 percent; severe where more than 15 percent.	Slight: moderate where slopes are more than 15 percent.
Bosket: BoA, BoB	Slight	Slight where slopes are less than 2 percent; moderate where more than 2 percent.	Slight	Slight.
Calhoun Mapped only with Foley soils.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.
Captina: CaB, CaC, CaD	Moderate: moderately well drained; slow permeability.	Moderate where slopes are less than 6 percent; slow permeability. Severe where slopes are more than 6 percent.	Slight where slopes are less than 8 percent; moderate where more than 8 percent.	Slight.
Clarksville: CeD, CeE	Severe: coarse fragments on surface.	Severe: slopes of more than 6 percent; coarse fragments on surface.	Severe: coarse fragments on surface; slopes of more than 15 percent in some places.	Severe: coarse fragments on surface.
Crowley: CoA	Severe: poorly drained; very slow permeability.	Severe: poorly drained; very slow permeability.	Severe: poorly drained; very slow permeability.	Moderate: poorly drained.
Dubbs: DeA, DeB	Slight	Slight where slopes are less than 2 percent; moderate where more than 2 percent.	Slight	Slight.
Dundee: DvA, DvB	Moderate: somewhat poorly drained; moderately slow permeability; seasonal high water table.	Moderate: somewhat poorly drained; slopes of more than 2 percent in some places.	Moderate: somewhat poorly drained; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table.
Foley: FcA For Calhoun part, see Calhoun series.	Severe: poorly drained; seasonal high water table; very slow permeability.	Severe: poorly drained; seasonal high water table; very slow permeability.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.
Gepp: GpD, GpE	Moderate: small stones. Severe where slopes are more than 15 percent.	Severe: small stones; slopes of more than 6 percent in most areas.	Moderate: small stones. Severe where slopes are more than 15 percent.	Moderate: small stones; slopes of more than 15 percent in some areas.
Healing: Hc	Severe: subject to flooding	Severe: subject to flooding	Severe: subject to flooding	Moderate: subject to flooding.

nd ols	Camp areas	Playgrounds	Picnic areas	Paths and trails
	Moderate: somewhat poorly drained; seasonal high water table; very slow permeability.	Moderate: somewhat poorly drained; seasonal high water table; very slow permeability.	Moderate: somewhat poorly drained; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table.
	Severe: subject to flooding	Severe: subject to flooding	Moderate: subject to flooding	Moderate: subject to flooding.
	Severe: poorly drained; clayey; very slow permeability; seasonal high water table.	Severe: poorly drained; clayey; very slow permeability; seasonal high water table.	Severe: poorly drained; clayey; seasonal high water table.	Severe: poorly drained; clayey; seasonal high water table.
rt, see s.	Severe: somewhat poorly drained; very slow permeability; dusty when soil is dry.	Severe: somewhat poorly drained; very slow permeability; dusty when soil is dry.	Moderate: somewhat poorly drained; dusty when soil is dry.	Moderate: somewhat poorly drained; dusty when soil is dry.
oD2	Slight where slopes are less than 8 percent; moderate where more than 8 percent; moderately slow permeability.	Moderate where slopes are less than 6 percent; severe where more than 6 percent; moderately slow permeability.	Slight where slopes are less than 8 percent; moderate where more than 8 percent.	Slight.
	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.
	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
	Slight	Moderate where slopes are less than 6 percent; severe where more than 6 percent.	Slight	Slight.
D	Moderate: moderately slow permeability; slopes of more than 8 percent.	Moderate: moderately slow permeability. Severe where slopes are more than 6 percent.	Slight where slopes are less than 8 percent; moderate where more than 8 percent.	Slight.
	Severe: poorly drained; seasonal high water table; clayey; very slow permeability.	Severe: poorly drained; seasonal high water table; clayey; very slow permeability.	Severe: poorly drained; seasonal high water table; clayey.	Severe: poorly drained; seasonal high water table; clayey.
D	Moderate: slow permeability	Moderate: slow permeability; coarse fragments. Severe where slopes are more than 6 percent.	Slight where slopes are less than 8 percent; moderate where more than 8 percent.	Slight.
	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; seasonal high water table.
rF part is e to be	Severe: very slow permeability; slopes of more than 15 percent in some places.	Severe: very slow permeability; slopes of more than 15 percent in some places.	Moderate where slopes are less than 15 percent; severe where more than 15 percent; locally coarse fragments.	Slight where slopes are less than 15 percent; moderate where 15 to 25 percent; severe where more than 25 percent.

its effect is modified locally by runoff and slope. Climate alone does not account for differences in the soils of the county.

Living organisms

The higher plants and animals, as well as insects, bacteria, and fungi are important in the formation of soils. Among the changes they cause are gains in organic matter and addition of nitrogen to the soil, gains or losses in other plant nutrients,

tities of chert are generally on the peaks and points of ridges. Soils, such as Agnos and Gepp, that formed in weathered material containing somewhat less chert are generally at a lower elevation. The chert is concentrated in the surface layer and few or no chert fragments are in the subsoil. Ventris soils formed in material almost free of chert, and they are high in calcium, which reflects the effects of the calcareous parent rocks. The clayey subsoil of Agnos, Gepp, and Ventris

The Mississippi River finally abandoned the vast complex of alluvial terraces that form much of Lawrence County and some adjacent counties in favor of channels to the east (*6*). The broad, abandoned back swamps were subsequently drained by smaller, more localized streams, such as Village Creek, White Oak Slough, and Cache River, which occupy former braided channels of the Mississippi River. Such streams were inadequate to maintain broad areas as active flood plains. Those parts of the alluvial plain above overflow were progressively mantled with silty loess deposits that gradually thickens easterly. The loess deposits were probably laid down at the same time as those on Crowley Ridge. Calhoun, Lafe, and some Foley soils formed where the silt is thickest in Lawrence County. Where it is thinner over the back swamp clays, Crowley and Hillemann soils formed. Where there are lenses in the thinnest silt deposits on the broad clayey flats, Jackport soils formed. Within the broad areas of these dominant soils, there are remnants of old natural levees on which Amagon, Dubbs, and Dundee soils formed.

Relief

The relief in Lawrence County is an inequality in elevation brought about by entrenchment of streams into the land surface, by faulting, and by deposition of sediment. The highest elevation in the county, about 780 feet above sea level, is about 4 miles south of the Spring River near the Sharp County line. The lowest elevation, where the Black River leaves the county, is about 220 feet above sea level. Some of the greatest differences among the soils are caused by differences in relief through its effect on drainage, runoff, erosion, and percolation of water through the soil.

Relief in the upland area of Lawrence County ranges from steep hillsides to nearly level plateaus, hillcrests, and side slopes of valleys. Local differences in elevations range to as much as 300 feet in areas of dissected hillsides and ridges. Along the foot slopes of the Ozark Highlands, differences in local elevations predominantly range from 50 to 100 feet. Throughout this area slopes are such that excess water is removed soon after it falls on the surface. Even when precipitation is more than sufficient to saturate, the soils are saturated for only short periods during and after rainfall or snowfall. Consequently, the soils are moderately well drained to somewhat excessively drained. Some are very slowly permeable. These conditions are reflected by the dominantly brown or red colors caused by the oxidation of iron. Agnos, Boden, Captina, Clarksville, Gepp, Loring, Peridge, Portia, Tonti, and Ventris soils are in this area.

Relief in the lowland area above the flood plains of streams in Lawrence County ranges from broad flats and depressions to undulating areas of alternating swales and low ridges. Local differences in elevation range to as much as 20 feet, but are generally 5 to 10 feet in undulating areas. The highest elevation, near College City, is about 275 feet above sea level. On the broad flats and in depressed areas on flats and between ridges, differences in local elevations are negligible. Surface drainage is slow or very slow. Soils in these areas are poorly drained or somewhat poorly drained, and most are slowly permeable. They have a seasonally perched water table. They are dominantly gray or they are mottled with gray because of the reduction of iron. Amagon, Calhoun, Crowley, Dundee, excessively drained Beulah soils have been little affected by relief.

The present flood plains along streams in the county are generally level to gently undulating, but some are concave. Most are subject to occasional or frequent flooding. The relief and the runoff velocity are such that sediment deposits remain fairly static or accumulate very slowly. Amagon, Dundee, and Healing soils are in areas where deposition is relatively static on level and gently undulating relief. Hontas and Sharkey soils are in areas of level or concave relief that receive minute sediment deposits.

In contrast with deposition, geologic erosion has more than kept pace with soil formation in some upland areas and outcroppings of rock occur. In areas of strong relief overlying cherty limestone, Clarksville and Gepp soils formed. These soils contain larger quantities of chert residue, particularly on the surface, which was left over after weathering. This chert mantle has retarded geologic erosion, but weathering continues. Consequently, these soils, which are deep over bedrock, have developed a thick argillic horizon. Ventris soils do not have a protective chert mantle. They have undergone geologic erosion at a faster rate, have a thinner argillic horizon, and are moderately deep over bedrock. Agnos and Boden soils are intermediate in weathering and erosion. They have a thinner argillic horizon than Clarksville and Gepp soils, but are deeper over bedrock than Ventris soils. Some Captina and Portia soils are in areas where weathering has proceeded faster than geologic erosion. They have developed a thick argillic horizon without the protective mantle of coarse fragments.

Some foot slopes in the uplands have deep accumulations of material that washed or sloughed down in part from adjacent higher soils. Loring soils formed in these areas. Some Captina soils are in the thinner deposits left on the higher slopes.

Peridge soils are on gently sloping stream terraces. They formed in deep, loamy and clayey material washed from the uplands and deposited on stream flood plains before the streams were further entrenched.

Time

The length of time required for formation of a soil depends largely on other factors of soil formation. Less time generally is needed if the climate is warm and humid and the vegetation is luxuriant. When other factors are equal, less time also is needed for sandy or loamy parent material than for clayey parent material. In terms of geologic time and of soil formation, the soils of Lawrence County range from relatively young to old. Soil age, however, does not always coincide with geologic time.

The sediments now forming the land surface in the eastern part of the county were probably deposited during and after the advance of the continental glaciers. The last of these glaciers retreated from the North Central States about 11,000 years ago (*9, 10*). Thus in terms of geologic time, these soils are young, but in terms of soil formation, their age varies widely. On broad flats, soils are more mature. Younger soils are on natural levees and in slack-water areas within the flood plains of present streams. These younger soils receive fresh sediments very slowly and show evidence of formation but lack the evidence of translocation of clay of more mature

The soils in most of the western part of the county formed in material weathered from rocks of Ordovician age. In terms strongly gleyed are Amagon, Calhoun, Crowley, Foley, Jackport, Lafe, McCrory, and Tuckerman soils.

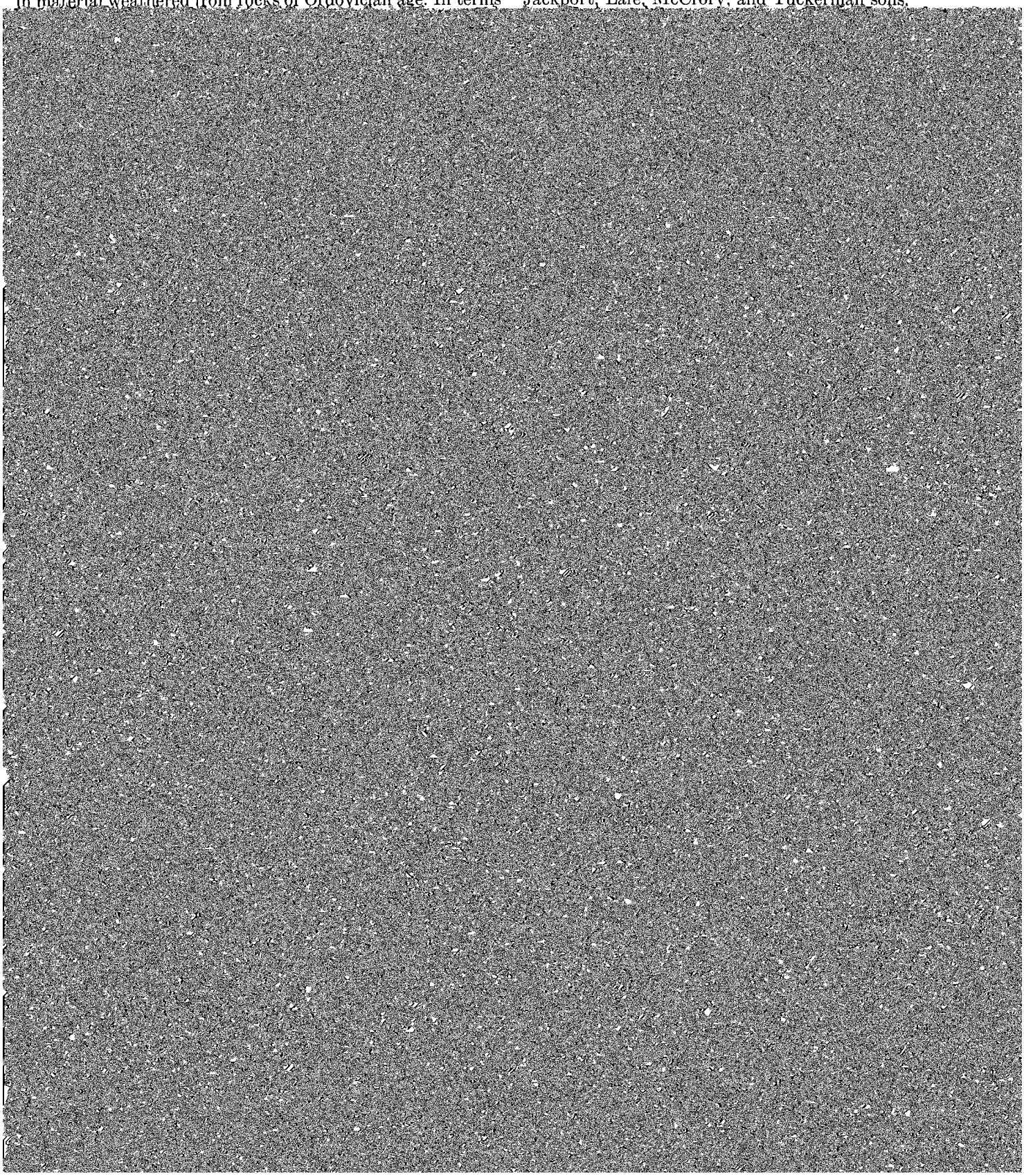

TABLE 10.—*Soil series classified into higher categories*

Series	Family	Subgroup	Order
Agnos	Clayey, mixed, mesic	Typic Hapludults	Ultisols.
Amagon	Fine-silty, mixed, thermic	Typic Ochraqualfs	Alfisols.
Beulah	Coarse-loamy, mixed, thermic	Typic Dystrochrepts	Inceptisols.
Boden	Clayey, mixed, mesic	Typic Hapludults	Ultisols.
Bosket	Fine-loamy, mixed, thermic	Mollic Hapludalfs	Alfisols.
Calhoun	Fine-silty, mixed, thermic	Typic Glossaqualfs	Alfisols.
Captina	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols.
Clarksville	Loamy-skeletal, siliceous, mesic	Typic Paleudults	Ultisols.
Crowley [1]	Fine, montmorillonitic, thermic	Typic Albaqualfs	Alfisols.
Dubbs	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols.
Dundee	Fine-silty, mixed, thermic	Aeric Ochraqualfs	Alfisols.
Foley	Fine-silty, mixed, thermic	Albic Glossic Natraqualfs	Alfisols.
Gepp	Very fine, mixed, mesic	Typic Paleudalfs	Alfisols.
Healing	Fine, silty, mixed, mesic	Typic Argiudolls	Mollisols.
Hillemann	Fine-silty, mixed, thermic	Albic Glossic Natraqualfs	Alfisols.
Hontas	Fine-silty, mixed, mesic	Fluvaquentic Eutrochrepts	Inceptisols.
Jackport	Very fine, montmorillonitic, thermic	Vertic Ochraqualfs	Alfisols.
Lafe	Fine-silty, mixed, thermic	Glossic Natrudalfs	Alfisols.
Loring	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
McCrory	Fine-loamy, mixed, thermic	Albic Glossic Natraqualfs	Alfisols.
Patterson	Coarse-loamy, mixed, thermic	Aeric Ochraqualfs	Alfisols.
Peridge	Fine-silty, mixed, mesic	Typic Paleudalfs	Alfisols.
Portia	Fine-loamy, siliceous, mesic	Typic Paleudalfs	Alfisols.
Sharkey	Very fine, montmorillonitic, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Tonti	Fine-loamy, mixed, mesic	Typic Fragiudults	Ultisols.
Tuckerman	Fine-loamy, mixed, thermic	Typic Ochraqualfs	Alfisols.
Ventris	Fine, mixed, mesic	Albaquic Hapludalfs	Alfisols.

[1] The Crowley soils in this survey are taxadjuncts to the Crowley series. They lack red mottles in the B horizon and are outside the defined range of the series in this respect.

syllables. The last syllable indicates the order. An example is *Aquepts* (*Aqu*, meaning water or wet, and *epts*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make

preceded by a series of adjectives, class names for texture and mineralogy, for example, that are used as family differentiae. See table 10. An example is the clayey, mixed, mesic family of Typic Hapludults.

Physical and Chemical Analyses

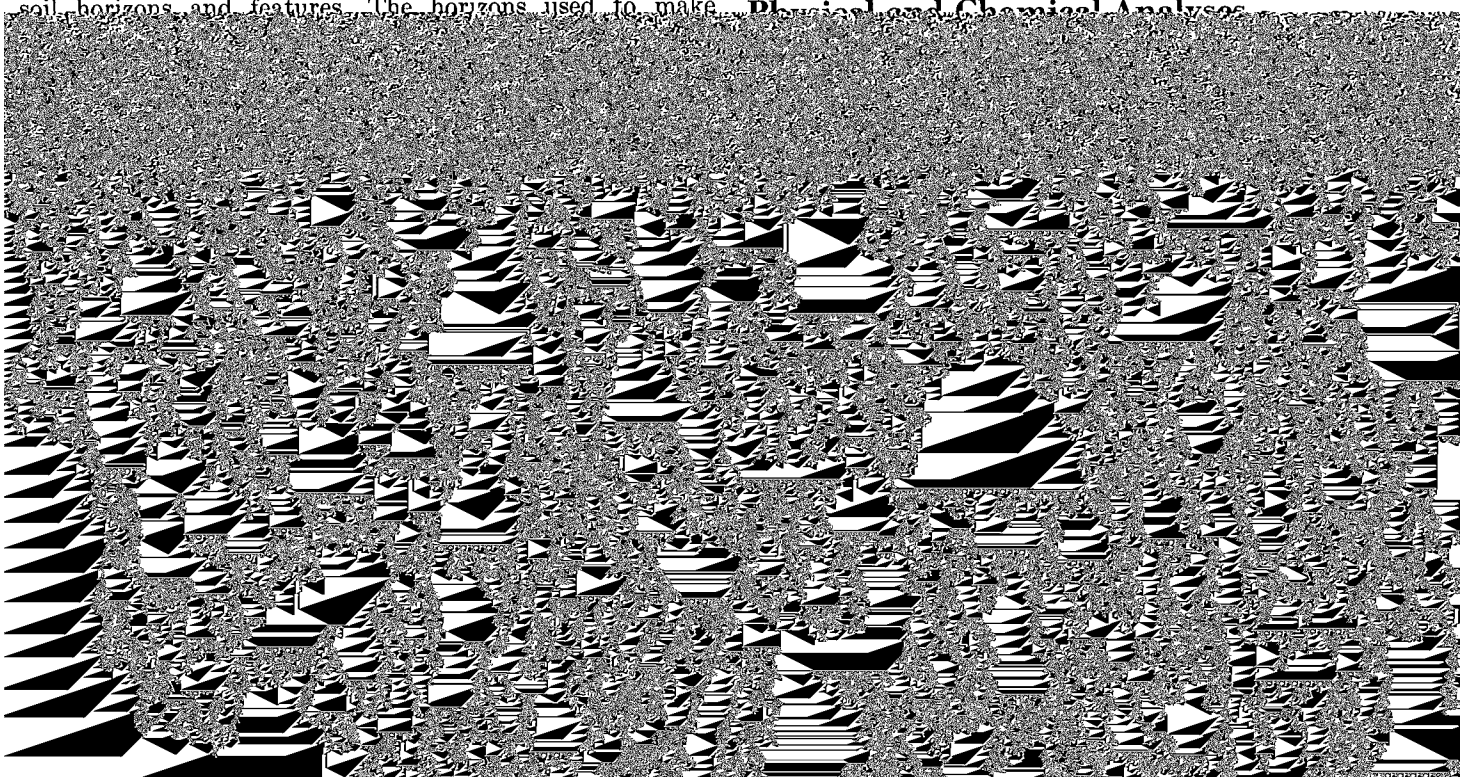

TABLE 11.—*Physical and chemical*

[Analyses made by the University of Arkansas, Fayetteville, Arkansas. Dashes indicate that no analysis

Soil and pedon number	Depth from surface	Horizon	Physical			
			Very coarse through medium sand (2.0–0.25 mm)	Fine sand (0.25–0.10 mm)	Very fine sand (0.10–0.05 mm)	Total sand (2.0–0.05 mm)
	Inches		*Percent*	*Percent*	*Percent*	*Percent*
Boden gravelly sandy loam: S70–Ark–38–7–(1–7)	0–5	A1	32	24	6	62
	5–7	A2	30	23	6	59
	7–11	B1	29	20	5	54
	11–23	B21t	16	11	3	30
	23–32	B22t	23	14	5	42
	32–42	B3t	35	18	4	57
	42–50	C	30	34	6	70
Captina silt loam: S70–Ark–38–6–(1–8)	0–5	Ap	5	5	3	13
	5–14	B21t	3	4	2	9
	14–22	B22t	3	4	2	9
	22–28	Bx1	4	5	2	11
	28–41	Bx2	3	4	2	9
	41–53	Bx3	5	8	4	17
	53–63	[1] Bx4	6	10	5	21
	63–72	[1] Bx4	7	11	5	23
Clarksville cherty silt loam: S70–Ark–38–4–(1–7)	0–2	A1	19	6	3	28
	2–8	A2	12	7	5	24
	8–22	B1t	12	7	5	24
	22–35	[1] B21t	21	7	7	35
	35–46	[1] B21t	9	5	6	20
	46–60	B22t	6	4	5	15
	60–72	B3t	6	5	5	16
Healing silt loam: S70–Ark–38–2–(1–6)	0–6	Ap	----------	----------	3	3
	6–9	A12	----------	----------	2	2
	9–16	A3	----------	----------	2	2
	16–27	B21t	----------	----------	1	1
	27–49	B22t	----------	----------	1	1
	49–72	B23t	----------	----------	2	2
Hontas silt loam: S70–Ark–38–12–(1–8)	0–7	Ap	1	1	1	3
	7–11	A12	2	1	----------	3
	11–15	B21	2	1	----------	3
	15–21	B22	3	1	1	5
	21–31	B23	8	1	1	10
	31–38	C1	7	1	1	9
	38–49	C2	3	1	1	5
	49–56	[1] C3	2	1	1	4
	56–72	[1] C3	4	1	1	6
Peridge silt loam: S70–Ark–38–1–(1–8)	0–4	Ap	2	2	2	6
	4–20	[1] B21t	1	1	1	3
	20–29	[1] B21t	1	1	1	3
	29–44	B22t	1	----------	1	2
	44–54	B23t	1	----------	1	2

analyses of selected soils

was made or that the data resulting from analysis was insignificant. The symbol < means less than]

Physical—Continued		Chemical							
		Milliequivalents per 100 grams of soil							
		Extractable bases							
Silt (0.05–0.002 mm)	Clay (<0.002 mm)	Calcium	Magnesium	Sodium	Potassium	Extractable acidity	Base saturation	Reaction 1:1 soil-water	Organic matter
Percent	*Percent*						*Percent*	*pH*	*Percent*
31	7	0.3	0.1	0.2	0.1	4.0	15	4.9	1.7
32	9	.2	.1	.1	.1	2.8	15	5.1	1.0
28	18	.3	.2	.1	.1	4.0	15	5.1	.6
12	58	.4	.9	.2	.2	16.0	10	4.7	.5
7	51	.4	.7	.2	.2	14.6	9	4.7	.3
5	38	.3	.6	.1	.1	11.0	9	4.8	.2
9	21	.2	.4	.1	.1	5.9	12	4.6	.2
74	13	1.4	.7	.2	.1	6.6	27	5.5	1.7
63	28	1.7	.9	.2	.1	10.3	22	5.1	.7
61	30	1.1	1.0	.2	.2	14.2	15	5.0	.4
64	25	.7	.8	.2	.1	12.3	13	5.0	.3
59	32	.4	1.1	.3	.1	14.6	12	5.0	.2
44	39	.7	1.8	.5	.1	17.0	15	4.6	.2
50	29	.8	1.8	.5	.1	13.6	19	4.9	.1
48	29	1.0	2.1	.6	.1	12.1	24	4.9	.1
64	8	4.6	.8	.1	.2	6.9	45	6.4	3.7
65	11	.8	.2	.1	.1	6.3	16	5.3	2.4
63	13	1.9	.2	.1	.1	2.6	47	6.1	1.1
47	18	2.6	.9	.1	.2	2.7	58	6.1	.3
48	32	1.3	.9	.1	.1	4.2	36	5.3	.3
34	51	1.3	1.2	.1	.1	9.2	23	4.9	.3
32	52	1.3	1.0	.1	.1	10.7	19	4.9	.3
78	19	10.5	1.8	.2	.2	1.8	88	7.4	2.6
77	21	8.2	1.2	.1	.2	2.2	82	7.5	2.3
72	26	11.4	1.2	.1	.2	3.0	81	7.3	2.0
70	29	10.5	1.0	.1	.2	2.8	81	7.2	1.2
69	30	8.1	.7	.1	.2	2.3	80	7.2	.7
69	29	9.9	.9	.2	.2	3.4	77	7.0	.6
79	18	4.2	1.6	.2	.1	4.9	55	6.5	1.9
78	19	4.4	1.5	.2	.1	5.3	54	6.2	1.6
77	20	5.2	1.4	.2	.1	6.0	53	5.9	1.4
82	23	4.6	1.4	.3	.1	7.6	46	5.8	1.3
67	23	3.5	1.1	.3	.1	8.0	38	5.6	.9
71	20	2.0	.8	.3	.1	8.5	27	5.5	.5
65	30	3.4	2.1	.8	.2	8.5	43	5.7	.6
66	30	4.7	3.5	1.2	.1	4.7	67	7.3	.6
62	32	4.9	3.9	1.1	.1	4.3	70	7.7	.5
77	17	3.7	1.0	.2	.5	5.1	51	6.1	2.9
63	34	2.4	1.4	.2	.2	9.2	31	4.9	.8
63	34	1.8	1.4	.2	.2	9.1	28	4.9	.4
61	37	1.9	1.5	.2	.3	9.8	28	5.0	.3
58	40	2.8	2.1	.2	.3	10.8	33	5.0	.4
57	41	2.8	1.8	.2	.3	10.5	33	5.0	.3
50	47	4.1	2.4	.2	.4	11.5	38	4.9	.4
31	67	6.1	3.7	.2	.5	13.3	44	4.9	.4

TABLE 11.—*Physical and chemical*

Soil and pedon number	Depth from surface	Horizon	Physical			
			Very coarse through medium sand (2.0–0.25 mm)	Fine sand (0.25–0.10 mm)	Very fine sand (0.10–0.05 mm)	Total sand (2.0–0.05 mm)
	Inches		*Percent*	*Percent*	*Percent*	*Percent*
Portia fine sandy loam: S70–Ark–38–8–(1–7)	0–3	A1	20	13	2	35
	3–6	A2	20	13	3	36
	6–11	B1	20	13	3	36
	11–24	B21t	14	10	2	26
	24–32	B22t	17	11	3	31
	32–45	B23t	22	14	4	40
	45–62	B24t	19	13	3	35

[1] Horizon subdivided for sampling purposes.

contain solub'e salts, base saturation was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium, and multiplying by 100.

The bases were extracted with 1*N*, pH 7.0, ammonium acetate. Calcium, potassium, and sodium were determined with a flamephotometer and magnesium was measured by atomic absorption. The extractable acidity was determined by the barium chloride triethanolamine method (*4*, *14*).

Soil pH was determined on 1:1 soil to water mixture. Available phosphorus was extracted with the Bray No. 1 solution (0.03*N* NH4F and 0.025*N* HCl) and measured colorimetrically.

Organic matter was determined by a modified Walkey-Black method (*7*). The organic matter is digested with potassium dichromate-sulfuric acid and the quantity of chromic acid reduced is measured colorimetrically.

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Glossary

ABC soil. A soil that has a complete profile, including an A, B, and C horizon.

AC soil. A soil that has an A horizon and a C horizon but no B horizon. Commonly such soils are immature, as those developing from alluvium or those on steep, rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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

analyses of selected soils—Continued

Physical—Continued		Chemical							
		Milliequivalents per 100 grams of soil							
		Extractable bases							
Silt (0.05–0.002 mm)	Clay (<0.002 mm)	Calcium	Magnesium	Sodium	Potassium	Extractable acidity	Base saturation	Reaction 1:1 soil-water	Organic matter
Percent	*Percent*						*Percent*	*pH*	*Percent*
57	8	1.4	.6	.1	.2	6.1	27	5.5	2.5
54	10	1.2	.7	.1	.1	4.2	33	5.8	1.7
53	11	1.0	.5	.1	.1	4.8	26	5.2	1.1
52	22	.9	1.0	.1	.2	8.2	21	5.1	.5
48	21	1.0	1.5	.2	.2	7.9	27	5.0	.4
42	18	1.0	1.3	.2	.1	6.3	29	5.0	.3
37	28	2.4	2.7	.2	.1	8.3	39	5.2	.2

pattern that they cannot be shown separately on a publishable soil map.

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

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

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

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

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

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

Decreaser. Any of the climax range plants most heavily grazed. Because they are the most palatable, they are first to be destroyed by overgrazing.

Deferred grazing. The practice of delaying grazing until range plants have reached a definite stage of growth, in order to increase the vigor of the forage and to allow the desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as

soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.

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

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. V-shaped gullies result if the material is more difficult to erode with depth; whereas U-shaped gullies result if the lower material is more easily eroded than that above it.

Horizon, soil. A layer of soil, approximately parallel to the surface, mineral, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

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

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a

normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from

aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles) adhering together without any regular cleavage, as in many claypans and hardpans).

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

Substratum. Technically, the part of the soil below the solum.

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