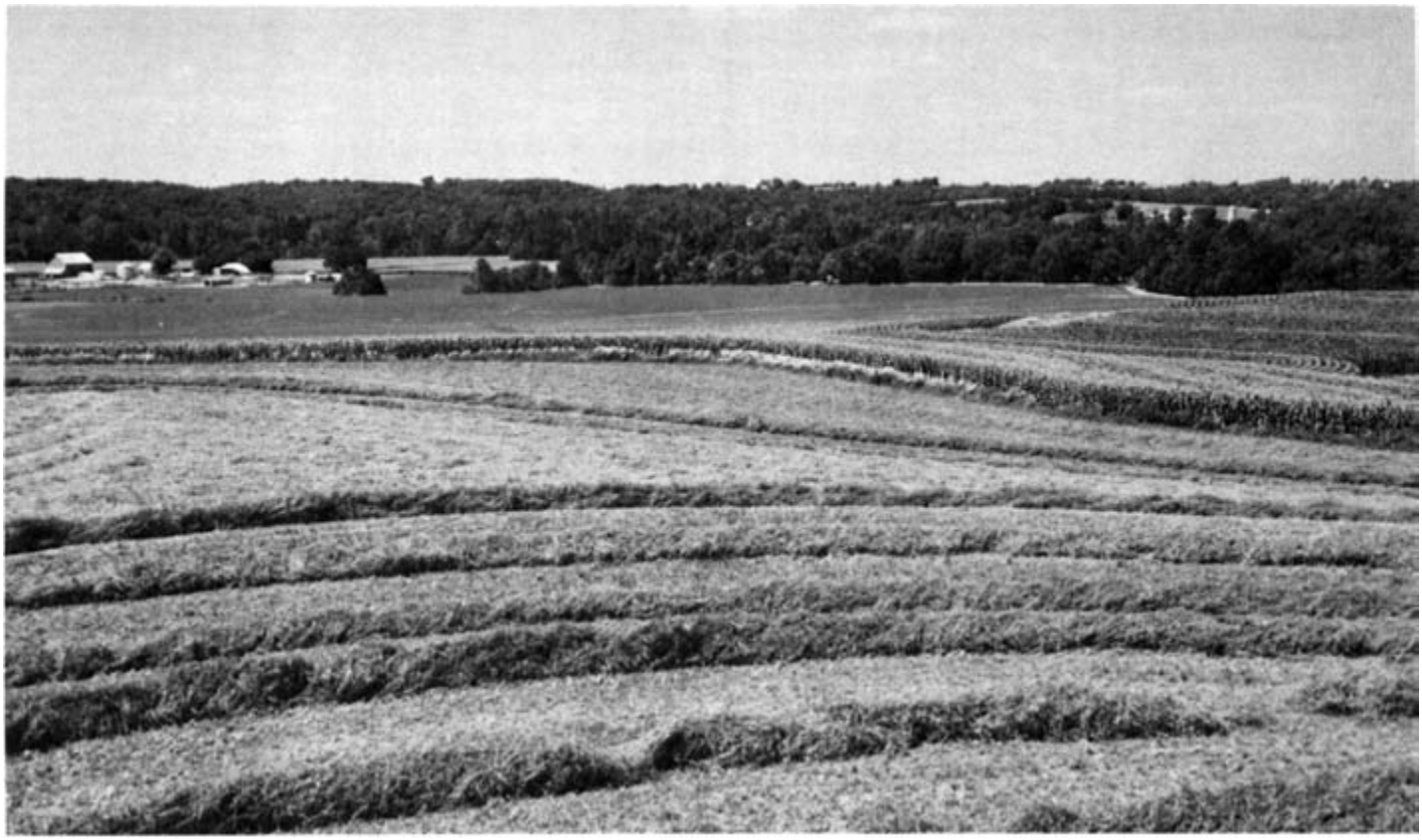
SOIL SURVEY OF

Adams County, Illinois



United States Department of Agriculture
Soil Conservation Service
in cooperation with
Illinois Agricultural Experiment Station

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 1962–73. Soil names and descriptions were approved in 1974. 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 Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Adams County Soil and Water 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. This survey is Illinois Agricultural Experiment Station Report Number 101.

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 Adams 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 numerical order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the capability unit and shows the woodland group, wildlife group, and recreation group 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 soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units, wildlife groups, recreation groups, and 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.

Local planning boards will find valuable information about the location, extent, and limitation of soils for various rural and urban uses in the section "Use and Management of the Soils."

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

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, 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 Soils."

Newcomers in Adams County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given at the beginning of the publication.

Cover: Alfalfa hay in a contoured and terraced area of Fayette soils.

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SOIL SURVEY OF ADAMS COUNTY, ILLINOIS

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MAJOR PART OF FIELDWORK BY L. J. BUSHUE, J. F. STEINKAMP, L. W. HACKER, R. F. WICKS, AND L. M. REINEBACH; OTHERS CONTRIBUTING WERE V. LINK, J. THOMPSON, R. BUSBY, K. BRACEY, AND W. BRINK, SOIL CONSERVATION SERVICE

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

ADAMS COUNTY is the westernmost county in Illinois. It is near the center of the state in the north-south direction (fig. 1). Adams County is bounded by Hancock County on the north; Schuyler, Brown, and Pike Counties on the east; Pike County on the south; and the Mississippi River on the west.

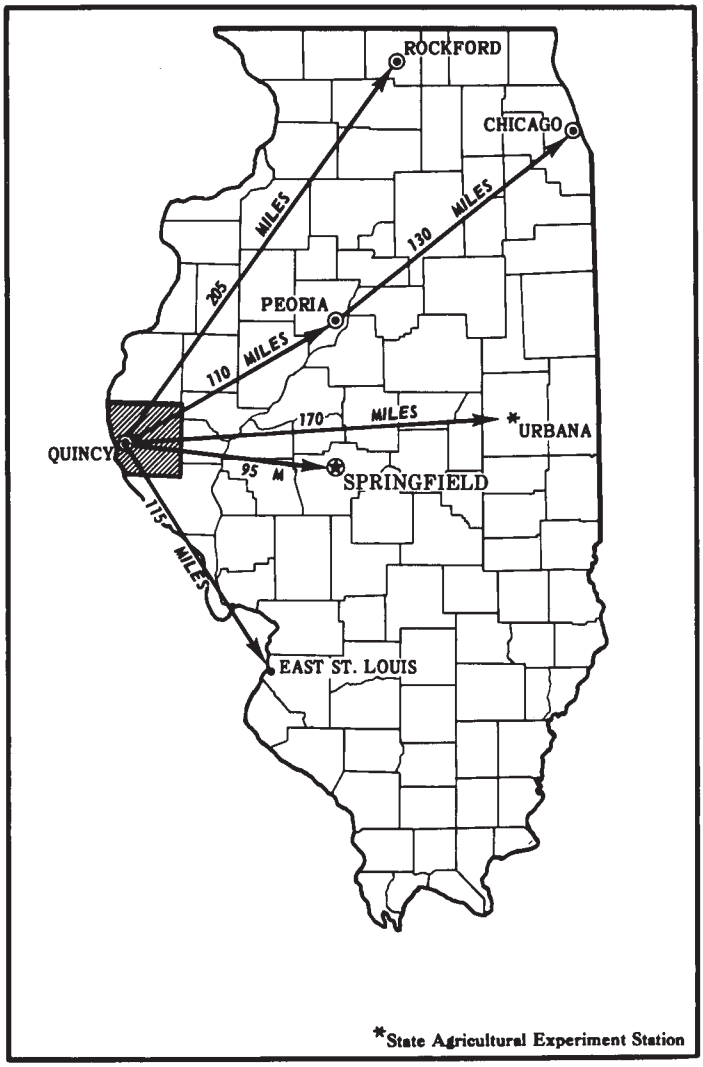

Figure 1.—Location of Adams County in Illinois.

General Nature of the Area

This section gives general information about Adams County. Settlement, industry, and farming are briefly discussed, and some information is given on physiography and climate.

Settlement, Industry, and Farming[1]

Adams County was established in 1825. It has an area of about 862 square miles, or 551,552 acres. In 1970 the population of the county was 70,861. Quincy, the county seat, had a population of 45,288.

The county has a well-developed transportation system. State Highway 96 extends north and south along the western side of the county. State Highways 57 and 61 are spurs connecting with State Highway 96. State Highway 104 begins at Quincy and extends eastward across the county. U.S. Highway 24 is the main east-west highway and extends from Quincy to the eastern edge of the county. The secondary roads are either blacktop or gravel. Two railroad lines serve the county. Barges on the Mississippi River provide a major transportation outlet for much of the grain shipped out of the county. Baldwin Field is the main airport and is 10 miles east of Quincy.

Farming is one of the major enterprises in Adams County. In 1969, according to the Census of Agriculture (*5*) [2], the county had 2,034 farms, totaling 479,229 acres.

Corn, soybeans, wheat, and hay are the main crops, and they cover more than half of the farm acreage. An average size farm is 236 acres. In 1969, 121,617 acres were in corn; 77,056 acres in soybeans; 25,326 acres in wheat; and 20,748 acres in hay. Half of the

[1] D. A. BENZ, district conservationist, Soil Conservation Service, helped prepare this section.

[2] Italic numbers in parentheses refer to Literature Cited, page 125.

remaining acreage was in pasture, and the rest was in woodland and other uses.

Livestock is raised on more than half of the farms. In 1969, the total number of cattle and calves was 58,154; dairy cows, 4,364; swine, 220,826; and sheep, 4,967.

Manufacturing and processing are important in the county's economy. Ninety-five such plants are in Quincy. As of June 1, 1972, 12,550 people were in the manufacturing labor force.

Physiography, Relief, and Drainage

Adams County has extremes in topography. The northeastern and central parts of the county have large, nearly level areas that are part of a relatively undissected upland drainage divide between the Mississippi and Illinois Rivers. Other large nearly level areas are on the flood plain along the Mississippi River. Small, nearly level areas and larger, gently sloping to very steep areas are in other parts of the county. The present topography is mainly the result of erosion, even though the Illinoian terminal moraine extends from about the northwestern part of the county to the southeastern part. The highest point is about 860 feet above sea level and is near the southeastern corner. The lowest point is about 460 feet above sea level and is on the flood plain of the Mississippi River near the southwestern corner.

The Mississippi basin in the county is drained mainly by Pigeon, Mill, and Bear Creeks. The Illinois basin is drained by McKee Creek and tributaries of the Lamoine River.

The soils in the upland part of the county formed mainly in loess and glacial drift. The combined thickness of these materials is mostly 30 to 60 feet. The soils in the bottom lands formed in sandy to clayey water-deposited material. This material is over 100 feet thick throughout most of the Mississippi River flood plain and 5 to 50 feet thick on small flood plains of the county.

Sources of water are plentiful on most of the flood plain of the Mississippi River. In the upland part of the county enough water is generally available for farm use. Most wells are drilled into limestone or, in places, sand or gravel beds in the glacial drift. A few sources of water in the glacial drift are located by using a 1- to 2-foot-diameter auger. Farm ponds supplement the water supply in many areas. Sources of water for municipal use are limited in the upland part of Adams County, but artificial lakes are current or potential sources of water for some of the larger towns.

Climate[3]

Adams County has the continental climate typical of central Illinois. In summer, the maximum temperature is 100 degrees or higher in 2 out of 3 years. In winter, the minimum temperature, on the average, is 5 to 10 degrees below zero. Low-pressure areas and associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year.

Annual precipitation, as shown in table 1, averages about 36 inches but ranges from 23 inches to 48 inches. Monthly precipitation averages less than 2 inches from December through February. The monthly average is more than 4 inches for May and June. More than 50 percent of the annual precipitation occurs during the growing season of May through September.

[3] By WILLIAM L. DENMARK, former climatologist for Illinois, National Weather Service, U. S. Department of Commerce, at Champaign.

TABLE 1.—*Temperature and precipitation data*

[Based on data from Quincy for the period 1931 to 1968]

Month	Temperature					Precipitation					
	Average daily maximum	Average daily minimum	Monthly	Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—	Average total	Highest amount		Lowest amount		Days with 0.1 inch or more
	°F	°F	°F	°F	°F	In	In	Year	In	Year	Number
January	37	20	28	74	−16	1.7	6.8	1965	0.3	1956	4
February	41	23	32	74	−16	1.5	3.5	1951	.2	1947	4
March	52	32	42	87	−7	2.6	6.3	1945	.4	1958	6
April	65	44	54	91	18	3.5	8.0	1944	1.0	1962	7
May	76	54	65	103	33	4.0	13.7	1935	1.3	1940	7
June	86	64	75	105	43	4.7	12.5	1947	.7	1963	7
July	90	68	79	114	48	3.7	13.5	1958	.3	1934	5
August	88	66	77	111	44	3.8	10.8	1939	.3	1934	5
September	81	58	69	103	26	3.8	12.7	1961	.1	1939	6
October	69	47	58	96	21	2.7	10.3	1941	.3	1964	5
November	53	34	43	83	−3	2.0	5.7	1934	.2	1933	5
December	40	24	32	71	−12	1.8	4.4	1932	.2	1955	4
Year	65	45	55	114	−16	35.8	13.7	1935	.1	1939	65

Normal rainfall in July and August is not sufficient to meet the moisture demand of a vigorously growing field crop. Subsoil moisture must be stored during the previous fall through spring for best crop production during most growing seasons.

Major droughts are infrequent, but prolonged dry periods during a part of the growing season may occur. Such periods often result in reduced crop yields.

Summer precipitation occurs mostly as brief showers or thunderstorms. A single thunderstorm often produces more than an inch of rain, and occasionally it is accompanied by hail and damaging winds. Nearly 6 inches of rain has fallen within a 24-hour period and nearly 16 inches in a single month. Thunderstorms occur on an average of 50 days annually, and about half of these occur during the critical growing period. Growing field crops are most likely to be damaged if hail falls during June, July, and August. Hail-producing thunderstorms in the same locality average nearly three per year, but they average less than one during the summer (7).

Annual snowfall averages about 22 inches. This much can fall in a single month.

The summers are warm, but hot periods are seldom prolonged. In most summers, cool air frequently comes from the north and moves the hot, humid, stagnant masses of air. July is normally the warmest month, and the hottest day on record is July 15, 1936, when the temperature reached 114°F. July 1936 had 15 consecutive days when the temperature was 100° or more. All months from May through September have had a temperature of 103° or more. About 40 days each year have a maximum temperature of 90° or more.

January is normally the coldest month. February often has days as cold as January, but the cold periods are generally short. The coldest temperature on record is -29° on February 13, 1905. Record temperatures in December and January have been as low as -20°.

The growing season is the number of days between the average date of the last freezing temperature in spring and the first in fall. The season is approximately 180 to 195 days in Adams County. The growth of different crops is affected at different temperatures. Temperatures often vary considerably between ridges and valleys during radiation freezes.

Table 2 gives the probability for several different threshold temperatures. All data are based on the period 1931 to 1960. The temperatures were recorded at a standard thermometer shelter of the National Weather Service at a height of approximately 5 feet above the ground and in a representative exposure in Quincy. Lower temperatures sometimes occur nearer the ground and in areas subject to extreme air drainage. Ten years of records at Quincy Airport indicate that the growing season is approximately 10 to 15 days shorter in rural areas than in Quincy.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Adams County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and spend of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Clinton and Ipava, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that

TABLE 2.—*Freeze probabilities for Adams County*

Probability	32° F	28° F	24° F	20° F	16° F
Last in spring:					
Average date	April 12	April 2	March 26	March 13	March 5
1 chance in 4 later than	April 21	April 11	April 4	March 22	March 14
1 chance in 10 later than	April 29	April 19	April 12	March 30	March 22
First in fall:					
Average date	October 25	October 31	November 11	November 22	November 28
1 chance in 4 earlier than	October 16	October 22	November 2	November 13	November 19
1 chance in 10 earlier than	October 9	October 15	October 26	November 6	November 12

affects management. For example, Clinton silt loam, 2 to 7 percent slopes, eroded, is one of several phases within the Clinton 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 in the back of this publication was prepared from the aerial photographs.

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

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit shown on the soil map of Adams County is a soil complex.

A soil complex consists of areas of two or more soils, so intermingled 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. The pattern and relative proportions of these soils are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Seaton-Hickory complex is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Limestone rock land is a land type in Adams County.

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

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

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map[4]

The general soil map at the back of this survey shows, in color, the soil associations in Adams County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may be found in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road or a building or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in the county are discussed in the following pages.

1. Herrick-Ipava-Virden association

Deep, nearly level to gently sloping, somewhat poorly drained and poorly drained soils that formed in loess; on uplands

This soil association consists of nearly level to gently undulating soils on broad interstream divides. Slopes generally are short. Elevation ranges from about 10 to 50 feet.

This association makes up about 15 percent of the county. About 26 percent of it is Herrick soils, 23 percent is Ipava soils, 20 percent is Virden soils, and 31 percent is minor soils (fig. 2).

Herrick soils are mainly near drainage divides, but some are on sides of small drainageways. They are nearly level, but some are gently sloping, and they are somewhat poorly drained. The surface layer is typically very dark gray silt loam about 12 inches thick. Below this is about 4 inches of dark-gray and very dark gray silt loam. The subsoil is grayish-brown heavy silty clay loam about 43 inches thick. In the upper 20 inches it is mottled with yellowish brown. In the lower 23 inches it is light brownish-gray and light olive gray silty clay loam. Light olive-gray silt loam mottled with yellowish brown is at a depth of about 59 inches.

Ipava soils are mainly near drainage divides, but some are on sides of small drainageways. They are mainly nearly level, but some are gently sloping, and they are somewhat poorly drained. The surface layer is typically black silt loam about 15 inches thick. The subsoil is about 33 inches thick and is mainly grayish-brown silty clay loam mottled with yellowish brown. Yellowish-brown silt loam mottled with grayish brown is at a depth of about 48 inches.

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[4] J. F. STEINKAMP, soil scientist, Soil Conservation Service, helped prepare this section.

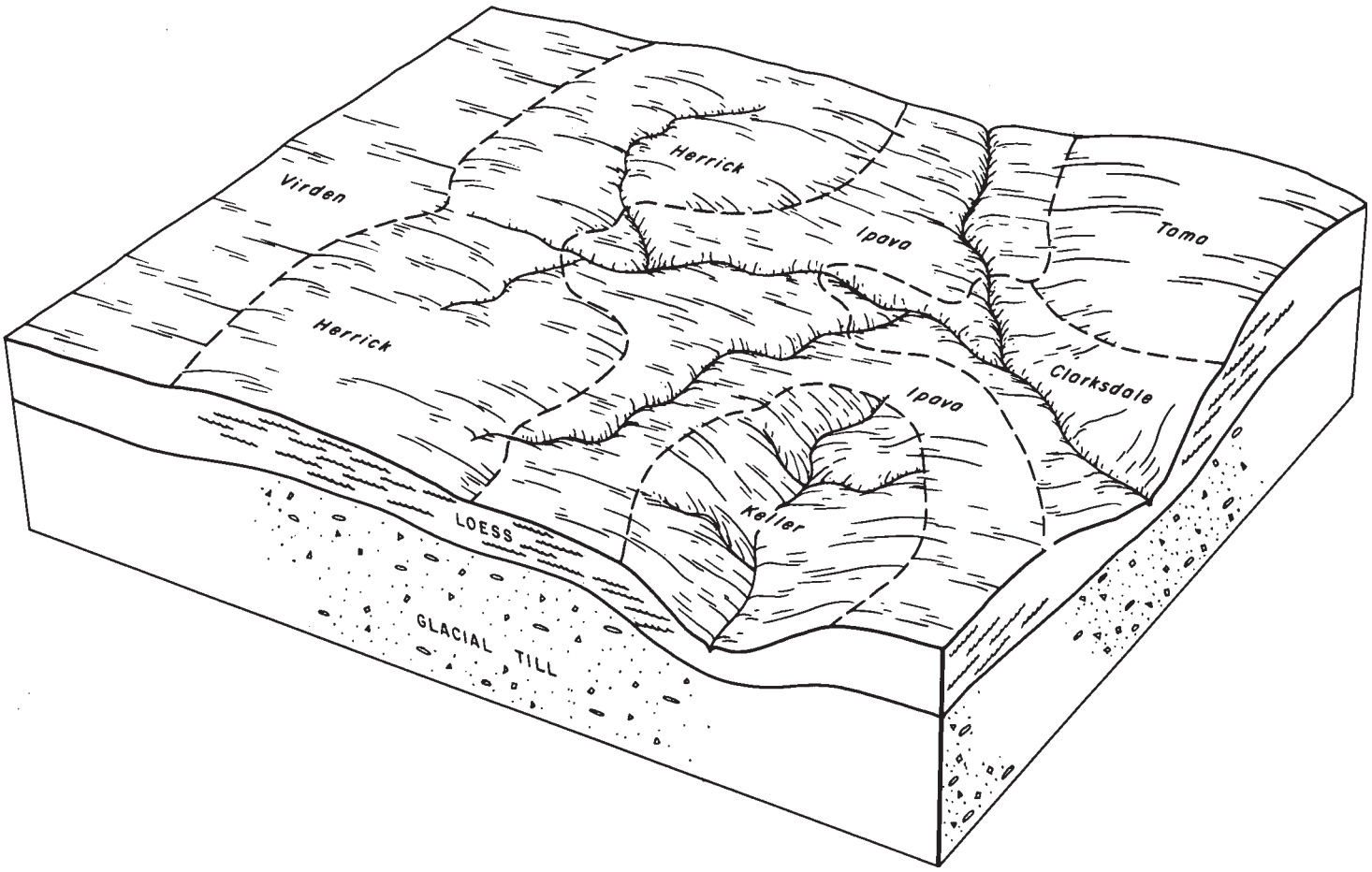

Figure 2.—**Typical pattern of soils and underlying material in association 1.**

Virden soils are nearly level and depressional and are poorly drained. The surface layer is typically black silt loam about 12 inches thick. The subsoil is about 41 inches thick. In the upper 9 inches it is black and very dark gray heavy silty clay loam mottled with grayish brown. Below that it is light olive-gray heavy silty clay loam mottled with olive brown in the upper part and light olive-gray silty clay loam mottled with dark yellowish brown in the lower part. Gray silt loam mottled with light olive brown is at a depth of about 53 inches.

The minor soils in this association are Tama, Keller, Clarksdale, and Lawson soils. Tama soils are well drained. They are on ridges and on sides of drainageways. Keller and Clarksdale soils are somewhat poorly drained. Keller soils are on sides of drainageways. Clarksdale soils are nearly level to moderately sloping and are on sides of drainageways and on drainage divides. Lawson soils are somewhat poorly drained and are on flood plains of small streams.

The soils in this association have a high available water capacity and a moderate to high content of organic matter. They have moderate to slow permeability. The main concerns of management are controlling water erosion and soil blowing, improving drainage, and maintaining organic-matter content.

Most of the acreage is used for cultivated crops and hay. A few acres are used for permanent pasture. The main enterprises are growing cash crops and raising beef cattle and hogs. Tama soils are well suited to vegetable and orchard crops. The soils have a high potential for producing all cultivated crops commonly grown in the county, such as corn, soybeans, small grains, and hay.

2. *Port Byron-Mt. Carroll association*

Deep, nearly level to strongly sloping, well drained and moderately well drained soils that formed in loess; on uplands

This soil association consists of nearly level to strongly sloping soils on ridges, interstream divides, and sides of drainageways. The gentle and moderate slopes generally are long, and the strong slopes generally are short. Elevation ranges from about 10 to 50 feet.

This association makes up about 4 percent of the county. About 31 percent of it is Port Byron soils, 25 percent is Mt. Carroll soils, and 44 percent is minor soils.

Port Byron soils are on ridges and on sides of drainageways. They are nearly level to moderately sloping

and well drained and moderately well drained. The surface layer is typically very dark grayish-brown silt loam about 16 inches thick. The subsoil is brown silt loam about 47 inches thick. In the lower 24 inches it is mottled with light brownish gray. Brown and light brownish-gray silt loam is at a depth of about 63 inches.

Mt. Carroll soils are on ridges of stream divides and on sides of drainageways. They are nearly level to strongly sloping and are well drained. The surface layer is typically very dark grayish-brown silt loam about 7 inches thick. Below this is about 2 inches of brown silt loam. The subsoil is about 40 inches thick. In the lower 13 inches it is dark yellowish-brown silt loam mottled with grayish brown. Yellowish-brown silt loam mottled with light brownish gray is at a depth of about 49 inches.

The minor soils in this association are Seaton, Downs, and Fayette soils. Seaton and Fayette soils are well drained and strongly sloping. They are mainly on sides of drainageways. Downs soils are well drained and moderately well drained. They are less sloping and are on ridges and on sides of drainageways.

The soils in this association have a high available water capacity and a moderate or moderately low content of organic matter. They have moderate permeability. The main concerns of management are controlling water erosion and maintaining organic-matter content, particularly on strongly sloping soils.

Most areas of this association are used for cultivated crops and hay. A few areas are used for permanent pasture. The main enterprises are growing cash crops and raising beef cattle and hogs. All the soils are well suited to vegetable and orchard crops. They have a high potential for producing all cultivated crops commonly grown in the county, such as corn, soybeans, small grains, grasses, and legumes.

3. Fayette-Rozetta-Seaton association

Deep, nearly level to very steep, well drained and moderately well drained soils that formed in loess; on uplands

This soil association consists of nearly level to rolling soils on interstream divides and gently undulating to very steep soils on the sides of drainageways. The steeper soils are adjacent to the Mississippi River bluff. Elevation ranges from about 10 to 200 feet.

This association makes up about 19 percent of the county. About 22 percent of it is Fayette soils, 15 percent is Rozetta soils, 15 percent is Seaton soils, and 48 percent is minor soils (fig. 3).

Fayette soils are on interstream divides and on sides of drainageways. They are nearly level to steep and are well drained. The surface layer is typically very dark grayish-brown silt loam about 3 inches thick. Below this is 10 inches of dark grayish-brown silt loam. The subsoil is dark yellowish-brown silty clay loam about 35 inches thick. Yellowish-brown silt loam mottled

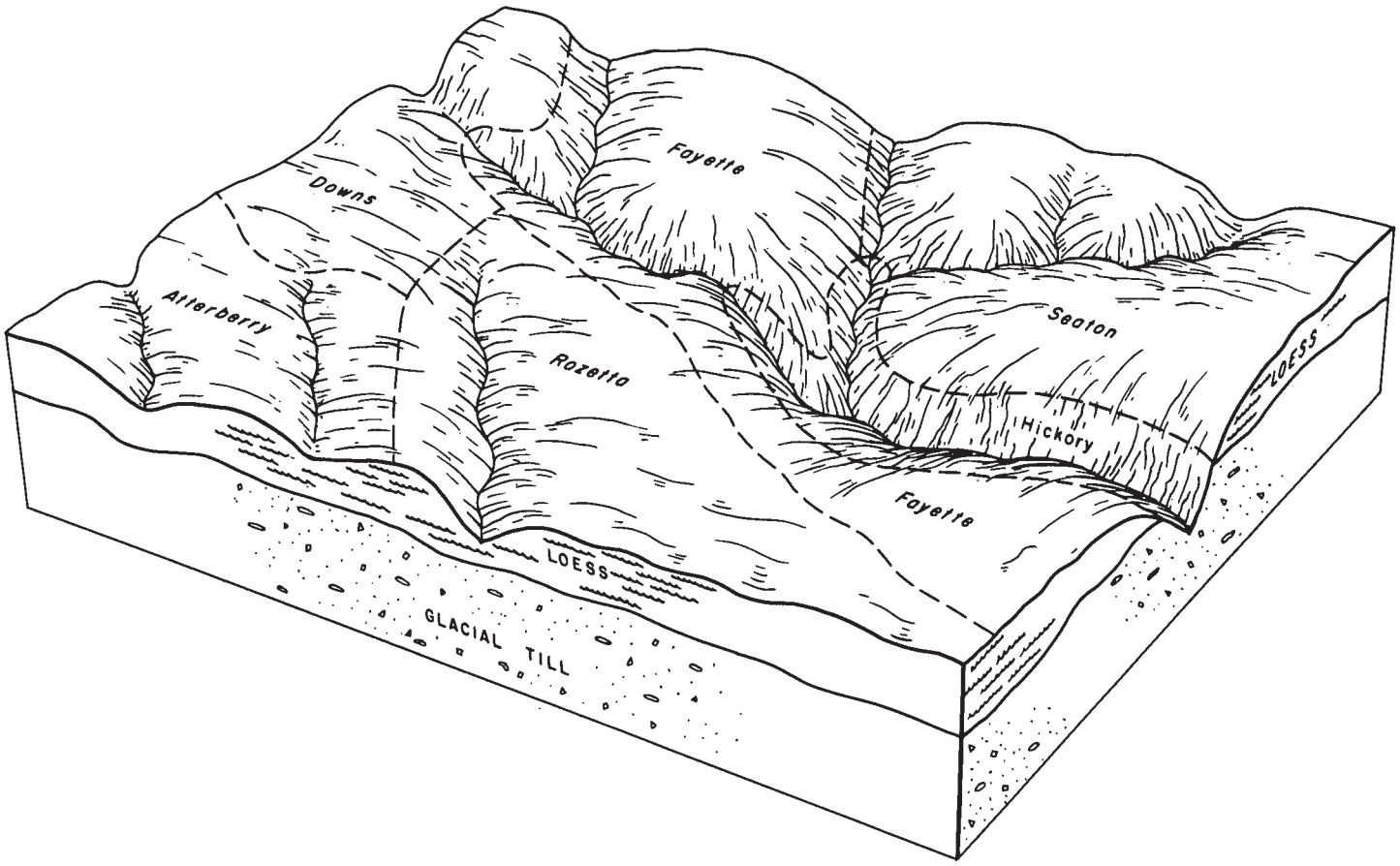

Figure 3.—**Typical pattern of soils and underlying material in association 3.**

with light yellowish brown is at a depth of about 48 inches.

Rozetta soils are on interstream divides and on sides of drainageways. They are nearly level to strongly sloping and are moderately well drained. The surface layer is typically dark grayish-brown silt loam about 5 inches thick. Below this is about 5 inches of brown silt loam. The subsoil is about 50 inches thick. In the upper 40 inches it is brown and yellowish-brown silty clay loam mottled with light brownish gray. Below that it is dark yellowish-brown, yellowish-brown, and light brownish-gray silt loam. Yellowish-brown and light brownish-gray silt loam is at a depth of about 60 inches.

Seaton soils are on interstream divides that are nearly level to rolling and on sides of drainageways that are rolling to very steep. These soils are nearly level to very steep and are well drained. The surface layer is typically dark grayish-brown silt loam about 8 inches thick. Below this is about 3 inches of brown silt loam. The subsoil is brown and yellowish-brown silt loam about 32 inches thick. Yellowish-brown silt loam is at a depth of about 43 inches.

The minor soils in this association are Downs, Hickory, Atterberry, and Stronghurst soils. Downs and Hickory soils are well drained and moderately well drained. Downs soils are nearly level and gently to strongly sloping and are on divides and on sides of drainageways. Hickory soils are strongly sloping to very steep and are on sides of drainageways. Atterberry and Stronghurst soils are somewhat poorly drained and are nearly level to moderately sloping. They are on interstream divides and on sides of drainageways.

The soils in this association have a high available water capacity and a moderate or moderately low content of organic matter. Atterberry and Stronghurst soils have moderate to moderately slow permeability, and the rest have moderate permeability. The main concerns of management are controlling water erosion, maintaining organic-matter content, maintaining good tilth in severely eroded areas, and improving drainage on Atterberry and Stronghurst soils.

About three-fourths of the acreage is used for cultivated crops and hay. The rest is in mostly steep areas that are used mainly for permanent pasture and woodland. The main enterprises are growing cash crops and hay and raising beef cattle and hogs. The well drained and moderately well drained soils are well suited to vegetable and orchard crops. The soils in less sloping areas have a high potential for producing all cultivated crops commonly grown in the county, such as corn, soybeans, small grains, grasses, and legumes. The moderately steep to steep soils are well suited to pasture and woodland.

4. *Hickory-Ursa-Keomah association*

Deep, nearly level to very steep, well drained to somewhat poorly drained soils that formed in loess or glacial till; on uplands

This soil association consists of nearly level to rolling soils on interstream divides and undulating to very steep soils on the sides of drainageways. Slopes are longer along Bear, Mill, and McKee Creeks than in other parts of the association. Elevation ranges from about 10 to 250 feet.

This association makes up about 42 percent of the county. About 20 percent of it is Hickory soils, 20 percent is Ursa soils, 18 percent is Keomah soils, and 42 percent is minor soils (fig. 4).

Hickory soils are on rolling to very steep sides of drainageways. They are mainly strongly sloping to very steep and are well drained and moderately well drained. The surface layer is typically very dark grayish-brown loam about 4 inches thick. Below this is about 7 inches of brown loam. The subsoil is yellowish-brown and brown clay loam about 37 inches thick. In the lower 23 inches it is mottled with light brownish gray. Brown loam is at a depth of 48 inches.

Ursa soils are on rolling to hilly sides of drainageways. They are strongly sloping to steep and are moderately well drained. The surface layer is typically dark grayish-brown silt loam about 4 inches thick. Below this is about 4 inches of brown heavy silt loam. The subsoil is about 55 inches thick. In the upper 21 inches it is yellowish-brown and light olive-gray clay and heavy clay loam mottled with yellowish brown. In the lower 24 inches it is light-gray clay loam mottled with yellowish brown. Greenish-gray light clay loam is at a depth of 63 inches.

Keomah soils are in nearly level areas and on undulating ridges on interstream divides. They are nearly level and moderately sloping and are somewhat poorly drained. The surface layer is typically dark grayish-brown silt loam about 7 inches thick. Below this is about 4 inches of grayish-brown silt loam. The subsoil is about 48 inches thick. In the upper part it is dark yellowish-brown, yellowish-brown, and grayish-brown heavy silty clay loam. In the lower part it is light olive-gray silty clay loam mottled with yellowish brown. Gray heavy silt loam is at a depth of 59 inches.

The minor soils in this association are Clinton, Clarksdale, Fishhook, Gosport, and Camden soils. Clinton and Clarksdale soils are in nearly level areas and on moderately sloping ridges on interstream divides. Clinton soils are moderately well drained. Clarksdale soils are somewhat poorly drained. Fishhook soils are somewhat poorly drained and are moderately sloping to moderately steep. They are on sides of drainageways. Gosport and Camden soils are moderately well drained and well drained and are strongly sloping to very steep. They are on sides of drainageways.

The soils in this association have a high to moderate available water capacity and a moderately low or moderate content of organic matter. Hickory and Camden soils have moderate permeability; the rest have moderately slow to very slow permeability. The main concerns of management are controlling water erosion, maintaining organic-matter content, maintaining good tilth in severely eroded areas, and improving drainage on Keomah and Clarksdale soils.

About two-thirds of the acreage is used for cultivated crops and hay. The rest is used mainly for permanent pasture and woodland. The main enterprises are growing cash crops and hay and raising beef cattle and hogs. The less sloping soils have a moderately high potential for producing all cultivated crops commonly grown in the county, such as corn, soybeans, small

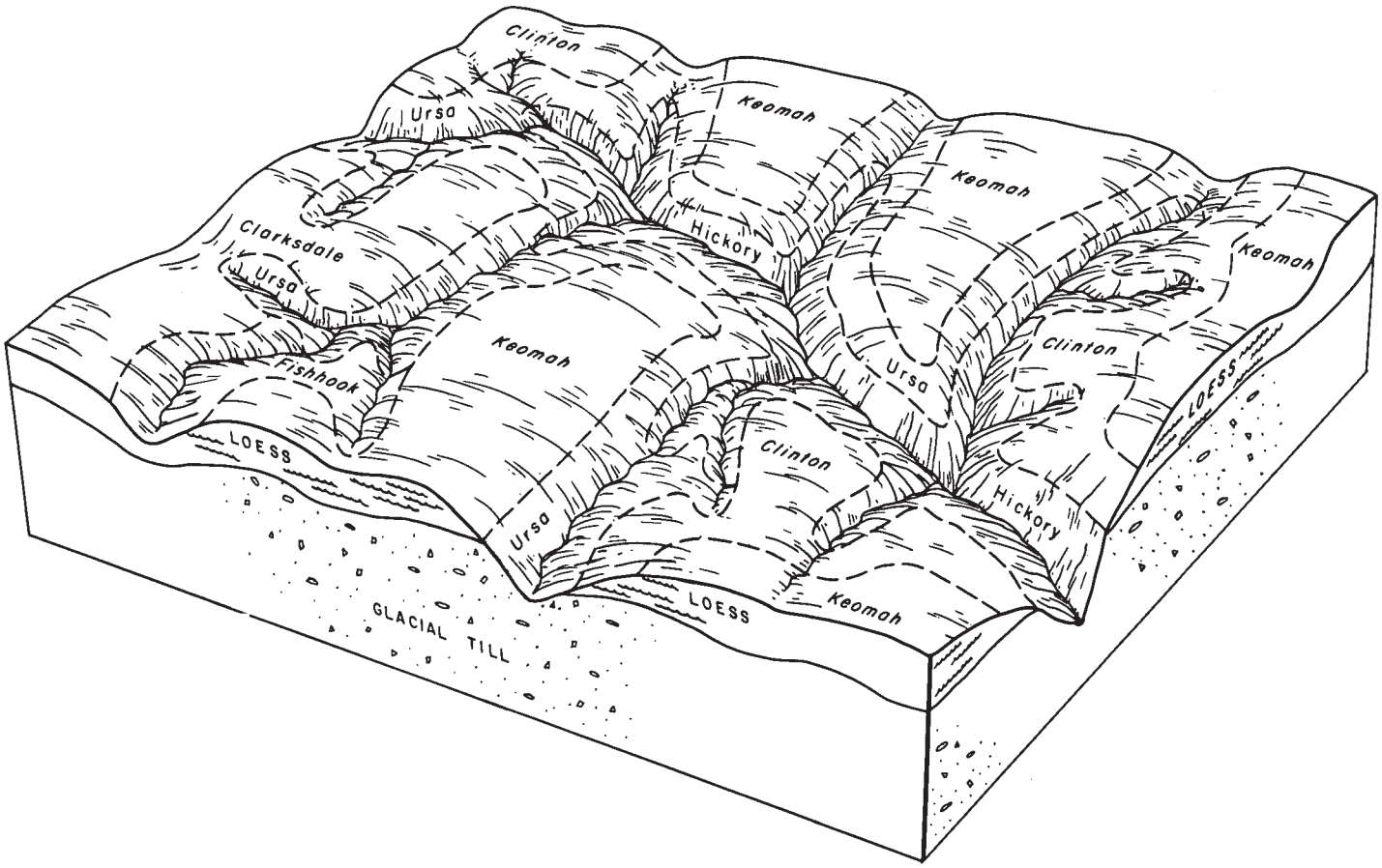

Figure 4.—**Typical pattern of soils and underlying material in association 4.**

grasses, and legumes. The steeper soils are well suited to pasture and woodland.

5. *El Dara-Clinton association*

Deep, nearly level to very steep, well drained and moderately well drained soils that formed in sandy, water-deposited sediments and loess; on uplands

This soil association consists of nearly level to hilly soils on ridges and drainageways (fig. 5). Slopes are mostly nearly level to very steep. Ridgetops generally are more rounded than in the other associations. Loess soils are on the ridges, and soils formed in sandy sediments are on sides of drainageways. Elevation ranges from about 10 to 150 feet.

This association makes up about 3 percent of the county. About 40 percent of the association is El Dara soils, 24 percent is Clinton soils, and 36 percent is minor soils.

El Dara soils are on sides of drainageways. They are strongly sloping to steep and are well drained and moderately well drained. The surface layer is typically dark-brown sandy loam about 7 inches thick. Below this is about 3 inches of yellowish-brown light loam. The subsoil is yellowish-brown loam, sandy clay loam, and sandy clay about 40 inches thick. In the lower 24 inches it is mottled with light brownish gray. Brownish-yellow sandy loam, loamy sand, or sand is at a depth of 50 inches.

Clinton soils are on ridges and on sides of drainageways. They are nearly level to strongly sloping and are moderately well drained. The surface layer is typically dark grayish-brown silt loam about 6 inches thick. Below this is about 6 inches of brown and dark-brown silt loam. The subsoil is dark-brown and yellowish-brown light silty clay loam to heavy silty clay loam about 37 inches thick. In the lower part it is mottled with gray. Yellowish-brown heavy silt loam mottled with gray is at a depth of 49 inches.

The minor soils in this association are Keomah, Rozetta, Ursa, Fayette, and Gosport soils. Keomah, Rozetta, and Fayette soils are gently sloping to strongly sloping and are on ridges. Keomah soils are somewhat poorly drained. Rozetta soils are moderately well drained. Fayette soils are well drained. Ursa and Gosport soils are moderately well drained. They are strongly sloping to very steep and are on sides of drainageways.

The soils in this association have a moderate to high available water capacity and a moderately low content of organic matter. They have moderate to slow permeability. The main concerns of management are controlling water erosion, improving drainage on Keomah

Figure 5.—**Severe gully erosion in association 5.**

soils, and maintaining organic-matter content and good tilth. There are a few seeps where the moderately permeable El Dara soils join less permeable soils.

About one-half of the acreage is used for cultivated crops. The rest is used for permanent pasture, woodland, and wildlife habitat. The main enterprises are growing cash crops and raising beef cattle and hogs. The nearly level to strongly sloping soils on ridges have a high potential for producing all cultivated crops commonly grown in the county. The strongly sloping to very steep soils on sides of drainageways have a moderate potential for hay, pasture, and woodland. El Dara, Ursa, and Gosport soils are suited to hay, pasture, and woodland. Corn, soybeans, small grains, and hay grow well on all the other soils in this association.

6. *Wakeland-Haymond association*

Deep, nearly level, somewhat poorly drained to well drained soils that formed in water-deposited sediments; on flood plains

This soil association consists of nearly level soils on flood plains and in the valleys of major creeks and their tributaries. A few sloughs are along the drainageways.

This association makes up about 4 percent of the county. About 50 percent of it is Wakeland soils, 40 percent is Haymond soils, and 10 percent is minor soils.

Wakeland soils are nearly level and are somewhat poorly drained. The surface layer is typically dark grayish-brown silt loam about 10 inches thick. Below this, to a depth of 68 inches, is dark grayish-brown and grayish-brown silt loam mottled with gray.

Haymond soils are nearly level and are well drained. The surface layer is dark grayish-brown silt loam about 7 inches thick. Below this, to a depth of 60 inches, is brown silt loam.

The minor soils in this association are Birds, Starks, Racoon, and Camden soils. Birds and Racoon soils are poorly drained, Starks soils are somewhat poorly drained, and Camden soils are well drained and moderately well drained. Camden soils are nearly level to moderately sloping, and the other soils are nearly level. Birds soils are on flood plains, and the rest are on low-lying terraces.

The soils in this association have a high available water capacity and a moderately low content of organic matter. They have moderate to slow permeability. The main concerns of management are preventing floods, improving drainage, and maintaining good tilth. In places fields are small.

Most areas of this association are used for cultivated crops, but small areas and a few undrained and wet

areas are used for permanent pasture, woodland, and wildlife habitat. The main enterprise is growing cash crops. All the soils, except for Birds and Racoon soils, have a high potential for all cultivated crops commonly grown in the county, such as corn, soybeans, and small grain, if they are drained and protected from flooding. They are also well suited to grasses and legumes. Birds and Racoon soils have a moderate potential for producing cultivated crops and are moderately well suited to grasses and legumes.

7. *Beaucoup-Wakeland association*

Deep, nearly level to gently sloping, poorly drained and somewhat poorly drained soils that formed in water-deposited sediments; on flood plains

This soil association consists of nearly level to gently undulating soils on flood plains of the Mississippi River valley. Sloughs and areas of water ranging from 1 to 10 acres in size are common, especially near the river. Drainage ditches are common on the flood plains north of Quincy and to a lesser extent south of Quincy. Elevation ranges from a few feet to about 10 feet.

This soil association makes up about 13 percent of the county. About 30 percent of it is Beaucoup soils, 20 percent is Wakeland soils, and 50 percent is minor soils.

Beaucoup soils are nearly level and are poorly drained. The surface layer is typically very dark gray silty clay loam about 15 inches thick. The subsoil is about 33 inches thick. It is mainly gray silty clay loam mottled with brown. Gray silty clay loam is at a depth of about 48 inches.

Wakeland soils are nearly level and are somewhat poorly drained. The surface layer is typically dark grayish-brown silt loam about 10 inches thick. Below this to a depth of 68 inches is dark grayish-brown and grayish-brown silt loam mottled with gray.

The minor soils in this association are Tice, Shiloh, Darwin, and Titus soils. Tice soils are nearly level and somewhat poorly drained. Shiloh, Darwin, and Titus soils are nearly level and are poorly drained.

The soils in this association, except for Shiloh and Titus soils, have a high available water capacity and a high to moderately low content of organic matter. They have moderate to very slow permeability. The main concerns of management are improving drainage, protecting from flooding, and maintaining good tilth.

Most areas of this association are used for cultivated crops. A few areas that are wet and undrained or not protected by levees are used for woodland and wildlife habitat. The soils have a high potential for producing all cultivated crops that are commonly grown in the county, such as corn, soybeans, and small grains. A good source of sand is west of Fall Creek.

Descriptions of the Soils[5]

The soil series and mapping units in Adams County are described in this section. A soil series is described in detail, and then each mapping unit in that series is described briefly. Unless specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Quarry, for example, does not belong to a soil series, but nevertheless it is listed in alphabetic order along with the soil series.

Preceding the name of each mapping unit is a symbol that identifies the mapping unit on the detailed soil map. Each soil symbol consists of a combination of two or three numerals representing a series. A letter representing the class of slope and a number indicating whether the soil is eroded or severely eroded may also be present. The letter W may precede the soil number to indicate a wet phase. Likewise, a sign "+" may follow the soil number to indicate other phases. Symbols without slope letters indicate level or nearly level soils or miscellaneous mapping units.

Listed at the end of each description of a mapping unit is the capability unit in which the mapping unit has been placed. The page for the description of each capability unit can be found by referring to the "Guide To Mapping Units" at the back of this survey which also lists the woodland group, wildlife group, and recreation group in which the soil has been placed.

The acreage and proportionate extent of each mapping unit are shown in table 3. Many of the terms used in describing soils can be found in the "Glossary" at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*10*).

Atlas Series

The Atlas series consists of deep, somewhat poorly drained, strongly sloping and moderately steep soils on uplands. These soils formed in less than 20 inches of loess and in the underlying clayey soils. They are on valley sides, generally in the upper part of a watershed. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is grayish-brown and light olive-brown silt loam about 4 inches thick. The subsoil extends to a depth of 70 inches. The upper part of it is yellowish-brown light silty clay loam about 3 inches thick. Be-

[5] J. F. STEINKAMP, soil scientist, Soil Conservation Service, helped prepare this section.

TABLE 3.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Atlas silt loam, 7 to 12 percent slopes	1,411	0.3
Atlas soils, 7 to 12 percent slopes, severely eroded	3,203	.6
Atlas silt loam, 12 to 18 percent slopes, eroded	575	.1
Atlas soils, 12 to 18 percent slopes, severely eroded	987	.2
Atterberry silt loam, 0 to 2 percent slopes	1,805	.3
Atterberry silt loam, 2 to 6 percent slopes	5,461	1.0
Baylis silt loam, 7 to 12 percent slopes, eroded	186	(1)
Baylis soils, 12 to 18 percent slopes, severely eroded	126	(1)
Baylis silt loam, 12 to 18 percent slopes, eroded	398	.1
Baylis soils, 12 to 18 percent slopes, severely eroded	81	(1)
Beaucoup silty clay loam	16,621	3.0
Beaucoup silty clay loam, wet	2,033	.4
Beaucoup silt loam, overwash	1,723	.3
Birds silt loam	4,338	.8
Blackoar silt loam	1,272	.2
Blair silt loam, 7 to 12 percent slopes, eroded	2,386	.4
Blair soils, 7 to 12 percent slopes, severely eroded	3,530	.6
Blair soils, 12 to 18 percent slopes, severely eroded	1,613	.3
Camden silt loam, 0 to 2 percent slopes	153	(1)
Camden silt loam, 2 to 7 percent slopes	520	.1
Camden silt loam, 7 to 12 percent slopes, eroded	639	.1
Camden soils, 7 to 12 percent slopes, severely eroded	554	.1
Camden silt loam, 12 to 18 percent slopes, eroded	1,799	.3
Camden soils, 12 to 18 percent slopes, severely eroded	1,151	.2
Camden silt loam, 18 to 30 percent slopes	2,437	.4
Camden silt loam, 30 to 50 percent slopes	684	.1
Clarksdale silt loam, 0 to 2 percent slopes	8,747	1.6
Clarksdale silt loam, 2 to 4 percent slopes	9,196	1.7
Clarksdale silt loam, 4 to 7 percent slopes, eroded	6,010	1.1
Clinton silt loam, 2 to 7 percent slopes, eroded	29,327	5.3
Clinton soils, 4 to 7 percent slopes, severely eroded	627	.1
Clinton silt loam, 7 to 12 percent slopes, eroded	4,770	.9
Clinton soils, 7 to 12 percent slopes, severely eroded	4,122	.7
Clinton-El Dara complex, 7 to 12 percent slopes, eroded	369	.1
Clinton-El Dara complex, 7 to 12 percent slopes, severely eroded	461	.1
Clinton-El Dara complex, 12 to 18 percent slopes, severely eroded	505	.1
Coatsburg silt loam, 4 to 7 percent slopes, eroded	906	.2
Coatsburg silt loam, 7 to 12 percent slopes, eroded	2,789	.5
Cowden silt loam	4,171	.8
Darwin silty clay	3,511	.6
Dickinson sandy loam, 0 to 4 percent slopes	955	.2
Downs silt loam, 0 to 2 percent slopes	373	.1
Downs silt loam, 2 to 7 percent slopes	11,727	2.1
Downs silt loam, 7 to 12 percent slopes, eroded	1,029	.2
Dupo silt loam	1,442	.3
El Dara sandy loam, 7 to 12 percent slopes	1,242	.2
El Dara soils, 7 to 12 percent slopes, severely eroded	1,018	.2
El Dara sandy loam, 12 to 18 percent slopes	1,964	.4
El Dara soils, 12 to 18 percent slopes, severely eroded	1,160	.2
El Dara sandy loam, 18 to 30 percent slopes, eroded	1,177	.2
El Dara soils, 30 to 50 percent slopes	369	.1
Fayette silt loam, 2 to 7 percent slopes	11,135	2.0
Fayette silt loam, 7 to 12 percent slopes, eroded	4,234	.8
Fayette soils, 7 to 12 percent slopes, severely eroded	2,793	.5
Fayette silt loam, 12 to 18 percent slopes, eroded	2,014	.4
Fayette soils, 12 to 18 percent slopes, severely eroded	1,451	.3
Fayette-Hickory complex, 12 to 18 percent slopes, eroded	247	.1
Fayette-Hickory complex, 12 to 25 percent slopes, severely eroded	381	.1
Fishhook silt loam, 4 to 7 percent slopes, eroded	2,715	.5
Fishhook soils, 4 to 7 percent slopes, severely eroded	1,611	.3
Fishhook silt loam, 7 to 12 percent slopes, eroded	4,599	.8
Fishhook soils, 7 to 12 percent slopes, severely eroded	5,154	.9
Fishhook silt loam, 12 to 18 percent slopes, eroded	1,379	.3
Gorham silty clay loam	1,129	.2
Gosport silt loam, 12 to 18 percent slopes, eroded	1,360	.2
Gosport soils, 12 to 18 percent slopes, severely eroded	635	.1
Gosport silt loam, 18 to 50 percent slopes, eroded	4,741	.9
Goss cherty silt loam, 15 to 50 percent slopes	1,628	.3
Hamburg silt loam, 30 to 50 percent slopes, eroded	218	(1)
Haymond silt loam	10,652	1.9
Herrick silt loam, 0 to 2 percent slopes	22,557	4.1
Herrick silt loam, 2 to 4 percent slopes	3,544	.6
Hickory loam, 7 to 12 percent slopes, eroded	1,345	.2
Hickory soils, 7 to 12 percent slopes, severely eroded	1,275	.2
Hickory loam, 12 to 18 percent slopes, eroded	4,995	.9
Hickory soils, 12 to 18 percent slopes, severely eroded	2,958	.5
Hickory loam, 18 to 30 percent slopes	27,552	5.0
Hickory loam, 30 to 50 percent slopes	7,467	1.4
Huntsville silt loam	972	.2
Ipava silt loam, 0 to 2 percent slopes	15,126	2.7
Ipava silt loam, 2 to 4 percent slopes	6,514	1.2
Joy silt loam	450	.1
Keller silt loam, 4 to 7 percent slopes, eroded	9,406	1.7
Keller silt loam, 7 to 12 percent slopes, eroded	2,532	.5
Keomah silt loam, 0 to 2 percent slopes	12,870	2.3
Keomah silt loam, 2 to 4 percent slopes	19,627	3.6
Keomah silt loam, 4 to 7 percent slopes, eroded	5,952	1.1
Keomah soils, 4 to 7 percent slopes, severely eroded	1,361	.2
Lawson silt loam	9,509	1.7
Limestone rock land	1,644	.3
Littleton silt loam	633	.1
Mt. Carroll silt loam, 0 to 2 percent slopes	778	.1
Mt. Carroll silt loam, 2 to 7 percent slopes	3,259	.6
Mt. Carroll silt loam, 7 to 12 percent slopes, eroded	239	(1)
Muscatine silt loam, 0 to 2 percent slopes	3,139	.6
Muscatine silt loam, 2 to 4 percent slopes	1,048	.2
NewGlarus-Palsgrove silt loams, 7 to 12 percent slopes, eroded	102	(1)

See footnote at end of table.

TABLE 3.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Acres	Percent
NewGlarus-Palsgrove silt loams, 12 to 18 percent slopes, eroded	702	.1
Orion silt loam	1,649	.3
Port Byron silt loam, 0 to 2 percent slopes	1,608	.3
Port Byron silt loam, 2 to 6 percent slopes	3,562	.6
Port Byron-Mt. Carroll-Urban land complex, 1 to 6 percent slopes	1,657	.3
Racoon silt loam	2,645	.5
Riley silty clay loam	3,625	.7
Riverwash, sand and gravel	617	.1
Rozetta silt loam, 0 to 2 percent slopes	235	(1)
Rozetta silt loam, 2 to 7 percent slopes	9,044	1.6
Rozetta silt loam, 7 to 12 percent slopes, eroded	3,369	.6
Rozetta soils, 7 to 12 percent slopes, severely eroded	2,455	.4
Rushville silt loam	1,442	.3
Sandy alluvial land	3,258	.6
Seaton silt loam, 0 to 2 percent slopes	272	.1
Seaton silt loam, 2 to 7 percent slopes	5,706	1.0
Seaton silt loam, 7 to 12 percent slopes, eroded	3,089	.6
Seaton silt loam, 12 to 18 percent slopes, eroded	1,396	.3
Seaton silt loam, 18 to 30 percent slopes	1,410	.3
Seaton silt loam, 30 to 50 percent slopes	634	.1
Seaton-Goss complex, 18 to 30 percent slopes	340	.1
Seaton-Goss complex, 30 to 50 percent slopes	616	.1
Seaton-Hickory complex, 18 to 30 percent slopes	481	.1
Seaton-Hickory complex, 30 to 50 percent slopes	497	.1
Seaton-Urban land complex, 1 to 7 percent slopes	1,913	.3
Seaton-Urban land complex, 7 to 15 percent slopes	578	.1
Shiloh silty clay	3,665	.7
Sparta loamy sand, 0 to 4 percent slopes	779	.1
Starks silt loam, 0 to 3 percent slopes	2,877	.5
Stronghurst silt loam, 0 to 2 percent slopes	345	.1
Stronghurst silt loam, 2 to 6 percent slopes	1,156	.2
Tama silt loam, 0 to 2 percent slopes	1,958	.4
Tama silt loam, 2 to 6 percent slopes	12,952	2.3
Tice silty clay loam	3,789	.7
Timula silt loam, 7 to 12 percent slopes, eroded	588	.1
Timula silt loam, 12 to 18 percent slopes, eroded	882	.2
Timula silt loam, 18 to 30 percent slopes, eroded	454	.1
Timula silt loam, 30 to 50 percent slopes	380	.1
Titus silty clay	2,463	.4
Ursa silt loam, 7 to 12 percent slopes, eroded	5,860	1.1
Ursa soils, 7 to 12 percent slopes, severely eroded	10,406	1.9
Ursa silt loam, 12 to 18 percent slopes, eroded	8,824	1.6
Ursa soils, 12 to 18 percent slopes, severely eroded	12,646	2.3
Ursa silt loam, 18 to 30 percent slopes, eroded	3,798	.7
Virden silt loam	19,478	3.5
Wakeland silt loam	23,832	4.3
Worthen silt loam, 0 to 2 percent slopes	1,303	.2
Worthen silt loam, 2 to 6 percent slopes	303	.1
Borrow pits	103	(1)
Cut and fill land	973	.2
Quarry	173	(1)
Strip mine	182	(1)
Total	551,552	100.0

[1] Less than 0.1 percent.

low this is 3 inches of dark grayish-brown heavy silty clay loam and 5 inches of grayish-brown light silty clay. Next is about 23 inches of grayish-brown and gray clay that is mottled with light olive brown. The lowermost part is gray heavy clay loam and gray clay loam about 27 inches thick.

Atlas soils are moderately low in organic matter. They have very slow permeability and a moderate available water capacity.

These soils are suited to hay, pasture, and woodland.

Representative profile of Atlas silt loam, 7 to 12 percent slopes, 1,295 feet east and 215 feet north of the southwest corner of SE¼ sec. 6, T. 1 N., R. 6 W., in a formerly cultivated pasture:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam with splotches of light gray (10YR 7/1); weak, medium, platy structure parting to moderate, medium, granular; friable; common, fine concretions of iron and manganese; medium acid; abrupt, smooth boundary.

A2—5 to 9 inches, grayish-brown (2.5Y 5/2) and light olive-brown (2.5Y 5/4) silt loam; weak, thick, platy structure parting to moderate, fine, subangular blocky; friable; some light-gray (10YR 7/1) silt grains on faces of peds; many very dark brown concretions of iron and manganese; strongly acid; clear, smooth boundary.

B1—9 to 12 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, fine, subangular blocky structure; firm; few sand grains; thin light-gray (10YR 7/1) silt grains on faces of peds; common, very dark brown concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIB21t—12 to 15 inches, dark grayish-brown (2.5Y 4/2) heavy silty clay loam; few, fine, faint, gray (5Y 5/1) mottles; moderate, fine, angular blocky structure; firm; few pebbles; thin, discontinuous, dark grayish-brown (2.5YR 4/2) clay films on faces of peds; few, very dark brown concretions of iron and manganese; very strongly acid; clear, smooth boundary.

IIB22t—15 to 20 inches, grayish-brown (2.5Y 5/2) light silty clay; few, fine, distinct; dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; firm; common fine pebbles; thin, discontinuous, dark-gray (5Y 4/1) clay films on faces of peds that are shiny and slick when wet; few worm holes filled with same colored material as the matrix; few concretions of iron and manganese; very strongly acid; clear, smooth boundary.

IIB23t—20 to 28 inches, grayish-brown (2.5Y 5/2) clay; common, fine, faint, light olive-brown (2.5Y 5/4) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; very firm; common fine pebbles; thin, continuous, dark-gray (5Y 4/1) clay films on faces of peds that are shiny and slick when wet; few concretions of iron and manganese; very strongly acid; clear, smooth boundary.

IIB24t—28 to 37 inches, gray (5Y 5/1) clay; common, medium, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; very firm; com-

mon fine pebbles; thin, continuous, dark-gray (5Y 4/1) clay films on faces of peds that are shiny and slick when wet; very strongly acid; gradual, smooth boundary.

IIB25t—37 to 43 inches, mixed dark-gray (N 4/0), gray (N 5/0), and olive-brown (2.5Y 4/4) clay that has thin irregular bands of olive brown; weak, medium, prismatic structure parting to weak, medium, angular blocky; very firm; common fine pebbles; thin, discontinuous, gray (5Y 5/1) clay films and shiny surfaces on faces of peds; strongly acid; clear, smooth boundary.

IIB26t—43 to 54 inches, gray (5Y 5/1) heavy clay loam; many, coarse, prominent, dark yellowish-brown (10 YR 4/4) mottles; weak, medium, prismatic structure parting to weak and moderate, medium, angular blocky; firm; thin, discontinuous, dark-gray (5Y 4/1) clay films on faces of peds; neutral; gradual, smooth boundary.

IIB3t—54 to 70 inches, gray (5Y 6/1) clay loam; many, coarse, prominent, yellowish-brown (10YR 5/8) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; firm; thin, patchy, dark-gray (5Y 4/1) clay films and grooved shiny surfaces; mildly alkaline; few concretions of lime.

The solum is 60 inches to more than 80 inches thick. The uneroded Ap and A2 horizons combined are 8 to 12 inches thick. The Ap horizon is dark grayish brown or brown. The A2 horizon is grayish brown, brown, light olive brown, and yellowish brown. The B horizon is mainly strongly acid and very strongly acid in the upper part, but it is medium acid in places.

Atlas soils are near Ursa, Blair, and Fishhook soils on the landscape. They are more poorly drained than Ursa soils. Their B horizon has more clay than Blair soils, and the upper part of their B horizon has more sand than Fishhook soils. They are commonly higher on the landscape than Ursa soils.

7D—Atlas silt loam, 7 to 12 percent slopes. This soil is in small and medium areas on sides of valleys near the head of drainageways (fig. 6). It has the profile described as representative of the series.

Included with this soil in mapping are small areas of moderately well drained Ursa soils and small areas of Blair soils that have a subsoil of light clay loam. Also included are areas of soils where the surface layer is thin and small areas where the surface layer is a mixture of the original surface layer, the subsurface layer, and some subsoil material.

The main concerns of management are erosion and excess wetness in the spring. This soil is used mainly for hay, pasture, and woodland, but some areas are used for cultivated crops. It is poorly suited to crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit IVe–7.

7D3—Atlas soils, 7 to 12 percent slopes, severely eroded. This soil is in small areas on sides of valleys near heads of drainageways. It has a profile similar to the one described as representative of the series, but

Figure 6.—**Typical area of Atlas silt loam, 7 to 12 percent slopes. This soil is commonly on the sides of drainageways near their source.**

the surface layer is mainly yellowish-brown or dark grayish-brown silty clay loam and silt loam.

Included with this soil in mapping are small areas of moderately well drained Ursa soils. Also included are small areas of Blair soils that have a subsoil of light clay loam and other small areas of soils that have a surface layer of dark grayish-brown silt loam.

The main concerns of management are erosion, tilth, and seasonal wetness. This soil is used for cultivated crops, hay, pasture, and some woodland. It is poorly suited to crops, because erosion is difficult to control. It is suited to pasture and woodland. Capability unit VIe–7.

7E2—Atlas silt loam, 12 to 18 percent slopes, eroded. This soil is in small and medium areas on sides of valleys along drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is thin or it is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of moderately well drained Ursa soils and of Blair soils that have a subsoil of light clay loam. Also included are small areas of soils that have a thicker surface layer of silt loam.

The main concerns of management are erosion, slope, and seasonal wetness. Most areas of this soil are used for pasture and woodland. It is better suited to pasture and woodland than to other uses. Capability unit VIe–7.

7E3—Atlas soils, 12 to 18 percent slopes, severely eroded. This soil is in small and medium areas on sides of valleys along drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is mainly yellowish-brown or dark grayish-brown silty clay loam and silt loam. Included in mapping are small areas of moderately well drained Ursa soils.

The main concerns of management are erosion, tilth, and seepage spots that are wet in the spring. Most areas of this soil are used for pasture, woodland, and some crops. It is suited to pasture and woodland. Capability unit VIIe–3.

Atterberry Series

The Atterberry series consists of deep, somewhat poorly drained soils on uplands. These soils are on nearly level drainage divides and on gently sloping and moderately sloping sides of ridges and drainageways. They formed in loess. The native vegetation was prairie grasses and hardwood trees.

In a representative profile the surface layer is very dark grayish-brown silt loam about 7 inches thick. Below this for about 8 inches is grayish-brown and dark grayish-brown silt loam mottled with dark yellowish brown. The subsoil is about 36 inches thick. For about 11 inches it is brown and yellowish-brown silty clay loam mottled with dark yellowish brown and light brownish gray. It is light brownish-gray and yellowish-brown light silty clay loam for about 25 inches. The underlying material is brownish gray and yellowish-brown silt loam. It extends to a depth of about 65 inches.

Atterberry soils are moderate in organic-matter content. They have moderate to moderately slow permeability and a high available water capacity.

These soils are suited to all crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Atterberry silt loam, 0 to 2 percent slopes, 245 feet east and 840 feet south of the northwest corner of SE¼ sec. 33, T. 1 S., R. 8 W., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, thick, platy structure parting to weak, very fine and fine, granular; friable; slightly acid; abrupt, smooth boundary.

A21—7 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, thin and medium, platy structure; friable; slightly acid; clear, smooth boundary.

A22—10 to 15 inches, grayish-brown (10YR 5/2) silt loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, platy structure parting to weak, fine, granular; friable; few concretions of iron and manganese; medium acid; clear, smooth boundary.

B1t—15 to 19 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, fine, subangular blocky structure; firm; light brownish-gray (10YR 6/2) silt grains on faces of peds; few concretions of iron and manganese; medium acid; clear, smooth boundary.

B21t—19 to 26 inches, brown (10YR 5/3) silty clay loam; many, medium, distinct, light brownish-gray (10YR 6/2) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, angular blocky structure; firm; thin, continuous, grayish-brown (10YR 5/2) clay films on faces of peds; few concretions of iron and manganese; medium acid; clear, smooth boundary.

B22t—26 to 36 inches, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium and coarse, angular blocky structure; firm; thin, continuous, grayish-brown (10YR 5/2) clay films on faces of peds; few concretions of iron and manganese; medium acid; gradual, smooth boundary.

B3—36 to 51 inches, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/4) light silty clay loam; weak, medium, prismatic structure; friable; medium, continuous, gray (10YR 5/1) clay films on faces of peds; few concretions of iron and manganese; medium acid; gradual, smooth boundary.

C—51 to 65 inches, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/6) silt loam; massive; friable; dark-gray (10YR 4/1) channel linings on faces of peds; slightly acid.

The solum is 40 to 60 inches thick. It is generally slightly acid or medium acid but is strongly acid in some profiles. The Ap and A1 horizons are 6 to 10 inches thick. The Ap horizon is commonly very dark grayish brown, but in places it is very dark gray and very dark brown. The A2 horizon is dark grayish brown, grayish brown, or dark gray. The C horizon is medium acid to neutral.

Atterberry soils are near Downs and Muscatine soils on the landscape. They are more poorly drained than Downs soils and have a thinner, dark-colored surface horizon than Muscatine soils. Atterberry soils have a profile similar to that of Clarksdale soils, but their B horizon has less clay.

61A—Atterberry silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of

soils that have a dark-colored surface layer 10 to 16 inches thick. Also included are a few areas, less than 2 acres in size, of poorly drained soils that are shown by a spot symbol on the detailed soil map.

This soil has few limitations to use and is well suited to crops commonly grown in the county. Artificial drainage is needed in many places. Capability unit I–5.

61B—Atterberry silt loam, 2 to 6 percent slopes. This soil is in small to large areas on sides of drainageways and ridges. It has a profile similar to the one described as representative of the series, but the surface layer and subsoil are a few inches thinner.

Included with this soil in mapping are small areas of moderately well drained Rozetta soils. Also included are small areas of soils that have a light-colored surface layer and small areas of soils that have a dark-colored surface layer 12 to 15 inches thick. A few areas, less than 2 acres in size, of poorly drained soils and some areas of severely eroded soils that have a surface layer of silty clay loam are also included. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and some areas of wet soils, which are more numerous near Payson. Most areas of this soil are used for cultivated crops, but a few areas are in pasture. This soil is well suited to all crops commonly grown in the county if erosion is controlled and excess water is removed. Capability unit IIe–5.

Baylis Series

The Baylis series consists of deep, well-drained, strongly sloping and moderately steep soils on uplands. These soils formed in loess and cherty limestone residuum. They are on the middle or lower parts of ridges and on sides of drainageways. The native vegetation was hardwood forest.

In a representative profile the surface layer is yellowish-brown light silty clay loam 7 inches thick. The subsoil is 68 inches thick. For 18 inches it is yellowish-brown and brown light silty clay loam. For 9 inches it is strong-brown light silty clay loam. For 17 inches it is brown heavy silty clay loam that has a few chert fragments. Below this for 24 inches it is reddish-brown cherty silty clay that has chert fragments as much as 4 inches in diameter.

Baylis soils are moderately low in organic-matter content. They have moderate permeability and a moderate available water capacity.

These soils are better suited to hay, pasture, or woodland than to other uses.

Representative profile of Baylis soils, 12 to 18 percent slopes, severely eroded, 925 feet south and 90 feet west of the northeast corner of sec. 33, T. 2 S., R. 8 W., in a cultivated field:

Ap—0 to 7 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

B21t—7 to 15 inches, brown (7.5YR 5/4) and some yellowish-brown (10YR 5/4) light silty clay loam; few, fine, faint, strong-brown (7.5YR 5/6) mottles; weak and moderate, medium, subangular blocky structure; firm; medium acid; clear, smooth boundary.

B22t—15 to 25 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium and coarse, subangular blocky structure; firm; thin, continous, brown (7.5YR 5/4) clay films on faces of peds; medium acid; clear, smooth boundary.

B3t—25 to 34 inches, strong-brown (7.5YR 5/6) light silty clay loam; weak, coarse, subangular blocky structure; firm; thin, discontinuous, reddish-brown (5YR 4/3) clay films on faces of peds, mainly in upper part of horizon; few medium fragments of chert; medium acid; gradual, smooth boundary.

IIB2lb—34 to 51 inches, dark-brown (7.5YR 4/4) and brown (7.5YR 5/4) heavy silty clay loam; weak, coarse, subangular blocky structure; firm; thin, discontinuous, reddish-brown (5YR 4/3) clay films on faces of peds, mainly in upper part of horizon; few, medium fragments of chert; medium acid; gradual, smooth boundary.

IIIB22b—51 to 60 inches, reddish-brown (5YR 4/3) cherty silty clay; weak, medium, subangular blocky structure; firm; chert fragments as much as 2 inches in diameter; slightly acid; gradual, wavy boundary.

IIIB23b—60 to 75 inches, reddish-brown (5YR 4/3) cherty silty clay; weak, fine, subangular blocky structure; firm; chert fragments as much as 4 inches in diameter; slightly acid.

The solum is 60 inches to more than 75 inches thick. The Ap horizon is dark grayish brown to yellowish brown. The A1 horizon is very dark grayish brown or very dark brown and less than 4 inches thick if uncultivated. Some profiles have a subsurface horizon, which is commonly yellowish brown or dark grayish brown. The Ap and A2 horizons are silt loam where uneroded. The A and B horizons combined are 20 to 40 inches thick. The IIIB22b horizon is cherty heavy silty clay loam to cherty clay. The content of chert is 35 to 90 percent by volume in most of these horizons. The upper parts of the B horizon are medium to very strongly acid, and the IIIBb horizons in the lower part are neutral to strongly acid.

Baylis soils are near Goss, Fayette, Rozetta, and Clinton soils on the landscape. The upper part of their B horizon has fewer chert fragments than cherty Goss soils, and they have a cherty and clayey IIIBb horizon that is not in Fayette, Rozetta, or Clinton soils.

472C2—Baylis silt loam, 7 to 12 percent slopes, eroded. This soil is on the middle or lower part of sides of ridges and valleys. Most areas are small in size, but some are medium to large. This soil has a profile similar to the one described as representative of the series, but the surface layer is commonly dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Fayette soils and cherty silt loam Goss soils. Also included are a few small areas of eroded soils that have a surface layer of yellowish-brown light silty clay loam.

The main concerns of management are erosion and slope. About half the acreage of this soil is used for cultivated crops and hay. The rest is used for pasture or woodland. This soil is suited to hay, pasture, and woodland. It is poorly suited to cultivated crops commonly grown in the county, because erosion is difficult to control. Capability unit IVe–1.

472C3—Baylis soils, 7 to 12 percent slopes, severely eroded. This soil is in small to medium areas on the middle or lower part of sides of ridges and valleys. It has a profile similar to the one described as representative of the series, but in some areas the surface layer is dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Fayette soils and soils that have a surface layer of cherty silty clay loam. Also included are small areas of soils that have a surface layer of brown cherty silty clay.

The main concern of management is erosion, but slope and soil tilth are also concerns. Most areas of this soil are used for cultivated crops, but some are used for hay and pasture, to which it is best suited. It is also well suited to woodland. Capability unit VIe–2.

472D2—Baylis silt loam, 12 to 18 percent slopes, eroded. This soil is in small to medium areas on the middle and lower parts of valley sides. It has the profile described as representative of the series, but the surface layer is commonly dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Fayette soils and cherty silt loam Goss soils. Also included are small areas of soils that have chert fragments and outcrops of limestone rock on the surface. These areas are shown by the symbols for chert spot and limestone outcrop on the detailed soil map.

The main concern of management is erosion. This soil is used mainly for hay, pasture, and woodland. Some areas are used for cultivated crops. This soil is better suited to hay, pasture, or woodland than to other uses. Capability unit VIe–2.

472D3—Baylis soils, 12 to 18 percent slopes, severely eroded. This soil is in small to medium areas on the middle and lower parts of valley sides. It has the profile described as representative of the series, but in some areas it has a surface layer of dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Fayette soils and cherty silty clay Goss soils. Also included are small areas of soils where brown cherty silty clay is near the surface.

The main concerns of management are erosion and tilth. About half the acreage of this soil is used for cultivated crops. The rest is used for hay and pasture. This soil is better suited to permanent pasture or woodland than to other uses. Capability unit VIIe–2.

Beaucoup Series

The Beaucoup series consists of deep, nearly level, poorly drained soils, mainly on the flood plains of the Mississippi River. A few small areas of these soils are on the flood plains of small streams. These soils formed in water-deposited sediments. The native vegetation was hardwood forest.

In a representative profile the surface layer is very dark gray silty clay loam about 15 inches thick. The subsoil is about 33 inches thick. For 9 inches it is dark-gray silty clay loam mottled with dark yellowish brown. Below that for 24 inches it is gray light silty clay loam mottled with brown and dark yellowish brown. Below the subsoil is gray light silty clay loam and silt loam mottled with brown. It extends to a depth of 60 inches.

Beaucoup soils are high in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are suited to crops commonly grown in the county if drained and protected from flooding.

Representative profile of Beaucoup silty clay loam, 65 feet east and 730 feet south of the northwest corner of NE¼ sec. 9, the center of the T-road intersection, T. 1 N, R. 9 W., in a cultivated field:

Ap—0 to 6 inches, very dark gray (10YR 3/1) silty clay loam; weak, fine, angular blocky structure; firm; neutral; abrupt, smooth boundary.

A12—6 to 15 inches, very dark gray (10YR 3/1) silty clay loam; few, fine, faint, dark yellowish-brown (10YR 3/4) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; firm; neutral; gradual, smooth boundary.

B21g—15 to 24 inches, dark-gray (10YR 4/1) silty clay loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure parting to moderate, medium, angular blocky; firm; neutral; gradual, smooth boundary.

B22g—24 to 35 inches, gray (5Y 5/1) silty clay loam; common, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; firm; neutral; clear, smooth boundary.

B3g—35 to 48 inches, gray (5Y 5/1) light silty clay loam; common, fine, distinct, brown (7.5YR 4/4) mottles; firm; neutral; clear, smooth boundary.

Cg—48 to 60 inches, gray (5Y 5/1), stratified light silty clay loam and silt loam; common, medium, distinct, brown (7.5YR 4/4) mottles; massive; firm; neutral; clear, smooth boundary.

The Ap horizon is black and very dark gray. The Ap and A12 horizons combined are about 14 to 24 inches thick. The B horizon is 24 to 42 inches thick. It is slightly acid to mildly alkaline. The C horizon is neutral to moderately alkaline.

Beaucoup soils are near Darwin, Titus, and Birds soils on the landscape. They have less clay throughout the solum than Darwin and Titus soils and more clay than Birds soils. They formed in the same kind of material as Tice and Gorham soils. They are more poorly drained than Tice soils and have more clay in the lower part of the B horizon than Gorham soils.

70—Beaucoup silty clay loam. This soil is in small to large areas, mainly on the flood plain of the Mississippi River, and it has a slope of 0 to 1 percent. It has the profile described as representative of the series.

Included with this soil in mapping near the bluff on the east edge of the flood plain, are small to medium areas of soils that have a thicker surface layer. Also included are small areas of soils that are medium acid in the subsoil.

The main concerns of management are poor natural drainage, flooding, and tilth. This soil is suited to crops commonly grown in the county if adequately drained and protected from flooding. Capability unit IIw–2.

W70—Beaucoup silty clay loam, wet. This soil is in small to large areas on lower parts of the flood plain than other Beaucoup soils. It has a slope of 0 to 1 percent. In places, the soil surface is covered with water in wet seasons. Included in mapping are small areas on higher parts of the landscape where the soils are less limited by wetness.

This soil is suited to most crops commonly grown in the county if properly drained and protected from flooding, but generally this is difficult to accomplish. The main concern of management is excess wetness. Frequent flooding, ponding, and a high water table make this soil unsuitable for most uses other than pasture or woodland. Capability unit Vw.

70+—Beaucoup silt loam, overwash. This soil is mainly in medium areas commonly adjacent to silty soil, and it has a slope of 0 to 1 percent. It has a profile similar to the one described as representative of the series, but the surface layer is dark grayish-brown silt loam 8 to 20 inches thick. Included in mapping are small areas of soils that have a surface layer of sand and sandy loam.

The main concerns of management are poor natural drainage and flooding. This soil is suited to crops commonly grown in the county if adequately drained and protected from flooding. Capability unit IIw–2.

Birds Series

The Birds series consists of deep, poorly drained, nearly level soils that formed in alluvium. These soils are on the flood plains of small to large streams. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark-gray and dark grayish-brown silt loam about 7 inches thick. The underlying material is dark-gray silt loam for about 12 inches. Below that for about 31 inches it is gray silt loam that has a few dark yellowish-brown mottles.

Birds soils are moderately low in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are suited to corn and soybeans if they are artificially drained. In places, frequent flooding and the small size of fields limit their suitability to woodland and pasture.

Representative profile of Birds silt loam, 1,530 feet west and 845 feet south of the northeast corner of sec. 8, T. 1 S., R. 6 W., in a cultivated field:

Ap—0 to 7 inches, dark-gray (10YR 4/1) and dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; common, small, soft accumulations of iron and manganese; neutral; abrupt, smooth boundary.

C1—7 to 12 inches, dark-gray (10YR 4/1) silt loam; many, fine, faint, dark grayish-brown (10YR 4/2) mottles; few, fine, distinct, dark yellowish-brown (10YR 4/4) streaks and stains; very weak, fine, granular structure; friable; common, small, soft accumulations of iron and manganese; slightly acid; clear, smooth boundary.

C2—12 to 19 inches, dark-gray (10YR 4/1) silt loam; few, fine, distinct, dark yellowish-brown (10YR 3/4) mottles; very weak, thick, platy structure parting to weak, fine, granular; friable; common, small, soft accumulations of iron and manganese; medium acid; clear, smooth boundary.

C3g—19 to 33 inches, gray (10YR 6/1) silt loam; many, medium, faint, gray (10YR 5/1) mottles and few, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; very weak, thick, platy structure; friable; common, medium, soft accumulations of iron and manganese; slightly acid; clear, smooth boundary.

C4g—33 to 42 inches, gray (10YR 5/1) silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; very weak, medium, angular blocky structure; friable; common, medium, soft accumulations of iron and manganese; neutral; gradual, smooth boundary.

C5g—42 to 50 inches, gray (5Y 5/1) silt loam; few, fine, distinct, dark-brown (10YR 3/3) mottles; massive; friable; common, medium, soft accumulations of iron and manganese; neutral.

The A horizon is 6 to 9 inches thick. It is medium acid to mildly alkaline. The C horizon is medium acid to mildly alkaline.

Birds soils formed in the same kind of material as Wakeland and Blackoar soils. They are more poorly drained than Wakeland soils and are lighter in color in the A horizon than Blackoar soils.

334—Birds silt loam. This soil is on the flood plains of small to large streams, and it has a slope of 0 to 2 percent. On the flood plains of small and medium streams, it commonly occurs away from the stream and near the uplands. The areas it occupies are small to large.

Included with this soil in mapping are small areas of Wakeland and Blackoar soils. Also included are areas of soils that have a subsoil of strongly acid silt loam.

This soil is suited to cultivated crops if adequately drained and if flooding is infrequent. Undrained areas or areas that flood frequently should be kept in permanent pasture or woodland. The main concerns of management are flooding, poor natural drainage, and moderately slow permeability. Outlets for drainage ditches are difficult to locate in places. Capability unit IIIw–4.

Blackoar Series

The Blackoar series consists of deep, poorly drained, nearly level soils that formed in alluvium. These soils are mainly on the flood plain of the Mississippi River. The native vegetation was mixed hardwood forest and grass.

In a representative profile the surface layer is very dark gray silt loam about 20 inches thick. The subsoil is about 24 inches thick. For about 6 inches it is dark-gray silt loam that has dark yellowish-brown mottles. Below that for about 18 inches it is gray silt loam that has dark yellowish-brown mottles. The underlying material is gray and dark-gray silt loam and light silty clay loam that has dark yellowish-brown mottles. It extends to a depth of 62 inches.

Blackoar soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Blackoar silt loam, 450 feet west and 100 feet north of the southeast corner of sec. 33, T. 2 N., R. 9 W., in a cultivated field:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; very dark grayish-brown (10YR 3/2) crushed; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—8 to 20 inches, very dark gray (10YR 3/1) silt loam; few, fine, distinct, dark-brown to brown (7.5YR 4/4) mottles; weak, fine, granular structure; friable; neutral; gradual, smooth boundary.

B1g—20 to 26 inches, dark-gray (10YR 4/1) silt loam; common, fine, distinct, dark yellowish-brown (10YR 3/4) mottles; weak, fine, subangular blocky structure; friable; few, very dark gray (10YR 3/1) channel linings; slightly acid; gradual, smooth boundary.

B21g—26 to 34 inches, gray (10YR 5/1) silt loam; common, fine, distinct, dark yellowish-brown (10YR 3/4) mottles; very weak, medium, prismatic structure parting to weak, fine, subangular blocky; friable; few, dark-gray (10YR 4/1) channel linings; medium acid; gradual, smooth boundary.

B22g—34 to 44 inches, gray (10YR 5/1) heavy silt loam; many, fine and medium, distinct, dark yellowish-brown (10YR 3/4) mottles; very weak, medium, prismatic structure parting to weak, fine, subangular blocky; friable; thin, discontinuous, gray to light-gray (10YR 6/1) silt grains on faces of peds and few, dark-gray (10YR 4/1) channel linings; medium acid; gradual, smooth boundary.

C1g—44 to 54 inches, gray (10YR 5/1) and some dark-

gray (10YR 4/1) heavy silt loam; common, medium, distinct, dark yellowish-brown (10YR 3/4) mottles; massive; friable; few, very dark gray (10 YR 3/1) and dark-gray (10 YR 4/1) channel linings; slightly acid; gradual, smooth boundary.

C2g—54 to 62 inches, mixed dark-gray (10YR 4/1) and gray (10YR 5/1) light silty clay loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; friable; common, very dark gray (10YR 3/1) channel linings; slightly acid.

The solum is 36 to 55 inches thick. It is neutral to medium acid. The dark-colored A horizon is 16 to 24 inches thick. The A, B, and C horizons are silt loam, but thin strata of silty clay loam are in places. The C horizon is commonly slightly acid to mildly alkaline.

Blackoar soils are near Beaucoup soils on the landscape, but they have less clay throughout the solum. They formed in the same kind of material as Birds and Wakeland soils. They are more poorly drained than Wakeland soils and are darker in color in the A horizon than Birds and Wakeland soils.

603—Blackoar silt loam. This soil is in medium to large areas on the flood plain of the Mississippi River, and it has a slope of 0 to 1 percent. Included in mapping are small areas of somewhat poorly drained Wakeland soils and other soils that have a thin dark-colored surface layer. Also included are a few, small, very poorly drained areas that are shown by a wet spot symbol on the detailed soil map.

The main concerns of management are poor natural soil drainage and flooding. Most areas of this soil are in cultivated crops, but a few areas that flood frequently are in woodland. This soil is well suited to cultivated crops if drained and protected from flooding. Capability unit IIw–2.

Blair Series

The Blair series consists of deep, somewhat poorly drained, strongly sloping and moderately steep soils on uplands. These soils formed in less than 20 inches of loess and loamy material. They are on sides of drainageways. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown heavy silt loam about 5 inches thick. The subsoil is 53 inches thick. For about 8 inches it is yellowish-brown silty clay loam mottled with yellowish brown and light brownish gray. It is yellowish-brown and grayish-brown light clay loam for about 17 inches. For about 20 inches it is grayish-brown and light brownish-gray light clay loam mottled with yellowish brown. Below that for 8 inches is grayish-brown clay loam mottled with yellowish brown.

Blair soils are moderately low in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are suited mainly to hay, pasture, and woodland.

Representative profile of Blair silt loam, 7 to 12 percent slopes, eroded, 470 feet west and 345 feet north of the southeast corner of NE¼ sec. 24, T. 1 N., R. 7 W., in a cultivated field:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) heavy silt loam; common, fine and medium, distinct, yellowish-brown (10YR 5/4) mottled weak, fine granular structure; friable; neutral; abrupt, smooth boundary.

B1—5 to 13 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/6) and many, medium, distinct, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; weak, medium, angular blocky structure and subangular blocky; firm; thin, discontinuous, brown (10YR 4/3) clay films; strongly acid; clear, smooth boundary.

IIB1—13 to 19 inches, yellowish-brown (10YR 5/4 and 10YR 5/6) light clay loam; common, fine, distinct, grayish-brown (10YR 5/2) mottles; weak, medium, angular blocky structure and subangular blocky; firm; medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, medium, dark accumulations of iron and manganese; strongly acid; clear, smooth boundary.

IIB21—19 to 30 inches, grayish-brown (10YR 5/2) clay loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 10YR 5/6) mottles; moderate, medium, angular blocky structure; firm; medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, medium, dark accumulations of iron and manganese; medium acid; gradual, smooth boundary.

IIB22—30 to 40 inches, grayish-brown (10YR 5/2) and light brownish-gray (10YR 6/2) light clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm, medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, medium, dark accumulations of iron and manganese; medium acid; gradual, smooth boundary.

IIB31—40 to 50 inches, grayish-brown (2.5Y 5/2) and light brownish-gray (2.5Y 6/2) light clay loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, medium, dark accumulations of iron and manganese; slightly acid; clear, smooth boundary.

IIB32—50 to 58 inches, grayish-brown (2.5Y 5/2) clay loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 10YR 5/6) mottles; weak, fine, angular blocky structure; firm; medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, medium, dark accumulations of iron and manganese; neutral.

The solum is 50 to 70 inches thick. The Ap horizon is mainly dark grayish brown, but it is brown in places. In uncultivated areas there is an A2 horizon that is brown, dark grayish brown, and grayish brown. The A horizon is silt loam or loam if not severely eroded. The IIB2 horizon is light or medium clay loam. The B horizon is mainly medium acid to very strongly acid. The C horizon, or the lower part of the B horizon if the B horizon is thick, is mildly alkaline to medium acid.

Blair soils are near Atlas, Fishhook, and Ursa soils on the landscape. Their B2 horizon has less clay than Atlas or Ursa soils. Blair soils have more sand and less clay in the upper part of the B horizon than Fishhook soils.

5D2—Blair silt loam, 7 to 12 percent slopes, eroded. This soil is in small areas on sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of moderately well drained Ursa soils. Also included are areas of soils where a clayey buried soil is within 20 to 40 inches of the surface and other small areas of soils that formed mainly in loess and are mainly light or medium silty clay loam in the subsoil. Small areas of poorly drained soils are also included. They are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and seasonal wetness. Most areas of this soil are used for pasture, hay, and cultivated crops, and some are used for woodland. This soil is suited to hay, pasture, and woodland. It is poorly suited to cultivated

crops, because controlling erosion is difficult. Capability unit IIIe–13.

5D3—Blair soils, 7 to 12 percent slopes, severely eroded. This soil is in small areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is yellowish-brown silty clay loam or light clay loam and dark grayish-brown silt loam.

Included with this soil in mapping are small areas of moderately well drained Ursa soils and areas of soils where a clayey buried soil is within 20 to 40 inches of the surface. Also included are small areas of soils that formed mainly in loess and are mainly light or medium silty clay loam in the subsoil. Small areas of soils that have a surface layer of dark grayish-brown or very dark grayish-brown silt loam are also included.

The main concerns of management are erosion, slope, tilth, and some seasonal wetness. Most areas of this soil are used for cultivated crops and pasture, but some areas are used for hay and woodland. This soil is suited to pasture and woodland. Capability unit IVe–13.

5E3—Blair soils, 12 to 18 percent slopes, severely eroded. This soil is in small areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the yellowish-brown silty clay loam or light clay loam subsoil is at the surface in many places. In about 40 percent of the mapped areas, the surface layer is silt loam.

Included with this soil in mapping are small areas of moderately well drained Ursa and Hickory soils. Also included are small areas of soils where a clayey buried soil is within 20 to 40 inches of the surface.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are used for crops or pasture. A few areas are in woodland. This soil is suited to pasture and woodland. Capability unit VIe–7.

Borrow Pits

B.P.—Borrow pits. This mapping unit consists of areas where the soil material was mechanically removed. Most borrow pits are small, but some take in 20 acres or more.

Borrow pits vary in texture and depth of excavation. Some hold water or have a high water table. The characteristics of surrounding undisturbed soils can be used to estimate properties of borrow pits less than 60 inches in depth.

Most borrow pits are low in fertility. They especially lack adequate nitrogen, and they are low in organic-matter content. Applying fertilizer in amounts based on soil tests is necessary to grow plants when reclaiming or vegetating borrow pits. A top dressing of topsoil can help start new seedlings. Not placed in a capability unit.

Camden Series

The Camden series consists of deep, nearly level to very steep, well drained and moderately well drained soils on stream terraces and uplands. These soils formed in water-deposited silty, loamy, and sandy sediments. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsoil is about 42 inches thick. For about 6 inches it is strong-brown light silty clay loam, the next 17 inches is strong-brown and yellowish-brown silty clay loam, and below that for 19 inches is yellowish-brown light silty clay loam that has some sand. The underlying material is brown and pale-brown sandy loam, loam, and sand. It extends to a depth of 59 inches.

Camden soils are moderately low in organic-matter content. They have a high available water capacity and moderate permeability.

Less sloping Camden soils are suited to crops commonly grown in the county if erosion is controlled. Steeper Camden soils are suited to permanent pasture and woodland.

Representative profile of Camden silt loam, 2 to 7 percent slopes, 240 feet north and 80 feet east of the southwest corner of NW¼ sec. 28, T. 2 S., R. 8 W., in a cultivated field:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure parting to moderate, fine, granular; friable; neutral; abrupt, smooth boundary.

B1t—9 to 15 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, fine, subangular blocky structure that is very weak, medium, platy in the upper 2 inches of the horizon; friable; neutral; clear, smooth boundary.

B2lt—15 to 24 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; light-gray (10YR 7/1), dry, silt grains between depth of 20 to 24 inches; few, small accumulations of iron and manganese; strongly acid; clear, smooth boundary.

B22t—24 to 32 inches, yellowish-brown (10YR 5/6) silty clay loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; moderate, coarse, angular blocky structure; firm; brown (7.5YR 5/4) clay films on faces of peds and on channel linings; few, patchy, light-gray (10YR 7/1), dry, silt grains; few, small concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIB3t—32 to 51 inches, yellowish-brown (10YR 5/6) light silty clay loam and some sand; common, fine and medium, distinct, grayish-brown (10YR 5/2) mottles; weak, coarse, prismatic structure; firm; thin, patchy, dark-brown (7.5YR 4/4) clay films on faces of peds and on channel linings; few black (10YR 2/1) coatings; few, very small concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIC—51 to 59 inches, brown (10YR 5/3) loam and sandy loam; pale-brown (10YR 6/3) sand in layers; single grain; non-coherent; few pebbles and small stones; slightly acid.

The solum is mainly strongly acid to slightly acid except where limed. The C horizon is slightly acid to mildly alkaline. The Ap horizon is dark grayish-brown or dark-brown silt loam. It is 5 to 9 inches thick. Some profiles have an A2 horizon, which is dark-brown or yellowish-brown silt loam as much as 8 inches thick. The B horizon is silty clay loam or light silty clay loam, loam, and sandy loam that has thin layers of sand in some places.

Camden soils formed in the same kind of material as Starks soils. They are better drained than Starks soils. Many Camden soils are near Hickory and Ursa soils on the landscape. They have stratified material in the lower part of the B horizon and in the C horizon which is lacking in Hickory and Ursa soils.

The lower part of the subsoil contains more silt and less sand than the defined range for this series, but this differ-

ence does not significantly alter their usefulness or behavior.

134A—Camden silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on stream terraces. It has a profile similar to the one described as representative of the series, but it has a subsurface layer 3 to 8 inches thick. Included in mapping are small areas of soils that have a subsoil of heavy silt loam.

This soil has few limitations to use. In places lowlying areas are flooded for short periods because of runoff from higher ground. Most areas of this soil are in cultivated crops, but some are in pasture and woodland. This soil is well suited to crops commonly grown in the county if field size is adequate. Capability unit I–1.

134B—Camden silt loam, 2 to 7 percent slopes. This soil is in small to medium areas on low ridges on stream terraces. In 50 percent of the mapped areas tillage has mixed some of the subsoil material with the surface layer. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of soils that have a heavy silt loam subsoil and small areas of soils that have a surface layer of strong-brown silty clay loam.

The main concern of management is erosion. In places runoff from higher ground flows to the lower areas after heavy rains. Most areas of this soil are in cultivated crops, but a few are in pasture and woodland. This soil is well suited to crops commonly grown in the county if field size is adequate. Capability unit IIe–1.

134C2—Camden silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on edges of stream terraces and in upland areas, but it formed in material deposited by water. It has a profile similar to the one described as representative of the series, but the surface layer is about 3 inches thinner and the combined surface layer and subsoil is about 4 inches thinner.

Included with this soil in mapping are small areas of Hickory and Ursa soils. Also included are small areas of soils that have a thicker surface layer.

The main concerns of management are erosion and slope. This soil is used for cultivated crops, pasture, and woodland. It is suited to most crops commonly grown in the county if erosion is controlled. Capability unit IIIe–1.

134C3—Camden soils, 7 to 12 percent slopes, severely eroded. This soil is in small to medium areas on edges of stream terraces and in upland areas, but it formed in material deposited by water. It has a profile similar to the one described as representative of the series, but the surface layer is strong-brown light silty clay loam or dark grayish-brown silt loam and the combined surface layer and subsoil is about 8 inches thinner. Included in mapping are small areas of Hickory and Ursa soils.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are in cultivated crops, but some are in pasture and a few in woodland. This soil is poorly suited to most crops commonly grown in the county. Erosion is more easily controlled if the soil is in hay or pasture. Capability unit IVe–1.

134D2—Camden silt loam, 12 to 18 percent slopes, eroded. This soil is in small to large areas on sides of valleys. Although it is in upland areas, it formed in stratified material deposited by water. It has a profile similar to the one described as representative of the series, but the surface layer is about 3 inches thinner, the combined surface layer and subsoil is about 6 inches thinner, and the underlying material contains less sand in most places. Included with this soil in mapping are small areas of Hickory and Ursa soils.

The main concerns of management are erosion and slope. This soil is mainly in pasture, but some areas are in woodland. This soil is suited to most crops commonly grown in the county, but erosion is more easily controlled if the soil is in hay or pasture. Capability unit IVe–1.

134D3—Camden soils, 12 to 18 percent slopes, severely eroded. This soil is in small to medium areas on sides of valleys. Although it is in upland areas, it formed in stratified material deposited by water. It has a profile similar to the one described as representative of the series, but the surface layer and subsoil combined are about 8 inches thinner, the surface layer is yellowish-brown silty clay loam or dark grayish-brown silt loam, and the underlying material contains less sand in most places. Included in mapping are areas of Ursa and Hickory soils.

The main concerns of management are erosion, slope, and tilth. This soil is used for cultivated crops, hay, pasture, and some woodland. It is better suited to hay, pasture, and woodland than to other uses. Capability unit VIe–1.

134E—Camden silt loam, 18 to 30 percent slopes. This soil is in small to large areas mainly on sides of stream valleys. Although it is in upland areas, it formed in stratified material deposited by water. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsoil is about 8 inches thinner, and the underlying material contains less sand in most places. Included in mapping are small areas of soils that have a thinner surface layer and small areas of Hickory soils.

The main concerns of management are erosion and slope. This soil is used mainly for pasture and woodland, to which it is better suited than to other uses. Capability unit VIe–1.

134F—Camden silt loam, 30 to 50 percent slopes. This soil is in small to large areas on sides of stream valleys. Although it is in upland areas, it formed in stratified material deposited by water. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsoil is about 11 inches thinner, and the underlying material contains less sand in most places. Included in mapping are small areas of soils that have a thinner surface layer and small areas of Hickory soils.

The main concerns of management are slope and erosion. This soil is mainly used for woodland, to which it is better suited than to other uses. Capability unit VIIe–1.

Clarksdale Series

The Clarksdale series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils on uplands. These soils formed in loess. They occupy

areas between soils that formed under grasses, commonly in medium to wide drainage divides, and soils that formed under forests, commonly near streams. The native vegetation was mixed hardwood forests and prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam 7 inches thick. The subsurface layer is dark grayish-brown silt loam about 7 inches thick. The subsoil is about 44 inches thick. For about 4 inches it is grayish-brown light silty clay loam mottled with brown. For the next 25 inches it is yellowish-brown and light olive-gray heavy silty clay loam mottled with grayish brown and yellowish brown. Below that for about 15 inches it is light olive-gray light silty clay loam mottled with yellowish brown. The underlying material is light olive-gray heavy silt loam mottled with yellowish brown. It extends to a depth of about 70 inches.

Clarksdale soils are moderate in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Clarksdale silt loam, 0 to 2 percent slopes, 960 feet west and 183 feet north of the southeast corner of sec. 18, T. 2 N., R. 7 W., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A21—7 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, thin, platy structure; friable; common, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; clear, smooth boundary.

A22—10 to 14 inches, dark grayish-brown (10YR 4/2) and gray (10YR 5/1) silt loam; moderate, medium, platy structure; friable; common, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; clear, smooth boundary.

B1—14 to 18 inches, grayish-brown (10YR 5/2) light silty clay loam; many, fine, distinct, brown (10YR 5/3) mottles; moderate, fine, subangular blocky structure; firm; nearly continuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

B21t—18 to 24 inches, yellowish-brown (10YR 5/4) heavy silty clay loam; many, fine, faint, grayish-brown (10YR 5/2) mottles; moderate and strong, medium, angular blocky structure; firm; nearly continuous, light-gray (10YR 7/1), dry, silt grains on faces of peds in the upper 2 inches; discontinuous dark-gray (10YR 4/1) clay films on faces of peds; strongly acid; clear, smooth boundary.

B22t—24 to 35 inches, light olive-gray (5Y 6/2) heavy silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/4) and common, medium, prominent, yellowish-brown (10YR 5/6) mottles; moderate, fine, prismatic structure parting to moderate, medium, angular blocky; firm; discontinuous, very dark gray (10YR 3/1) and dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; medium acid; gradual, smooth boundary.

B23t—35 to 43 inches, light olive-gray (5Y 6/2) silty clay loam; many, medium, prominent, yellowish-brown (10YR 5/6) mottles; moderate, medium, prismatic structure; firm; discontinuous, dark-gray (10YR 4/1) and some very dark-gray (10YR 3/1) clay films on faces of peds and on channel linings; medium acid; gradual, smooth boundary.

B3—43 to 58 inches, light olive-gray (5Y 6/2) light silty clay loam; many, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure; firm; discontinuous, dark-gray (10YR 4/1) and some very dark gray (10YR 3/1) clay films on faces of peds and on channel linings; slightly acid; gradual, smooth boundary.

C—58 to 70 inches, light olive-gray (5Y 6/2) heavy silt loam; many, medium, prominent, yellowish-brown (10YR 5/6) mottles; massive; friable; very dark gray (10YR 3/1) channel linings; neutral.

The solum is 45 to 60 inches thick. The dark-colored Ap or A1 horizon is 6 to 10 inches thick. It is commonly very dark grayish brown, but in places it is very dark gray, very dark brown, or black. The A2 horizon is dark gray to light brownish gray. The B2 horizon is heavy silty clay loam or light silty clay. The B horizon is mainly medium acid and strongly acid, but it becomes less acid in the lower part. The C horizon is commonly medium acid to neutral.

Clarksdale soils are near Keomah, Clinton, and Herrick soils on the landscape. They are darker colored in the Ap or A1 horizon than Keomah and Clinton soils and have a thinner dark-colored Ap or A1 horizon than Herrick soils. They have a profile similar to that of Atterberry soils but their B2 horizon has more clay.

257A—Clarksdale silt loam, 0 to 2 percent slopes. This soil is in small to large areas on medium-width drainage divides and near the edge of wide drainage divides. It has the profile described as representative of the series.

Included with this soil in mapping are Herrick and Keomah soils. Also included are poorly drained soils in areas less than 2 acres in size. These areas are shown by a spot symbol on the detailed soil map.

The main concern of management is excess water. Most areas of this soil are in cultivated crops. A few areas are in pasture or woodland. This soil is well suited to all crops commonly grown in the county if excess water is removed. Capability unit I–7.

257B—Clarksdale silt loam, 2 to 4 percent slopes. This soil is in small to medium areas on ridges and on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner.

Included with this soil in mapping are small areas of Herrick and Keomah soils on ridges and sides along drainageways. Also included are poorly drained soils in areas less than 2 acres in size. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and, in some areas, excess water. Most areas of this soil are in cultivated crops, and some are in pasture or woodland. This soil is well suited to all crops commonly grown in the county if erosion is controlled and if excess water is removed. Capability unit IIe–13.

257C2—Clarksdale silt loam, 4 to 7 percent slopes, eroded. This soil is in small areas mainly along drainageways, but a few areas are on sides of ridges. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsoil are 5 to 10 inches thinner.

Included with this soil in mapping are small areas of Keller soils on sides of drainageways. Also included are a few small areas of eroded soils that have a surface layer of brownish silty clay loam and other areas of soils that have a thicker, dark-colored surface layer. Small areas of wet soils are also included. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and, in some areas, excess water. Most areas of this soil are in cultivated crops, but some areas are in pasture. This soil is well suited to all crops commonly grown in the county if erosion is controlled and if excess water is removed. Capability unit IIe–13.

Clinton Series

The Clinton series consists of deep, moderately well drained, gently sloping to strongly sloping soils that formed in loess. These soils are on narrow ridges and edges of broad drainage divides in most of the upland part of the county. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is brown and dark brown, and it is about 6 inches thick. The subsoil is about 37 inches thick. For about 4 inches it is yellowish-brown light silty clay loam. Below that for about 14 inches it is yellowish-brown heavy silty clay loam mottled with gray in the lower 6 inches. The lower 19 inches is dark-brown silty clay loam. The underlying material extends to a depth of about 65 inches. It is yellowish-brown heavy silt loam that has gray mottles.

Clinton soils are moderately low in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are suited to crops commonly grown in the county if erosion is controlled.

Representative profile of Clinton silt loam, 2 to 7 percent slopes, eroded, 1,045 feet north and 460 feet east of the southwest corner of SE¼ sec. 13, T. 1 S., R. 6 W., in a cultivated field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, very fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A21—6 to 9 inches, brown (10YR 5/3) silt loam; dark-brown to brown (10YR 4/3) exteriors of peds; thin, patchy, light-gray (10YR 7/1), dry, silt grains on faces of peds; weak, thin, platy structure parting to weak, very fine, subangular blocky; friable; slightly acid; clear, smooth boundary.

A22—9 to 12 inches, brown (10YR 5/3) silt loam; dark-brown (10YR 4/3) exteriors of peds; very weak, thick, platy structure parting to weak, fine, subangular blocky; thin, patchy, light-gray (10YR 7/1), dry, silt grains on faces of peds; friable; slightly acid; clear, smooth boundary.

B1t—12 to 16 inches, yellowish-brown (10YR 5/4) light silty clay loam; dark-brown (10YR 4/3) exteriors of peds; moderate, fine, subangular blocky structure; very thin, discontinuous clay films and thin, nearly continuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; firm; strongly acid; clear, smooth boundary.

B21t—16 to 19 inches, yellowish-brown (10YR 5/4) heavy silty clay loam; strong, fine, subangular blocky structure; thin, continuous, brown (10YR 5/3) clay films and thin, nearly continuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; firm; strongly acid; clear, smooth boundary.

B22t—19 to 30 inches, yellowish-brown (10YR 5/4) heavy silty clay loam; common, fine, distinct, gray (10YR 6/1) mottles in the lower 6 inches; weak, medium, prismatic structure parting to moderate, medium, angular blocky; thin, continuous, dark-brown (10YR 4/3) clay films and thick, discontinuous, gray (10YR 6/1), dry, silt grains on faces of peds; firm; strongly acid; gradual, smooth boundary.

B3t—30 to 49 inches, dark-brown (10YR 4/3) silty clay loam; many, fine, distinct, gray (10YR 6/1) mottles; weak, coarse, angular and subangular blocky structure; medium, discontinuous, brown (10YR 4/3) clay films on faces of peds; firm; strongly acid; gradual, smooth boundary.

C—49 to 65 inches, yellowish-brown (10YR 5/4) heavy silt loam; many, medium, distinct, gray (10YR 6/1) mottles and few, fine, distinct, brown to dark-brown (7.5YR 4/4) streaks; massive; few, patchy, dark-brown (10YR 4/3) clay films on faces of peds; friable; medium acid.

The solum is 40 inches to more than 60 inches thick. The A2 horizon is brown or yellowish brown. About 10 inches of the upper part of the B horizon is free of gray mottles. The B horizon is medium acid and strongly acid. The C horizon is slightly acid and medium acid.

Clinton soils are near Keomah and Fishhook soils on the landscape, but they are better drained. They have a profile similar to that of Rozetta soils, but their B2 horizon has less clay.

18B2—Clinton silt loam, 2 to 7 percent slopes, eroded. This soil is in small to medium areas on sides of ridges and drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of sloping, somewhat poorly drained Keomah and Fishhook soils near heads of drainageways. Also included are areas of soils that have a thicker surface layer, and small areas of soils that have shale or limestone outcrops. Most of these areas are shown by a spot symbol on the detailed soil map.

The main concern of management is erosion. Most areas of this soil are used for crops, but some are used for pasture, and a few areas are in woodland. This soil is well suited to all crops commonly grown in the county if erosion is controlled. Capability unit IIe–1.

18B3—Clinton soils, 4 to 7 percent slopes, severely eroded. This soil is mainly in small areas along drainageways, but a few areas of this soil are on sides of ridges. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thinner, and the surface layer is yellowish-brown silty clay loam and grayish-brown silt loam.

Included with this soil in mapping are small areas of sloping, somewhat poorly drained Keomah and Fishhook soils near heads of drainageways. Also included are a few small areas of soils that have a surface layer of very dark grayish-brown silt loam.

The main concerns of management are erosion and tilth. This soil is used mainly for crops. It is suited to crops commonly grown in the county if erosion is controlled. Capability unit IIIe–1.

18C2—Clinton silt loam, 7 to 12 percent slopes, eroded. This soil is mainly in small to medium areas along drainageways, but a few areas are on sides of ridges. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsoil are a few inches thinner, and the subsoil is less clayey.

Included with this soil in mapping are small areas of somewhat poorly drained Fishhook soils and small areas, on the lower part of the sides, of Hickory soils that have a surface layer of loam. Also included are a few small areas of soils that have a surface layer of yellowish-brown silty clay loam and small areas of soils that have shale or limestone outcrops, indicated by a spot symbol on the detailed soil map.

The main concerns of management are erosion and slope. This soil is used mainly for crops, but it is also used for pasture and woodland. It is suited to most crops commonly cultivated in the county if erosion is controlled. It is also well suited to hay, pasture, and woodland. Capability unit IIIe–1.

18C3—Clinton soils, 7 to 12 percent slopes, severely eroded. This soil is in small to medium areas mainly along drainageways, but a few areas are on sides of ridges. It has a profile similar to the one described as representative of the series, but the surface layer is yellowish-brown silty clay loam and dark grayish-brown silt loam, and the subsoil is much thinner and has less clay.

Included with this soil in mapping are small areas of somewhat poorly drained Fishhook soils and small areas, on the lower part of the sides, of Hickory soils that have a surface layer of loam. Also included are small areas of soils where slope is as much as 16 percent and small areas of soils that have sand, shale, and limestone ledges on the surface, indicated by a spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are used for cultivated crops or rotation pasture. Some areas are used for permanent pasture. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit IVe–1.

932C2—Clinton-El Dara complex, 7 to 12 percent slopes, eroded. This complex consists of about 65 percent Clinton silt loam and 35 percent El Dara sandy loam. These soils are in small areas on sides of ridges and mounds and on sides of valleys cut by streams. El Dara soils are on the lower part of the sides.

These soils have a profile similar to the one described as representative of their series, but the surface layer is thinner. In places the silty clay loam or sandy clay loam subsoil is at the surface. Included with this complex in mapping are small areas of Atlas and Blair soils.

The main concerns of management are erosion and slope. The soils in this complex are suited to crops commonly grown in the county if erosion is controlled. Most areas of these soils are in pasture, but some are in cultivated crops and woodland. Capability unit IIIe–1.

932C3—Clinton-El Dara complex, 7 to 12 percent slopes, severely eroded. This complex consists of about 60 percent Clinton soils and 40 percent El Dara soils. These soils are in small to medium areas on sides of ridges, mounds, and valleys cut by streams. El Dara soils are on the lower part of the sides.

These soils have a profile similar to the one described as representative of their series, but the surface layer is silty clay loam, sandy clay loam, silt loam, or sandy loam. Included in mapping are small areas of Atlas and Blair soils.

The main concerns of management are erosion, slope and tilth. Most areas of these soils are cultivated, but some are in pasture and woodland. The soils in this complex are suited to hay, pasture, and woodland. They are poorly suited to cultivated crops, because of the difficulty in controlling erosion. The silty clay loam or sandy clay loam surface layer makes establishment of hay and pasture difficult. Capability unit IVe–1.

932D3—Clinton-El Dara complex, 12 to 18 percent slopes, severely eroded. This complex consists of about 55 percent Clinton soils and 45 percent El Dara soils. About 25 percent of these soils are slightly or moderately eroded and have a surface layer of silt loam or sandy loam. These soils are in small areas on sides of ridges and sides of valleys cut by streams. Clinton soils are on the upper part of the sides.

The soils in this complex have a profile similar to the one described as representative of their series, but the surface layer is silty clay loam, sandy clay loam, silt loam, or sandy loam. Included in mapping are small areas of Atlas and Blair soils.

The main concerns of management are erosion, slope, and tilth. Most areas of these soils are in cultivated crops, pasture, or woodland. The soils in this complex are suited to pasture and woodland. Capability unit VIe–1.

Coatsburg Series

The Coatsburg series consists of deep, poorly drained, moderately sloping and strongly sloping soils on uplands. These soils formed in thin loess and clayey buried soils that formed in glacial drift. They are on sides of drainageways, commonly near the upper end of drainageways that drain the broad prairies. The native vegetation was prairie grasses.

In a representative profile the surface layer is about 12 inches thick. The upper part is very dark brown silt loam, and the lower part is very dark grayish-brown heavy silt loam. The subsoil extends to a depth of 60 inches. For about 4 inches it is very dark grayish-brown clay loam. For about 28 inches it is very dark grayish-brown and dark-gray light clay mottled with light olive brown in the lower part. Below that for about 16 inches it is gray heavy clay loam mottled with strong brown.

Coatsburg soils are moderate in organic-matter content. They have slow to very slow permeability and a moderate available water capacity.

Moderately sloping Coatsburg soils are suited to cultivated crops if erosion is controlled. Strongly sloping Coatsburg soils are suited to hay, pasture, and woodland.

Representative profile of Coatsburg silt loam, 7 to 12 percent slopes, in an area of Coatsburg silt loam, 7 to 12 percent slopes, eroded, 205 feet south and 150 feet east of the northwest corner of SE¼ sec. 20, T. 2 N., R. 5 W., in a formerly cultivated pasture:

Ap—0 to 7 inches, very dark brown (10YR 2/2) silt loam; few, fine, distinct, dark reddish-brown (5YR 3/4) mottles; moderate, medium, crumb structure; friable; 5 percent content of quartz grains; strongly acid; abrupt, smooth boundary.

A3—7 to 12 inches, very dark grayish-brown (10YR 3/2) heavy silt loam; few, fine, faint, dark grayish-brown (10YR 4/2) and very dark brown (10YR 2/2) mottles; moderate, very fine, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

IIB1t—12 to 16 inches, very dark grayish-brown (2.5Y 3/2) clay loam; very dark grayish-brown (10YR 3/2) crushed; moderate, very fine, subangular blocky structure; firm; thin, continuous, very dark

gray (10YR 3/1) clay films on faces of peds; medium acid; clear, smooth boundary.

IIB21t—16 to 22 inches, very dark grayish-brown (2.5Y 3/2) light clay; few, medium, distinct, dark reddish-brown (5YR 3/4) mottles; moderate, medium, angular blocky structure; firm; thin, continuous, very dark gray (10YR 3/1) clay films on faces of peds; common, medium concretions of iron and manganese; medium acid; clear, smooth boundary.

IIB22gt—22 to 31 inches, dark-gray (N 4/) light clay; few, fine, distinct, olive-brown (2.5Y 4/4) mottles; weak, medium, angular blocky structure; firm; thin, continuous, gray (5Y 5/1) clay films on faces of peds; few, medium concretions of iron and manganese; slightly acid; clear, smooth boundary.

IIB23gt—31 to 44 inches, dark-gray (5Y 4/1) light clay; common, fine and medium, distinct, light olive-brown (2.5Y 5/6) and olive-brown (2.5Y 4/4) mottles; weak, coarse, prismatic structure; firm; thin, continuous, dark-gray (N 4/) clay films on faces of peds; few, medium concretions of iron and manganese; slightly acid; gradual, smooth boundary.

IIB3gt—44 to 60 inches, gray (5Y 5/1) heavy clay loam; many, coarse, prominent, strong-brown (7.5YR 5/6) mottles; very weak, prismatic structure; firm; few, large concretions of iron and manganese; thin, discontinuous, dark-gray (10YR 4/1) clay films; neutral.

The solum is 40 inches to more than 80 inches thick. The Ap horizon is commonly 10 to 15 inches thick where uneroded. It is black, very dark brown, very dark gray, and very dark grayish brown. It is silt loam or heavy silt loam in the upper part and heavy silt loam to light clay loam or light silty clay loam in the lower part.

The IIB horizon is heavy silty clay loam, heavy clay loam, silty clay, or clay. It is dominantly gray or dark gray, but it is mottled with light olive brown or yellowish brown in places. The upper part of the IIB horizon has mottles of reddish brown or reddish yellow in many places. The IIB horizon is medium acid to strongly acid in the upper part and mildly alkaline to slightly acid at a depth of 40 to 60 inches.

Coatsburg soils are near Keller, Atlas, and Blair soils on the landscape. They have more sand and less silt in the upper part of the B horizon and are more poorly drained than Keller soils. They are darker colored in the A horizon than Atlas and Blair soils, and their B horizon has more clay than that of Blair soils.

660C2—Coatsburg silt loam, 4 to 7 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways near the source of the drainageway. It has a profile similar to the one described as representative of the series, but the plow layer is a mixture of the original surface layer and some subsoil.

Included with this soil in mapping are small areas of somewhat poorly drained Keller soils. Also included are small areas of soils that have a thicker surface layer. Other areas of soils are included that have a plow layer that is mainly subsoil and is grayish silty clay loam. Small areas of soils that have a subsoil of light or medium clay loam are also included.

The main concerns of management are erosion, excess water, and slow to very slow permeability. This soil is used mainly for cultivated crops. A few areas are used for pasture. If erosion is controlled and excess water is removed, this soil is suited to crops commonly grown in the county. It is also suited to pasture. Capability unit IIIe–7.

660D2—Coatsburg silt loam, 7 to 12 percent slopes, eroded. This strongly sloping soil is in small to medium areas on sides of drainageways. Most areas of this soil have a profile similar to the one described as representative of the series, but the plow layer is a mixture of the original surface layer and some subsoil. About 20 percent of the acreage of this soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of severely eroded soils where the plow layer is mostly subsoil material of grayish silty clay loam and small areas of soils where the subsoil is light or medium clay loam. Also included are small areas of somewhat poorly drained Keller soils and small areas of Atlas and Blair soils that have a dark grayish-brown surface layer.

This soil is used mainly for cultivated crops. Some areas are used for hay and pasture. This soil is suited to hay and pasture. It is poorly suited to cultivated crops commonly grown in the county, because erosion is difficut to control. The main concerns of management are erosion and slow to very slow permeability. Slope and tilth are also concerns on areas of more eroded soils. Capability unit IVe–7.

Cowden Series

The Cowden series consists of deep, poorly drained, nearly level soils that formed in loess. These soils are on drainage divides and in many places are near heads of drainageways. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is about 8 inches thick. It is dark-gray silt loam in the upper part and grayish-brown silt loam in the lower part. The subsoil is about 39 inches thick. For 9 inches it is gray and very dark gray light silty clay that has grayish-brown mottles. Below that for about 9 inches it is light brownish-gray light silty clay that has yellowish-brown mottles. For the lower 21 inches it is light brownish-gray heavy silty clay loam and silty clay loam that has yellowish-brown mottles. The underlying material is gray heavy silt loam that extends to a depth of 65 inches.

Cowden soils are moderate in organic-matter content. They have slow permeability and a moderate to high available water capacity.

These soils are well suited to most crops commonly grown in the county if drained. They are not well suited to such crops as alfalfa that are sensitive to a high water table.

Representative profile of Cowden silt loam, 885 feet west and 70 feet north of the southeast corner of NW¼ sec. 17, T. 2 N., R. 5 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A21—7 to 11 inches, dark-gray (10YR 4/1) silt loam; moderate, medium, platy structure; friable; patchy, white (10YR 8/1), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

A22—11 to 15 inches, grayish-brown (10YR 5/2) silt loam; few, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, platy structure; friable; discontinuous, white (10YR 8/2), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

B21t—15 to 24 inches, very dark gray (10YR 3/1) and gray (10YR 5/1) light silty clay; common, fine, distinct, grayish-brown (10YR 5/2) mottles; moderate, fine, angular blocky structure; very firm;

continuous very dark gray (10YR 3/1) clay films on faces of peds; strongly acid; clear, smooth boundary.

B22t—24 to 33 inches, light brownish-gray (2.5Y 6/2) light silty clay; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, angular blocky structure; very firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds and on channel linings; medium acid; clear, smooth boundary.

B23t—33 to 44 inches, light brownish-gray (2.5Y 6/2) heavy silty clay loam; common, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds and on channel linings; slightly acid; gradual, smooth boundary.

B3—44 to 54 inches, light olive-gray (5Y 6/2) silty clay loam; common, medium, distinct, light olive-brown (2.5Y 5/4) mottles; weak, coarse, angular blocky structure; firm; few, discontinuous, very dark gray (10YR 3/1) clay films on faces of peds and on common channel linings; slightly acid; gradual, smooth boundary.

C—54 to 65 inches, gray (5Y 6/1) heavy silt loam; few, fine, distinct, light olive-brown (2.5Y 5/4) mottles; massive; friable; common, very dark gray (10YR 3/1) channel linings; slightly acid.

The solum is 45 to 60 inches thick. The Ap horizon is 6 to 10 inches thick and is very dark gray or, less commonly, very dark grayish brown. The A2 horizon is 5 to 16 inches thick and is grayish brown, dark gray, and gray. The B2 horizon is silty clay or heavy silty clay loam. The B horizon is commonly medium acid and strongly acid in the upper part and neutral to strongly acid in the lower part. The C horizon is commonly medium acid to moderately alkaline.

Cowden soils are near Virden and Herrick soils on the landscape (fig. 7). They have a gray A2 horizon that is lacking in Virden soils. They are more poorly drained and have a thinner surface layer than Herrick soils.

112—Cowden silt loam. This soil is on broad uplands, and it has a slope of 0 to 1 percent. Most areas are small, but a few are medium in size.

Included with this soil in mapping are areas, less than 2 acres in size, of soils that have high exchangeable sodium in the subsoil. These are indicated by a "$" symbol on the detailed soil map. Also included are areas of soils that have a surface layer of very dark gray silt loam 10 to 14 inches thick. Small areas of somewhat poorly drained Herrick soils are also included.

The main concerns of management are poor natural drainage, ponding, and slow permeability. Most areas of this soil are used for cultivated crops. This soil is well suited to crops commonly grown in the county if excess water is removed. Capability unit IIw–3.

Cut and Fill Land

C.F.—Cut and fill land. This mapping unit consists of areas where the soil material has been disturbed to an extent that prevents its being placed in a soil series. Most of the soil material has been excavated and

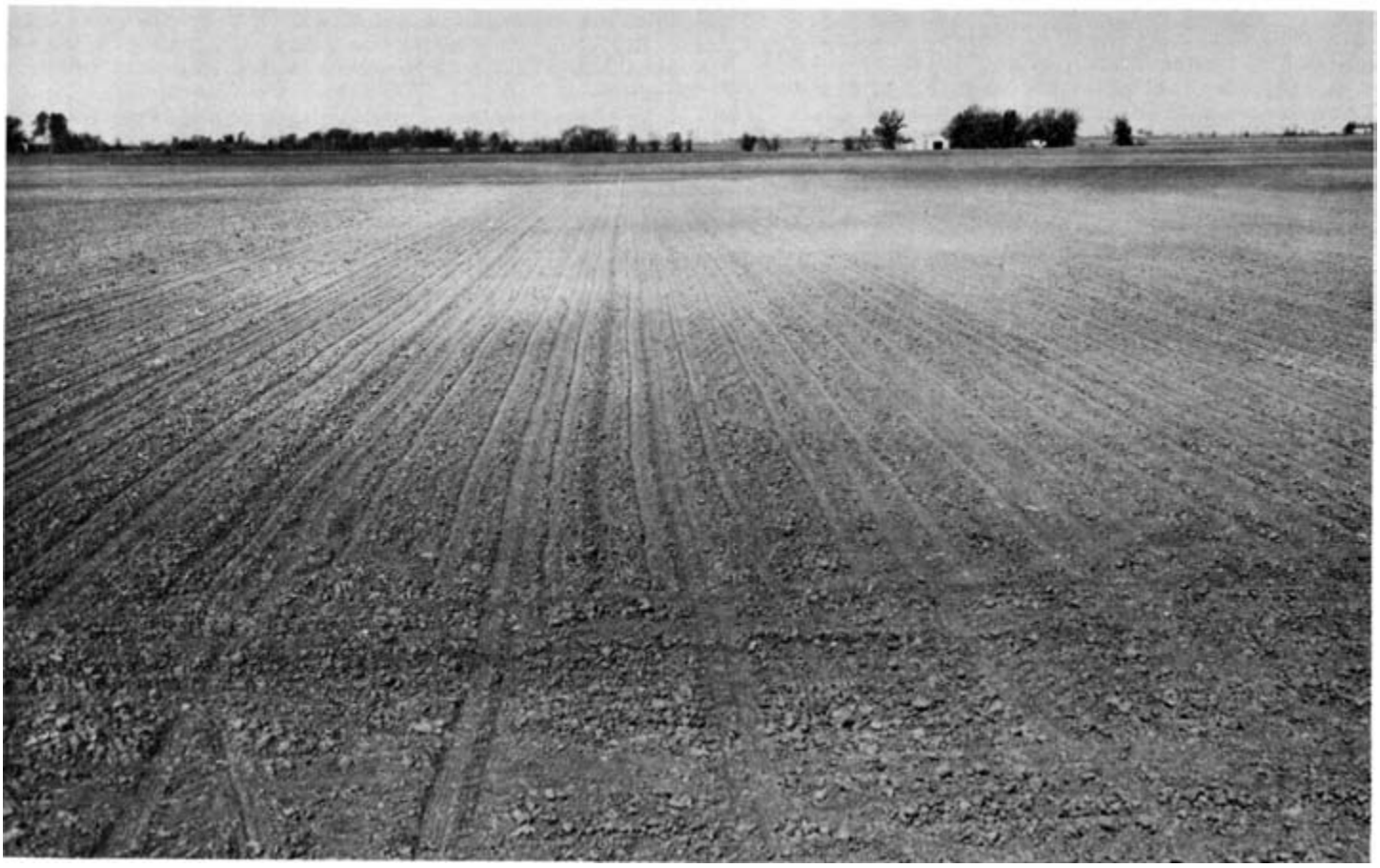

Figure 7.—Typical area of light-colored Cowden silt loam. Virden silt loam in the foreground; Herrick silt loam in the far background.

moved to another location, but some has been left in place.

A large area of cut and fill land is at Baldwin Field airport east of Quincy. The amount of mechanical disturbance to the soil material within this area of cut and fill land ranges from slight to extensive. Parent material or subsoil material is exposed at most excavated sites; most filled areas consist of a mixture of surface soil, subsoil, and parent material. An estimate of the composition of the cut and fill can be made by referring to the characteristics of the surrounding undisturbed soil except where deep cuts were made. The general soil map is also a guide to the kind of material present.

Most cut and fill land is low in fertility, especially lacking nitrogen, and in organic-matter content. Applying fertilizer in amounts based on soil tests is necessary to grow plants in cut and fill areas. A top dressing of topsoil, manure, or mulches can help start new seedlings. Most areas of cut and fill are subject to severe erosion unless vegetated. Not placed in a capability unit.

Darwin Series

The Darwin series consists of deep, nearly level, poorly drained soils on the Mississippi River flood plain. These soils formed in water-deposited clayey sediments. The native vegetation was hardwood forest.

In a representative profile the surface layer is very dark gray silty clay about 17 inches thick. The subsoil is about 22 inches thick. For about 6 inches it is dark-gray silty clay that has dark yellowish-brown mottles. Below that for 16 inches it is dark-gray silty clay. The underlying material is gray silty clay. It extends to a depth of 60 inches.

Darwin soils are high in organic-matter content. They have very slow permeability and a moderate available water capacity.

These soils are suited to most crops commonly grown in the county if drained and protected from flooding.

Representative profile of Darwin silty clay, 475 feet east and 145 feet south of the northwest corner of sec. 4; also 1,965 feet west of the center of a large north-south drainage ditch near the center of the section and 145 feet south of the north county line (on the north bank of an east-west drainage ditch); T. 2 N, R. 9 W., in a cultivated field:

Ap—0 to 9 inches, very dark gray (10YR 3/1) silty clay; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, fine, granular structure; firm; neutral; abrupt, smooth boundary.

A1—9 to 17 inches, very dark gray (10YR 3/1) silty clay; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, angular blocky structure; firm; neutral; clear, smooth boundary.

B21g—17 to 23 inches, dark-gray (10YR 4/1) silty clay; common, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; neutral; clear, smooth boundary.

B22g—23 to 39 inches, dark-gray (5Y 4/1) silty clay; weak, medium and coarse, subangular blocky structure; firm; neutral; clear, smooth boundary.

Cg—39 to 60 inches, gray (5Y 5/1 and 5Y 6/1) silty clay; common, fine and medium, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; firm; neutral.

The A horizon is black or very dark gray. The B horizon is dark gray to gray and contains 45 to 55 percent clay. The C horizon is silty clay loam to clay. The A and B horizons are slightly acid to mildly alkaline.

Darwin soils are near Titus, Beaucoup, Shiloh, and Gorham soils on the landscape. They have similar natural drainage but have more clay throughout the solum.

71—Darwin silty clay. This soil is mainly in small to large areas on the flood plain of the Mississippi River. It has a slope of 0 to 1 percent.

Included with this soil in mapping are small to medium areas of soils that have a thicker, darker colored surface layer. Also included are small areas of soils that are light silty clay throughout.

On 5 percent of the mapped areas the hazard of flooding and ponding is severe. In some of these areas the soil surface is under water in wet seasons. Improvement of many of these areas is uneconomical. An additional 5 percent of the mapped areas has a surface layer of silt loam about 8 to 20 inches thick. Soil tilth is less of a hazard in these areas.

The main concerns of management are poor natural soil drainage, very slow permeability, flooding, ponding, and tilth. This soil is suited to most crops commonly grown in the county if adequately drained and protected from flooding. Capability unit IIIw–2.

Dickinson Series

The Dickinson series consists of deep, well drained to somewhat excessively drained, nearly level and gently sloping soils on terraces. These soils formed in sandy materials on terraces or benches that are generally 5 to 20 feet above the flood plain, mainly near the Mississippi River. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark brown and very dark grayish-brown sandy loam about 19 inches thick. The subsoil is about 20 inches thick. For about 5 inches it is brown sandy loam. For 6 inches it is brown light sandy loam. Below that for about 9 inches it is brown heavy loamy sand. The underlying material extends to a depth of 56 inches. It is brown sand and loamy sand that has common pebbles as much as one-half inch in diameter in the lower part.

Dickinson soils are moderate in organic-matter content. They have moderately rapid permeability and a low to moderate available water capacity.

These soils are suited to all crops commonly grown in the county if soil blowing is controlled.

Representative profile of Dickinson sandy loam, 0 to 4 percent slopes, 975 feet south and 220 feet west of the northeast corner of SW1/4 sec. 24, T. 2 N., R. 10 W., in a cultivated field:

A1—0 to 13 inches, very dark brown (10YR 2/2) sandy loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

A3—13 to 19 inches, very dark grayish-brown (10YR 3/2) sandy loam; weak, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21—19 to 24 inches, brown (10YR 4/3) sandy loam; very dark grayish-brown (10YR 3/2) exteriors of peds; moderate, fine, subangular blocky structure; friable; small very dark grayish-brown (10YR 3/2) fillings of holes; medium acid; clear, smooth boundary.

B22—24 to 30 inches, brown (10YR 4/3) light sandy loam; moderate, medium, subangular blocky struc-

ture; very friable; medium acid; clear, smooth boundary.
B3—30 to 39 inches, brown (10YR 4/3) heavy loamy sand; weak, medium, subangular blocky structure; very friable; slightly acid; gradual, wavy boundary.
C1—39 to 48 inches, brown (7.5YR 4/3) sand; single grained; noncoherent; slightly acid; gradual, wavy boundary.
C2—48 to 56 inches, brown (7.5YR 4/3) loamy sand; single grained; noncoherent; slightly hard when dry; common pebbles as much as one-half inch in diameter becoming more numerous with depth; slightly acid.

The solum is 24 to 50 inches thick. The A horizon is 12 to 20 inches thick and is very dark gray, very dark brown, or dark brown. The lower part of the B horizon is sandy loam to loamy sand. The B horizon is slightly acid to strongly acid. The C horizon is sand or loamy sand and contains some gravel in places. It is neutral to medium acid.

Dickinson soils are near Sparta soils on the landscape. They are less sandy throughout the solum than Sparta soils.

87B—Dickinson sandy loam, 0 to 4 percent slopes. This soil is in small to large areas on terraces, mainly on the Mississippi River flood plain, and it has a slope of 0 to 4 percent. Included in mapping are small areas of nearly level soils that have a surface layer of silt loam. Also included are small areas of soils that have a dark-colored surface layer 24 to 30 inches thick and other small areas of soils that have a surface layer of loamy sand.

Most areas of this soil are used for cultivated crops. This soil is suited to crops commonly grown in the county if soil blowing is controlled and crop residues are properly managed. It is well suited to alfalfa and other deep rooted crops. The main concerns of management are low available water capacity and low fertility. Soil blowing is also a hazard. Capability unit IIIs–3.

Downs Series

The Downs series consists of deep, well-drained, nearly level to steep soils on uplands. These soils formed in loess. They are in areas between soils that formed under grasses, commonly in medium to wide drainage divides, and soils that formed under forests, commonly near streams. The native vegetation was hardwood forest and prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 7 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is about 52 inches thick. For 4 inches it is brown heavy silt loam. For 36 inches it is yellowish-brown silty clay loam mottled with light brownish gray in the lower 21 inches. Below that for 12 inches it is yellowish-brown heavy silt loam mottled with light brownish gray. The underlying material extends to a depth of 68 inches. It is yellowish-brown silt loam mottled with light brownish gray.

Downs soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county. Erosion is a slight to moderate hazard.

Representative profile of Downs silt loam, 2 to 7 percent slopes, 810 feet south and 30 feet east of the northwest corner of sec. 9, T. 1 S., R. 8 W., in a cultivated field:

A—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.
A2—7 to 11 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure; friable; neutral; clear, smooth boundary.
B1—11 to 15 inches, brown (10YR 4/3) heavy silt loam; weak, medium, subangular blocky structure; friable; neutral; clear, smooth boundary.
B21t—15 to 21 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; common, light-gray (10YR 7/1), dry, silt grains and very thin, discontinuous, brown (10YR 4/3) clay films on faces of peds; medium acid; clear, smooth boundary.
B22t—21 to 30 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm; common, light-gray (10YR 7/1), dry, silt grains and thin, continuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; medium acid; clear, smooth boundary.
B23t—30 to 41 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, prismatic structure parting to moderate, coarse, subangular blocky; firm; few, light-gray (10YR 7/1), dry, silt grains and thin, discontinuous, dark-brown (7.5YR 4/3) clay films on faces of peds; medium acid; clear, smooth boundary.
B31t—41 to 51 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, distinct, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/8) mottles; weak, coarse, prismatic structure; firm; thin, discontinuous, dark-brown (7.5YR 4/3) clay films on faces of peds and on channel fillings; medium acid; gradual, smooth boundary.
B32—51 to 63 inches, yellowish-brown (10YR 5/4) heavy silt loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, prismatic structure; friable; dark-brown (7.5YR 4/3) channel linings and fillings; slightly acid; gradual, smooth boundary.
C—63 to 68 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; massive; friable; slightly acid.

The solum is 40 inches to more than 60 inches thick. The Ap horizon or A1 horizon is 6 to 10 inches thick. It is commonly very dark grayish brown, but in places it is very dark gray or very dark brown. The B horizon is brown or yellowish brown. In some profiles gray mottles are below the upper 10 inches of the B horizon. The B horizon is slightly acid to very strongly acid.

Downs soils are near Fayette, Tama, and Clinton soils on the landscape. They are darker in color in the Ap or A1 horizon than Fayette and Clinton soils, and they have a thinner dark-colored Ap and A1 horizon than Tama soils.

386A—Downs silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on medium-width drainage divides and on edges of wide drainage divides. It has the profile described as representative of the series, but the surface layer is a few inches thicker.

Included with this soil in mapping are small areas of lighter colored Fayette soils and somewhat poorly drained Atterberry soils. Also included are small areas of soils that have a dark-colored surface layer 10 to 14 inches thick.

There are no serious management problems on this soil. Most areas of this soil are in cultivated crops, and it is well suited to this use. It is also suited to orchard and vegetable crops. Capability unit I–1.

386B—Downs silt loam, 2 to 7 percent slopes. This soil is in small to medium areas on ridges and on sides of shallow drainageways. It has the profile described

as representative of the series. On about 40 percent of the mapped areas some subsoil is mixed with the surface layer.

Included with this soil in mapping are small areas of somewhat poorly drained Atterberry and Clarksdale soils and Fayette soils that have a light-colored surface layer. Also included are small areas of eroded soils that have a surface layer of brown silty clay loam. In addition, a few areas of wet soils less than 2 acres in size are mapped. They are shown by a wet spot symbol on the detailed soil map.

The only management concern is a hazard of erosion. Most areas of this soil are in cultivated crops. It is well suited to all crops commonly grown in the county. It is also suited to orchard and vegetable crops. Capability unit IIe–14.

386C2—Downs silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas commonly on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer and the subsoil are about 5 inches thinner.

Included with this soil in mapping are small areas of Fayette soils that have a light-colored surface layer and small areas of eroded soils that have a surface layer of brown silty clay loam. Also included are some small areas of wet soils that are shown by a wet spot symbol on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are in cultivated crops. Other areas are in pasture, and a few are in woodland. This soil is suited to cultivated crops and hay if erosion is controlled. It is also suited to orchards. Capability unit IIIe–14.

Dupo Series

The Dupo series consists of deep, nearly level, somewhat poorly drained soils that formed in alluvium. These soils are mainly on the Mississippi River flood plain. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The material underlying the surface layer is about 22 inches thick. For 12 inches it is dark grayish-brown silt loam. Below that for about 10 inches it is dark-gray and dark grayish-brown silt loam. The buried surface layer is black heavy silty clay loam about 20 inches thick. The buried subsoil is very dark gray light silty clay that extends to a depth of 72 inches.

Dupo soils are moderately low in organic-matter content. They have moderately slow to slow permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Dupo silt loam, 1,400 feet east and 1,270 feet south of the northwest corner of sec. 14, T. 1 N, R 9 W., in a cultivated field:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; mildly alkaline; clear, smooth boundary.

C1—9 to 21 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, fine, granular structure; friable; discontinuous very dark grayish-brown (10YR 3/2) coatings on faces of peds; few, light brownish-gray (10YR 6/2) sand grains; mildly alkaline; clear, smooth boundary.

C2—21 to 31 inches, dark-gray (10YR 4/1) and dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct, grayish-brown (10YR 5/2) and dark yellowish-brown (10YR 4/4) mottles; very weak, fine, subangular blocky structure; firm; very dark gray (10YR 3/1) channel linings and discontinuous coatings on faces of peds; mildly alkaline; abrupt, smooth boundary.

IIAb—31 to 51 inches, black (5Y 2/1) heavy silty clay loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, angular blocky structure; firm; mildly alkaline; clear, smooth boundary.

IIBb—51 to 72 inches, very dark gray (5Y 3/1) light silty clay; few, fine, dark yellowish-brown (10YR 3/4) mottles; weak, fine, angular blocky structure; firm; mildly alkaline.

The A and C horizons combined are 20 to 40 inches thick. These horizons are mainly dark grayish-brown or dark-brown silt loam, but they include strata or lenses of silty clay loam, sandy loam, and sand. The IIAb and IIBb horizons are black or very dark gray heavy silty clay loam to clay. Reaction is mildly alkaline to medium acid throughout the profile.

Dupo soils are near Shiloh, Titus, Darwin, and Wakeland soils on the landscape. They have less clay in the A and C horizons than Shiloh, Titus, and Darwin soils, and they have a IIAb horizon that is lacking in the Wakeland soils. Dupo soils have a profile similar to that of Orion soils, but their IIAb horizon has more clay than those soils.

180—Dupo silt loam. This soil is in broad, medium to large areas, mainly in the Mississippi River flood plain, and it has a slope of 0 to 1 percent. Included in mapping are areas of poorly drained Shiloh and Titus soils and of moderately permeable Wakeland soils. Also included are small areas of soils where material overlying the buried soil is as thin as 16 inches and others where the overlying material is dark colored. Small areas of sand and poorly drained soils are shown by a spot symbol on the detailed soil map.

The main concerns of management are excess water and flooding. This soil is used mainly for cultivated crops. It is well suited to crops commonly grown in the county if adequately drained and protected from flooding. Capability unit IIw–4.

El Dara Series

The El Dara series consists of deep, well drained and moderately well drained, strongly sloping to very steep soils. These soils formed in stratified sandy and loamy sediments, which commonly are on higher parts of the landscape in the areas where these soils are found. They are on the sides of valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark-brown light sandy loam about 7 inches thick. The subsurface layer is yellowish-brown light loam about 3 inches thick. The subsoil is about 40 inches thick. For 4 inches it is yellowish-brown loam. For 12 inches it is yellowish-brown sandy clay loam. Below that for 24 inches it is yellowish-brown sandy clay loam mottled with light brownish gray. The underlying material is brownish-yellow light sandy loam that extends to a depth of 60 inches.

El Dara soils are moderately low in organic-matter

content. They have moderate permeability and a moderate available water capacity.

Less sloping El Dara soils are poorly suited to crops commonly grown in the county. The hazard of erosion is severe on these soils. Other El Dara soils are suited to hay, pasture, and woodland.

Representative profile of El Dara silt loam, 7 to 12 percent slopes, 625 feet north and 170 feet east of the southwest corner of sec. 6, T. 3 S., R. 6 W., in a formerly cultivated pasture:

Ap—0 to 7 inches, dark-brown (10YR 4/3) light sandy loam; weak, medium, platy structure parting to weak, very fine, granular; friable; medium acid; abrupt, smooth boundary.

A2—7 to 10 inches, yellowish-brown (10YR 5/6) light loam; moderate, medium, platy structure; friable; strongly acid; abrupt, smooth boundary.

B1t—10 to 14 inches, yellowish-brown (10YR 5/6) loam; weak, very fine and fine, angular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—14 to 26 inches, yellowish-brown (10YR 5/6) light sandy clay loam; moderate, medium, angular and subangular blocky structure; firm; thin, continuous, yellowish-brown (10YR 5/4) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B22t—26 to 38 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, light brownish-gray (2.5Y 6/2) mottles; moderate, medium and coarse, angular and subangular blocky structure; firm; thin, continuous, brown (7.5YR 5/4) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B3t—38 to 50 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, light brownish-gray (2.5Y 6/2) and few, fine, faint, yellowish-brown (10YR 5/8) mottles; weak, coarse, angular blocky structure; firm; thin, continuous, brown (7.5Y 5/4) clay films on faces of peds; very strongly acid; clear, smooth boundary.

C—50 to 60 inches, brownish-yellow (10YR 6/6) light sandy loam; single grained; noncoherent; very strongly acid; abrupt, smooth boundary.

The solum is 40 to 60 inches thick. The Ap horizon includes dark grayish-brown or brown sandy loam, loam, or silt loam. The A2 horizon is yellowish-brown to grayish-brown loam or sandy loam. The B2 horizon is sandy loam to clay loam. The B horizon commonly is very strongly acid or extremely acid. The C horizon is sand to sandy clay loam and is commonly stratified.

El Dara soils are near Clinton, Rozetta, and Ursa soils on the landscape. They have more sand throughout the solum than those soils, and their B horizon has less clay than Ursa soils.

264C—El Dara sandy loam, 7 to 12 percent slopes. This soil is in small to medium areas on sides of mounds and drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are Hickory soils that formed in glacial till, and clayey Ursa soils. Also included are small areas of soils that have plastic clayey shale under the subsoil. Small areas of wet soils are shown by a wet spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and low fertility. A few areas of this soil are in cultivated crops, but it is used mainly for hay, pasture, and woodland. It is suited to cultivated crops if erosion is controlled. It is well suited to hay, pasture, and woodland. Capability unit IIIe–6.

264C3—El Dara soils, 7 to 12 percent slopes, severely eroded. This soil is in small to medium areas on sides of mounds and drainageways. It has a profile similar to the one described as representative of the series, but the surface layer and subsurface layer are thinner or are yellowish-brown sandy clay loam or dark-brown sandy loam.

Included with this soil in mapping are Hickory soils that formed in glacial till and Ursa soils that have a clayey subsoil. Also included are areas of soils that have plastic clayey shale under the subsoil and other areas an acre or less in size of wet soils.

Most areas of this soil are used for cultivated crops, hay, and pasture. It is poorly suited to cultivated crops, because erosion is difficult to control. It is better suited to hay, pasture, and woodland. Concerns of management include slope and low fertility. Erosion is a severe hazard. Capability unit IVe–6.

264D—El Dara sandy loam, 12 to 18 percent slopes. This soil is in small to large areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thinner.

Included with this soil in mapping are Hickory and Ursa soils. Areas of soils that have sand or clayey shale under the subsoil at a depth of 30 inches are also included.

The main concerns of management are erosion, slope, and low fertility. Most areas of this soil are in hay or pasture. Some areas are in cultivated crops or woodland. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is better suited to hay, pasture, or woodland. Capability unit IVe–6.

264D3—El Dara soils, 12 to 18 percent slopes, severely eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a mixture of the subsurface layer and the upper part of the subsoil. The surface layer is thinner and is yellowish-brown heavy loam and sandy clay loam or dark-brown sandy loam. The subsoil is also thinner.

Included with this soil in mapping are Hickory soils formed in clay loam glacial till and Ursa soils that have a clayey subsoil. Areas of soils that have sand or clayey shale under the subsoil at a depth of 30 inches are also included.

The main concerns of management are erosion, slope, tilth, and low fertility. Most areas of this soil are in hay or pasture. Some areas are in cultivated crops. This soil is suited to hay, pasture, or woodland. Capability unit VIe–6.

264E2—El Dara sandy loam, 18 to 30 percent slopes, eroded. This soil is in small to large areas on sides of stream valleys. It has a profile similar to the one described as representative of the series, but the surface layer and subsurface layer are 3 to 5 inches thinner, and the subsoil is also thinner.

Included with this soil in mapping are Hickory soils that formed in clay loam glacial till and Ursa soils that have a clayey subsoil. Also included are small areas of soils that have a surface layer of loamy sand and a subsoil of sandy loam. Areas of severely eroded soils are shown by a severely eroded spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and low fertility. Most areas of this soil are in pasture

or woodland. It is suited to these uses, but erosion is difficult to control. Capability unit VIe–6.

264F—El Dara soils, 30 to 50 percent slopes. This soil is in small to large areas on sides of stream valleys. It has a profile similar to the one described as representative of the series, but the subsoil is 5 to 10 inches thinner, and the surface layer is sandy loam, loamy sand, and sandy clay loam.

Included with this soil in mapping are Hickory soils that formed in clay loam glacial till and Camden soils that formed in silty and loamy water-deposited material. Also included are small areas of soils that have a surface layer, subsurface layer, subsoil, and underlying material of loamy sand and small areas of soils on the lower parts of the valley sides that have a subsoil and underlying material of silty clay.

The main concern of management is slope. Most areas of this soil are in woodland. It is better suited to this use than to other uses. Erosion is a severe hazard if woodland is removed. Capability unit VIIe–1.

Fayette Series

The Fayette series consists of deep, well-drained soils on uplands in the western part of the county. These soils formed in loess. They are on the tops of medium-width and narrow ridges and on sides of valleys.

In a representative profile the surface layer, if uncultivated, is very dark grayish-brown silt loam about 3 inches thick. The subsurface layer is dark grayish-brown and dark-brown silt loam about 10 inches thick. The subsoil is dark yellowish-brown silty clay loam 35 inches thick. The underlying material extends to a depth of 60 inches. It is yellowish-brown silt loam mottled with light yellowish brown.

Fayette soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity.

Less sloping Fayette soils are well suited to cultivated crops if protected from excess erosion. Steeper soils are suited to hay, pasture, and woodland.

Representative profile of Fayette silt loam, 2 to 7 percent slopes, 1,505 feet north and 390 feet east of the southwest corner of NW¼ sec. 17, T. 1 S., R. 8 W., in a wooded area:

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A2—3 to 13 inches, dark grayish-brown (10YR 4/2) and dark-brown (10YR 4/3) silt loam; very dark grayish-brown (10YR 3/2) exteriors of peds; weak, medium, platy structure; friable; light-gray (10YR 7/2), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

B1t—13 to 18 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; discontinuous, light-gray (10YR 7/2), dry, silt grains on faces of peds; very strongly acid; clear, smooth boundary.

B2t—18 to 30 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; discontinuous, light-gray (10YR 7/2), dry, silt grains and thin, continuous, dark-brown (7.5YR 4/3) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B3t—30 to 48 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; few, fine, faint, light yellowish-brown (2.5Y 6/4) mottles in lower part of horizon; weak, coarse, subangular blocky structure; firm; medium, discontinuous, dark-brown (7.5YR 4/3) clay films and discontinuous light-gray (10YR 7/2) silt grains on faces of peds; few, small, dark concretions; very strongly acid; gradual, smooth boundary.

C—48 to 60 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, light brownish-gray (2.5Y 6/2) and light yellowish-brown (2.5Y 6/4) mottles; massive; firm; few, small, dark concretions; strongly acid.

The solum is 36 to 60 inches thick. Some profiles have an Ap horizon that is dark grayish brown or dark brown. The A1 horizon is less than 4 inches thick and is very dark grayish brown or very dark brown. The subsurface layer is brown or dark grayish brown. The B2 horizon is light silty clay loam, but in a few profiles it is medium silty clay loam. The lower part of the B horizon has gray mottles in places. The B horizon is commonly medium acid to very strongly acid. The C horizon is slightly acid to strongly acid.

Fayette soils are near Rozetta, Hickory, and Goss soils on the landscape. They are better drained than Rozetta soils and have less sand throughout the solum than Hickory soils. They lack the chert fragments that are throughout Goss soils.

280B—Fayette silt loam, 2 to 7 percent slopes. This soil is mainly in small to large areas on ridges and on the sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of moderately well drained Rozetta soils on the sides of drainageways and on the lower sides of ridges and of darker colored Downs soils near the center of ridgetops. Also included are small areas of eroded soils where the surface layer is a mixture of the original surface layer, the subsurface layer, and the upper part of the subsoil. In these soils the surface layer is yellowish-brown light silty clay loam about 5 to 8 inches thick. Small areas of wet soils that are shown by a spot symbol on the detailed soil map, areas of soils that have a subsoil of heavy silty clay loam, and a few areas of nearly level soils are also included.

The main concern of management is erosion. Most areas of this soil are in cultivated crops. Other areas are in pasture or woodland. If erosion is controlled, this soil is well suited to crops commonly grown in the county. It is also suited to vegetable and orchard crops. Capability unit IIe–1.

280C2—Fayette silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas that are mainly on sides of drainageways, but a few areas are on ridges. It has a profile similar to the one described as representative of the series, but in most areas the plow layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of Hickory soils and of cherty silt loam Goss soils on the lower sides of ridges and drainageways. Also included are small areas of soils that have a thinner subsoil and have gray material below a depth of 35 inches.

The main concern of management is erosion, but slope is also a concern. Most areas of this soil are in cultivated crops, and other areas are in pasture or woodland. If erosion is controlled, this soil is suited to crops commonly grown in the county. It is well suited to pasture, orchards, and woodland. Capability unit IIIe–1.

280C3—Fayette soils, 7 to 12 percent slopes, severely

eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer and subsurface layer are less than 3 inches thick, and in cultivated areas, the plow layer is mainly subsoil material and is dark yellowish-brown light silty clay loam or dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Hickory soils that formed in clay loam glacial till. Also included are small areas, on the lower sides of drainageways, of cherty silty clay Goss soils and soils that have gray silty clay till on the surface. Areas of soils that have gray or limy silty material below a depth of 35 inches are also included.

The main concerns of management are erosion and tilth, but slope is also a concern. About half the acreage of this soil is in cultivated crops. The rest is in hay or pasture. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit IVe–1.

280D2—Fayette silt loam, 12 to 18 percent slopes, eroded. This soil is in small to large areas on sides of stream valleys. It has a profile similar to the one described as representative of the series, but the surface layer, subsurface layer, and subsoil are thinner. In cultivated areas the surface layer is a mixture of the original surface layer, the subsurface layer, and some subsoil.

Included with this soil in mapping are small areas of Hickory soils that formed in clay loam glacial till and of cherty silt loam Goss soils on the lower part of the valley sides. Also included are small areas of soils that have gray silty clay till on the surface and areas of soils that have limestone at or near the surface that are shown by a spot symbol on the detailed soil map. Areas of soils that have limy silty material below a depth of 35 inches are also included.

The main concerns of management are erosion and slope. Most areas of this soil are in hay, pasture, or woodland. The rest is in cultivated crops. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit IVe–1.

280D3—Fayette soils, 12 to 18 percent slopes, severely eroded. This soil is in small to large areas on sides of stream valleys. In places, it is on only the upper and middle parts of the sides. This soil has a profile similar to the one described as representative of the series, but the surface layer is mainly subsoil material that is dark yellowish-brown light silty clay loam or dark grayish-brown silt loam. Also, the subsoil is several inches thinner, and where this soil is not cultivated, the surface layer and the subsurface layer are less than 3 inches thick.

Included with this soil in mapping are small areas of Hickory soils that formed in clay loam glacial till. Also included are small areas, on the lower part of the valley sides, of severely eroded Goss soils and soils that have gray silty clay till on the surface. Areas of soils that have limy silty material below a depth of 35 inches, small areas of soils that have a slope of 25 to 45 percent, and other small areas of soils that have escarpments and limestone outcrops are also included.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are in cultivated crops, and the rest is in hay or pasture. This soil is suited to hay, pasture, and woodland. Capability unit VIe–1.

936D2—Fayette-Hickory complex, 12 to 18 percent slopes, eroded. This complex consists of about 60 percent Fayette silt loam and about 40 percent Hickory loam. These soils are in medium areas on sides of valleys cut by streams. Few to many pebbles and small stones are on the surface of the Hickory soils that are on the lower part of the valley sides.

The soils in this complex have a profile similar to the one described as representative of their series, but the surface layer is about 6 inches thick, and in places the subsoil is exposed. Included in mapping are small areas of soils that have a thicker surface layer and small areas of Ursa soils.

The main concerns of management are erosion and slope. The soils in this complex are suited to hay, pasture, and woodland. Capability unit IVe–1.

936D3—Fayette-Hickory complex, 12 to 25 percent slopes, severely eroded. This complex consists of about 55 percent Fayette soils and about 45 percent Hickory soils. These soils are in small to medium areas on sides of valleys cut by streams. Common to many pebbles and small stones are on the surface of the Hickory soils that are on the lower part of the valley sides.

The soils in this complex have a profile similar to the one described as representative of their series, but in about 60 percent of the acreage the subsoil is exposed and in about 40 percent the surface layer is silt loam and loam. Included in mapping are small areas of Ursa soils.

The main concerns of management are erosion and slope. The soils in this complex are suited to pasture and woodland. In many places the establishment of pasture is difficult because of the silty clay loam or clay loam surface layer. Capability unit VIe–1.

Fishhook Series

The Fishhook series consists of deep, somewhat poorly drained, moderately sloping to moderately steep soils on uplands. These soils formed in loess and clayey buried soils in glacial drift. They are on sides of drainageways, commonly near the drainageway head. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. For 17 inches it is brown heavy silty clay loam mottled with grayish brown. For about 9 inches it is gray silty clay loam mottled with light brownish gray. Below that for 29 inches it is dark gray and gray heavy clay loam and clay.

Fishhook soils are moderately low in organic-matter content. They have slow permeability and a high available water capacity.

Less sloping, eroded Fishhook soils are suited to row crops if erosion is controlled. More strongly sloping or severely eroded Fishhook soils are suited to hay, pasture, and woodland.

Representative profile of Fishhook silt loam, 4 to 7 percent slopes, eroded, 1,260 feet north and 455 feet east of the southwest corner of NW¼ sec. 8, T. 1 N., R 6 W., in a formerly cultivated pasture:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) heavy silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

B21t—5 to 10 inches, brown (10YR 5/3) heavy silty clay loam; few, fine, faint, yellowish-brown (10YR 5/6) mottles; moderate and strong, fine, angular blocky structure; firm; thin, continuous, brown (10YR 4/3) clay films on faces of peds; few concretions of iron and manganese; medium acid; clear, smooth boundary.

B22t—10 to 22 inches, brown (10YR 5/3) heavy silty clay loam; common, medium, faint, grayish-brown (10YR 5/2) and common, medium, faint, yellowish-brown (10YR 5/6) mottles; weak, medium and coarse, angular blocky structure; firm; thin, continuous, brown (10YR 4/3) and few spots of dark-gray (10YR 4/1) clay films on faces of peds; common concretions of iron and manganese; strongly acid; clear, smooth boundary.

B22tg—22 to 31 inches, gray (10YR 5/1) heavy silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) and common, medium, faint, light brownish-gray (10YR 6/2) mottles; weak, fine, prismatic structure; firm; thin, continuous, dark-gray (10YR 4/1) clay films on faces of peds; few concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIB21tg—31 to 44 inches, dark-gray (10YR 4/1) heavy clay loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure; firm; moderately thick black (10YR 2/1) coatings on faces of peds and on channel fillings; few, large concretions of iron and manganese; slightly acid; clear, smooth boundary.

IIB22tg—44 to 55 inches, gray (10YR 5/1) light clay; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, prismatic structure; very firm; thin, continuous light-gray (10YR 6/1) clay films on faces of peds; few concretions of iron and manganese; neutral, gradual, smooth boundary.

IIB23tg—55 to 60 inches, gray (5Y 5/1) heavy clay loam to light clay; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine and medium, angular blocky structure; firm; thin, discontinuous, dark-gray (5Y 4/1) clay films on faces of peds; few concretions of iron and manganese; mildly alkaline.

The solum is commonly more than 60 inches thick. The Ap horizon is dark grayish-brown or brown silt loam. The B2 horizon is heavy silty clay loam or light silty clay. The combined A and B horizons are 20 to 40 inches thick. The IIB2 horizon is heavy silty clay loam or heavy clay loam to silty clay or clay. The B horizon is medium acid and strongly acid. The IIB horizon is slightly acid to medium acid in the upper part and becomes less acid with depth.

Fishhook soils are near Keomah, Atlas, Keller, and Blair soils on the landscape. They have a clayey IIB horizon that is lacking in the Keomah and Blair soils. Their A horizon and upper part of the B horizon have less sand and slightly less clay than Atlas soils. They are lighter in color in the Ap horizon than Keller soils.

6C2—Fishhook silt loam, 4 to 7 percent slopes, eroded. This soil is in small areas on sides of drainageways, commonly near the drainageway source. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Blair soils that have a clay loam subsoil. Also included are small areas of soils that have silty clay buried soils at depths of less than 20 inches or more than 40 inches and small areas of soils that have a dark-colored surface layer 6 to 10 inches thick.

The main concerns of management are erosion and a few areas of wet soils. Most areas of this soil are in cultivated crops. The rest is in pasture or woodland. If erosion is controlled and excess water is removed, this soil is suited to cultivated crops and to pasture and woodland. Capability unit IIIe–7.

6C3—Fishhook soils, 4 to 7 percent slopes, severely eroded. This soil is in small areas on sides of drainageways, commonly near the drainageway source. It has a profile similar to the one described as representative of the series, but the surface layer is brown silty clay loam or dark grayish-brown silt loam.

Included with this soil in mapping are areas of severely eroded Coatsburg and Keller soils and small areas of Blair soils that have a clay loam subsoil. Also included in mapping are small areas of soils that have silty clay buried soils within depths of less than 20 inches or more than 40 inches.

The main concerns of management are erosion, tilth, and some small areas of wet soils. This soil is used mainly for cultivated crops. A few areas are used for pasture. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland if excess water is removed. Capability unit IVe–7.

6D2—Fishhook silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways, commonly near the drainageway source. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thinner.

Included with this soil in mapping are small areas of severely eroded soils that have a surface layer of silty clay loam. Also included are a few small areas of soils that have shale on the surface, shown by a spot symbol on the detailed soil map. Small areas of soils that have a subsoil of sandy clay loam are also included.

The main concerns of management are erosion, slope, and a few small areas of wet soils. Most areas of this soil are used for cultivated crops or for pasture. A few areas are in woodland. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland if excess water is removed. Capability unit IVe–7.

6D3—Fishhook soils, 7 to 12 percent slopes, severely eroded. This soil is in small to medium areas on sides of drainageways, commonly near the drainageway source. It has a profile similar to the one described as representative of the series, but the surface layer is brown silty clay loam and dark grayish-brown silt loam.

Included with this soil in mapping are areas of severely eroded Keller soils and small areas of moderately well drained Ursa soils. Also included are some small areas of wet soils, sandy soils, and soils that have limestone outcrops. They are shown by a spot symbol on the detailed soil map. A few small areas of soils that have a subsoil of sandy clay loam are also included.

Most areas of this soil are used for crops. Other areas are used for hay or pasture. This soil is suited to hay, pasture, and woodland. The main concerns of management are erosion and tilth. Slope and small areas of wet soils are also concerns. Capability unit VIe–7.

6E2—Fishhook silt loam, 12 to 18 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is thinner and has more yellowish-brown mottles. About 50 percent of the acreage of this soil is severely

eroded and has a surface layer of silty clay loam and silt loam.

Included with this soil in mapping are small areas of moderately well drained Ursa soils. Small areas of soils that have a subsoil of light clay loam are also included.

The main concerns of management are erosion, tilth, and slope. Most areas of this soil are used for hay, pasture, or woodland. A few small areas are used for cultivated crops. This soil is suited to hay, pasture, and woodland. Capability unit VIe–7.

Gorham Series

The Gorham series consists of deep, poorly drained, nearly level soils that formed in alluvium. These soils are mainly on the Mississippi River flood plain.

In a representative profile the surface layer is very dark gray silty clay loam about 18 inches thick. The subsoil is dark-gray light silty clay loam about 22 inches thick. It has gray and dark yellowish-brown mottles in the upper 14 inches. Below that for about 8 inches it is dark-gray and gray heavy sandy loam. Underlying the subsoil is grayish-brown sand that extends to a depth of about 60 inches.

Gorham soils are high in organic-matter content. They have moderately slow permeability and a moderate to high available water capacity.

These soils are suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Gorham silty clay loam, 925 feet north and 555 feet west of the southeast corner of sec. 34, T. 2 S., R. 9 W., in a cultivated area:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silty clay loam; weak, fine, granular structure; firm; slightly acid; abrupt, smooth boundary.

A11—8 to 18 inches, very dark gray (10YR 3/1) silty clay loam; moderate, medium, angular blocky structure; firm; slightly acid; clear, smooth boundary.

B21g—18 to 32 inches, dark-gray (10YR 4/1) light silty clay loam; common, fine, faint, gray (10YR 5/1) and common, fine, distinct, dark, yellowish-brown (10YR 3/4) mottles; weak, medium, subangular blocky structure; firm; slightly acid; clear, smooth boundary.

B22g—32 to 40 inches, dark-gray (10YR 4/1) and gray (10YR 5/1) heavy sandy loam; weak, medium, angular blocky structure; very friable; neutral; clear, smooth boundary.

IIC—40 to 60 inches, grayish-brown (2.5Y 5/2) medium sand; single grained; loose; neutral.

The solum is commonly 35 to 50 inches thick, but in places it is as much as 60 inches thick. The A horizon is 10 to 24 inches thick. It is mainly very dark gray, but it is also black and very dark grayish-brown. The lower parts of the B horizons combined are more than 6 inches thick. They are sandy clay loam to loamy sand. The solum is slightly acid to mildly alkaline.

Gorham soils are near Riley and Beaucoup soils on the landscape. They are more poorly drained than Riley soils. Their A and B horizons combined are thicker than those of Riley soils, and the lower part of their B horizon has more sand and less clay than Beaucoup soils.

162—Gorham silty clay loam. This soil is mainly in medium to large areas on the Mississippi River flood plain, and it has a slope of 0 to 2 percent. Included in mapping are a few areas of soils that have a surface layer of clay loam, a thinner subsoil, or underlying material of loam or sandy clay loam. Also included are small areas of sandy and wet soils that are shown by a spot symbol on the detailed soil map. A few areas of soils that have a layer of sand less than 6 inches thick in the upper part of the subsoil are also included.

The main concerns of management are excess water, flooding, and tilth. This soil is used mainly for cultivated crops. It is well suited to cultivated crops if excess water is removed and if protected from flooding. Capability unit IIw–2.

Gosport Series

The Gosport series consists of moderately deep, moderately well drained, moderately steep to steep soils on uplands. These soils formed in thin loess and shales that had some interbedded sandstone and limestone. They are on sides of stream valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is very dark grayish-brown silt loam about 3 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is about 26 inches thick. For about 10 inches it is yellowish-brown heavy silt loam and heavy silty clay loam. For the next 5 inches it is yellowish-brown silty clay. Below that for about 11 inches it is yellowish-brown and light olive-brown light silty clay. The underlying material is light olive-brown and olive shale that can be dug (with difficulty) with a spade. It extends to a depth of about 44 inches.

Gosport soils are moderately low in organic-matter content. They have very slow permeability and a moderate available water capacity.

These soils are suited to hay, pasture, and woodland.

Representative profile of Gosport silt loam, 18 to 50 percent slopes, eroded, 1,320 feet north and 1,150 feet east of the southwest corner of NW¼ sec. 14, T. 2 S., R. 6 W., in a wooded area:

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; common sand grains; moderate, very fine, granular structure; friable; few, very small chert pebbles; strongly acid; clear, wavy boundary.

A2—3 to 7 inches, brown (10YR 4/3) silt loam; common sand grains; small brown (10YR 5/3) patches; moderate, thin, platy structure; friable; few, very small chert pebbles; very strongly acid; clear, smooth boundary.

B1—7 to 10 inches, yellowish-brown (10YR 5/4) heavy silt loam; moderate, fine and very fine, subangular blocky structure; friable; very few chert pebbles; few mica flakes; very strongly acid; clear, smooth boundary.

IIB21—10 to 17 inches, yellowish-brown (10YR 5/4) heavy silty clay loam; moderate, fine and medium, subangular blocky structure; firm; very few chert pebbles; common mica flakes; very strongly acid; clear, smooth boundary.

IIB22—17 to 22 inches, yellowish-brown (10YR 5/4) silty clay; patchy; very pale brown (10YR 7/3) dry, silt grains on faces of peds; strong, medium, subangular and angular blocky structure; firm; very few, small chert pebbles; few fragments of shale (can be broken with fingers); extremely acid; clear, smooth boundary.

IIB3—22 to 33 inches, yellowish-brown (10YR 5/4) and light olive-brown (2.5Y 5/4) light silty clay; patchy, dark brown to brown (10YR 4/3) coatings or clay films on faces of peds; moderate, medium and coarse, angular blocky structure; firm; many shale fragments, most of which have thin to thick weathered rinds; extremely acid; gradual, wavy boundary.

C—33 to 44 inches, light olive-brown (2.5Y 5/3) and olive (5Y 5/4) shale; breaks into half-inch to 3-inch shale fragments; can be dug (with difficulty) with a spade; extremely acid.

The solum is commonly 25 to 30 inches thick, but in places it is 20 to 40 inches thick. Depth to material that is predominately shale is commonly 10 to 15 inches. The A1 horizon is typically very dark grayish brown, but it is dark brown, very dark gray, and very dark grayish brown in places. It is commonly silt loam, but it is loam, sandy loam, and silty clay loam in places. Some profiles have an A2 horizon that is dark grayish brown to brown and that is as much as 7 inches thick. The A2 horizon is similar in texture to the A1 horizon. The B horizon is heavy silty clay loam to silty clay or clay. It is strongly acid to extremely acid.

Gosport soils are near Hickory, Ursa, and Camden soils on the landscape. They have more clay in the B horizon than Hickory and Camden soils. Unlike Ursa soils, they have partly weathered shale fragments in the lower part of the B horizon and unweathered shale below the B horizon.

551E2—Gosport silt loam, 12 to 18 percent slopes, eroded. This soil is in medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer and subsurface layer are a few inches thinner, and the subsoil is a few inches thicker. In cultivated areas the surface layer and subsurface layer are mixed with some of the subsoil.

Included with this soil in mapping are small areas of Hickory soils that have a surface layer of loam. Also included are small areas of soils where the surface layer is up to 5 inches thicker and small areas of soils that have a reddish-brown subsoil. Some areas of soils that have slightly acid to moderately alkaline material underlying the subsoil are also included.

The main concerns of management are erosion and slope. This soil is used mainly for hay, pasture, and woodland. Some areas are used for cultivated crops. It is suited to hay, pasture, and woodland. Capability unit VIe–2.

551E3—Gosport soils, 12 to 18 percent slopes, severely eroded. This soil is on sides of drainageways. Most areas are medium in size, but a few are small. This soil has a profile similar to the one described as representative of the series, but the surface layer and subsurface layer are less than 3 inches thick, and the subsoil is a few inches thicker. In cultivated areas the surface layer is mainly subsoil material and is yellowish-brown silty clay loam and dark grayish-brown silt loam.

Included with this soil in mapping are small areas of Hickory clay loam. Also included are small areas of soils that have a surface layer of silt loam and other areas of soils that have reddish-brown subsoil. Areas of soils that have slightly acid to moderately alkaline material underlying the subsoil are also included.

The main concerns of management are erosion, slope, and tilth. This soil is used mainly for hay and pasture. Small areas are used for cultivated crops. This soil is suited to pasture and woodland. Capability unit VIIe–2.

551F2—Gosport silt loam, 18 to 50 percent slopes, eroded. This soil is in small to large areas on sides of stream valleys. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Hickory soils that have a surface layer of loam. Also included are small areas of severely eroded soils that have shale, limestone, or sandstone bedrock on the surface. These areas are shown by a spot symbol on the detailed soil map. Areas of soils that have slightly acid to moderately alkaline material underlying the subsoil are also included.

The main concerns of management are erosion and slope. Soil slips are a hazard in some places. This soil is used mainly for pasture and woodland and is better suited for these than for other uses. Capability unit VIIe–2.

Goss Series

The Goss series consists of deep, well-drained, moderately steep to very steep soils on uplands, mainly in the southwestern part of the county. These soils formed in material weathered from cherty limestone bedrock. They are on sides of stream valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is brown cherty silt loam about 7 inches thick. The subsoil extends to a depth of about 100 inches. For about 4 inches it is reddish-brown cherty heavy loam. For the next 19 inches it is reddish-brown cherty silty clay. The next 50 inches is reddish-brown cherty clay. Below that for about 20 inches it is olive-brown cherty silty clay.

Goss soils are low in organic-matter content. They have moderate permeability and a low available water capacity.

These soils are suited to woodland and pasture.

Representative profile of Goss cherty silt loam, 15 to 50 percent slopes, in an area 1,145 feet west and 25 feet south of the northeast corner of NW¼ sec. 30, T. 3 S., R. 6 W.:

A1—0 to 7 inches, brown (7.5YR 4/2) cherty silt loam; weak, fine, granular structure; friable; slightly acid; clear, wavy boundary.

B1—7 to 11 inches, reddish-brown (5YR 4/3)cherty heavy loam; moderate, very fine, angular blocky structure; firm; 10 percent content of small chunks of dark-brown to brown (7.5YR 4/2) silt loam; medium acid; clear, wavy boundary.

B21t—11 to 19 inches, reddish-brown (5YR 4/4) cherty silty clay; moderate, very fine, angular blocky structure; firm; 5 percent content of small chunks of dark-brown to brown (7.5YR 4/2) silt loam; chert fragments as much as 4 inches in diameter; few rounded chert pebbles; continuous reddish-brown (5YR 4/4) clay films on faces of peds and chert fragments; medium acid; gradual, wavy boundary.

B22t—19 to 30 inches, reddish-brown (5YR 4/3) cherty silty clay; moderate, very fine, angular blocky structure; firm; chert fragments as much as 4 inches in diameter; few rounded chert pebbles; continuous reddish-brown (5YR 4/3) clay films on faces of peds and chert fragments; strongly acid; gradual, wavy boundary.

B23t—30 to 47 inches, reddish-brown (5YR 4/3) cherty clay; moderate, very fine, angular blocky structure; firm; chert fragments as much as 4 inches in diameter; few rounded chert pebbles; discontinuous reddish-brown (2.5YR 4/4) clay films on chert fragments; strongly acid; gradual, wavy boundary.

B24t—47 to 62 inches, reddish-brown (5YR 4/3) cherty clay; moderate, very fine, angular blocky structure; firm; chert fragments as much as 6 inches in diameter; few rounded chert pebbles; discon-

tinuous reddish-brown (5YR 4/3) clay films on chert fragments; strongly acid; gradual, wavy boundary.

B25t—62 to 80 inches, reddish-brown (5YR 4/3) and dark reddish-brown (5YR 3/3) cherty clay; moderate, very fine, angular blocky structure; firm; chert fragments as much as 6 inches in diameter; very few rounded pebbles; discontinuous reddish-brown (5YR 4/3) clay films on chert fragments; strongly acid; gradual, wavy boundary.

B26t—80 to 100 inches, olive-brown (2.5Y 3/4) cherty silty clay; moderate, very fine, angular blocky structure; firm; chert fragments as much as 8 inches in diameter; patchy olive-brown (2.5YR 3/4) clay films on chert fragments; slightly acid.

The solum is 60 inches to more than 100 inches thick. The A1 horizon is dark grayish-brown, brown, dark-brown, and very dark brown cherty silt loam or silt loam and is 2 to 7 inches thick. Some profiles have an A2 horizon that is mainly brown cherty silt loam, silt loam, or loam. The B horizon is cherty silty clay and cherty clay. It has a chert content of 50 to 80 percent. The B horizon is mainly slightly acid to strongly acid and commonly becomes less acid in the lower part.

Goss soils are near Baylis, Fayette, and Clinton soils on the landscape. They have a cherty texture throughout the B horizon that is lacking in those soils.

606F—Goss cherty silt loam, 15 to 50 percent slopes. This soil is in medium to large areas on the bluff bordering the Mississippi River flood plain and on sides of small and medium-sized stream valleys (fig. 8). Included in mapping are small areas of soils that have limestone rock outcrops and other areas of severely eroded soils that have a surface layer of cherty silty clay loam. These areas are shown by a spot symbol on the detailed soil map. Also included are areas of soils where the upper part of the subsoil is silty clay loam and the lower part of the subsoil is cherty silt loam to cherty sandy loam. A few areas of soils that have a slope of 50 to 60 percent are also included.

Figure 8.—A recent road cut in a steep area of Goss cherty silt loam.

The main concerns of management are erosion, droughtiness, stones on the surface, and slope. Most areas of this soil are used for pasture or woodland. It is better suited to woodland than to other uses. If woodland is cleared, erosion is a severe hazard. Capability unit VIIs–2.

Hamburg Series

The Hamburg series consists of deep, somewhat excessively drained, very steep soils on uplands. These soils formed in loess. They are mostly on the bluff bordering the Mississippi River flood plain and on nearby very steep valley sides. They are commonly on the upper part of the valley sides. The native vegetation was prairie grasses, hardwood forests, and redcedar.

In a representative profile the surface layer is very dark grayish-brown silt loam about 4 inches thick. The underlying material is brown and pale-brown silt loam. It extends to a depth of about 50 inches. In the lower 25 inches it has light brownish-gray mottles.

Hamburg soils are moderately low in organic-matter content. They have moderate permeability and a moderate available water capacity. These soils are suited to pasture, wildlife, and scenic purposes.

Representative profile of Hamburg silt loam, 30 to 50 percent slopes, eroded, 1,110 feet east and 185 feet north of the southwest corner of sec. 1, T. 1 N., R. 9 W., in a pasture:

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, crumb structure; very friable; few, small and medium, concretions of lime; slight effervescence, mildly alkaline; clear, smooth boundary.

C1—4 to 13 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; few, small and medium, concretions of lime; strong effervescence, moderately alkaline; gradual, smooth boundary.

C2—13 to 25 inches, brown (10YR 5/3) silt loam; massive; very friable; few, small and medium, concretions of lime; strong effervescence, moderately alkaline; gradual, smooth boundary.

C3—25 to 35 inches, pale-brown (10YR 6/3) silt loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; massive; very friable; few, small and medium, concretions of lime; strong effervescence, moderately alkaline; gradual, smooth boundary.

C4—35 to 50 inches, brown (10YR 5/3) silt loam; many, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; massive; slightly hard when dry, very friable; few, small and medium, concretions of lime; few, soft, dark-colored accumulations of iron and manganese; strong effervescence, moderately alkaline.

The A horizon commonly is 2 to 5 inches thick. It is very dark grayish-brown, brown, and dark-brown silt loam. The C horizon is brown, pale brown or yellowish-brown silt loam or silt, and in places the lower part is mottled with relic gray colors. The combined A and C horizons are from 45 inches to many feet thick. These horizons are mildly alkaline to moderately alkaline and effervescent in hydrochloric acid.

Hamburg soils are near Timula, Seaton, and Hickory soils on the landscape. Unlike those soils, Hamburg soils have a profile that is mildly alkaline to moderately alkaline.

30F2—Hamburg silt loam, 30 to 50 percent slopes, eroded. This soil is in small areas on the bluff bordering the Mississippi River flood plain. Included in mapping are small areas of Timula soils. Also included are small areas of soils that have a slope of less than 30 percent.

The main concerns of management are erosion, slope, and droughtiness. Most areas of this soil are in grasses, and a few are in woodland. It is suited to pasture, wildlife habitat, and scenic purposes. Capability unit VIIe–1.

Haymond Series

The Haymond series consists of deep, well-drained, nearly level soils that formed in alluvium. These soils are mainly near streams, commonly in a natural levee position. They are also in and near areas where small- and medium-sized upland streams join the Mississippi River flood plain. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam 7 inches thick. The underlying material is brown silt loam that extends to a depth of 60 inches.

Haymond soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are suited to all crops commonly grown in the county if protected from flooding. In places the suitability of these soils is limited by small field size caused by meandering of streams that farm equipment cannot cross.

Representative profile of Haymond silt loam, 715 feet south and 100 feet west of the northeast corner of NW¼ sec. 15, T. 2 N., R. 8 W., in a cultivated field:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; neutral; clear, smooth boundary.

C1—7 to 14 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; few thin varves of brown (10YR 5/3) sandy loam; neutral; clear, smooth boundary.

C2—14 to 26 inches, brown (10YR 4/3) silt loam; very dark grayish-brown (10YR 3/2) exteriors of peds; weak, medium, granular structure; friable; neutral; clear, smooth boundary.

C3—26 to 38 inches, brown (10YR 4/3) silt loam; very weak, fine, subangular blocky structure; friable; neutral; gradual, smooth boundary.

C4—38 to 60 inches, brown (10YR 5/3) silt loam; very weak, medium, subangular blocky structure; friable; neutral.

The A horizon is 6 to 10 inches thick. The lower part of the C horizon is brown to grayish brown or is mottled. The A and C horizons are silt loam. They have thin strata of loam and sandy loam in places. The A and C horizons are neutral to medium acid.

Haymond soils are near Wakeland and Birds soils on the landscape, but they are better drained. Haymond soils are on flood plains in a position similar to that of Huntsville soils, but they are lighter in color in the A horizon and upper part of the C horizon than Huntsville soils.

331—Haymond silt loam. This soil is in medium to large areas on flood plains of small and medium-sized streams and of the Mississippi River (fig. 9). Included in mapping are a few areas of soils that have free carbonates in the surface layer and in the underlying material. These areas are shown by a calcareous spot symbol on the detailed soil map. Also included are small areas of soils that have sand, chert, and gravel fragments and limestone bedrock on the surface, shown by a spot symbol on the detailed soil map, and small to medium areas where the soils have a very dark grayish-brown plow layer.

The main concern of management is flooding. Most areas of this soil are used for cultivated crops. A few small areas are used for pasture or woodland. This soil is well suited to all crops commonly grown in the county if protected from flooding. Capability unit I–3.

Herrick Series

The Herrick series consists of deep, somewhat poorly drained, nearly level and gently sloping soils on uplands. These soils formed in loess. They are mostly on medium and wide drainage divides. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark gray silt loam about 12 inches thick. The subsurface layer is dark-gray and very dark gray silt loam about 4 inches thick. The subsoil is about 43 inches thick. For about 20 inches it is grayish-brown and light brownish-gray heavy silty clay loam mottled with yellowish brown. Below that for about 23 inches it is light brownish-gray and light olive-gray silty clay loam. The underlying material is light olive-gray silt loam mottled with yellowish-brown. It extends to a depth of about 70 inches.

Herrick soils are moderate in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are suited to all crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Herrick silt loam, 0 to 2 percent slopes, 1,320 feet south and 230 feet west of the northeast corner of sec. 25, T. 1 N., R. 5 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—7 to 12 inches, very dark gray (10YR 3/1) silt loam; black (10YR 2/1) exteriors of peds; weak, medium, platy structure; friable; discontinuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; slightly acid; clear, smooth boundary.

A3—12 to 16 inches, dark-gray (10YR 4/1) and very dark gray (10YR 3/1) silt loam; very dark gray (10YR 3/1) exteriors of peds; moderate, medium, subangular blocky structure and angular blocky that has a weak platy tendency; friable; nearly continuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; clear, smooth boundary.

B1t—16 to 19 inches, dark-gray (10YR 4/1) and very dark gray (10YR 3/1) light silty clay loam; many, fine, distinct, brown (10YR 5/3) mottles; moderate, fine, angular blocky structure; firm; few, light-gray (10YR 7/1), dry, silt grains on faces of peds in upper part; medium acid; clear, smooth boundary.

B21t—19 to 22 inches, grayish-brown (10YR 5/2) heavy silty clay loam; many, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, angular blocky structure; firm; continuous very

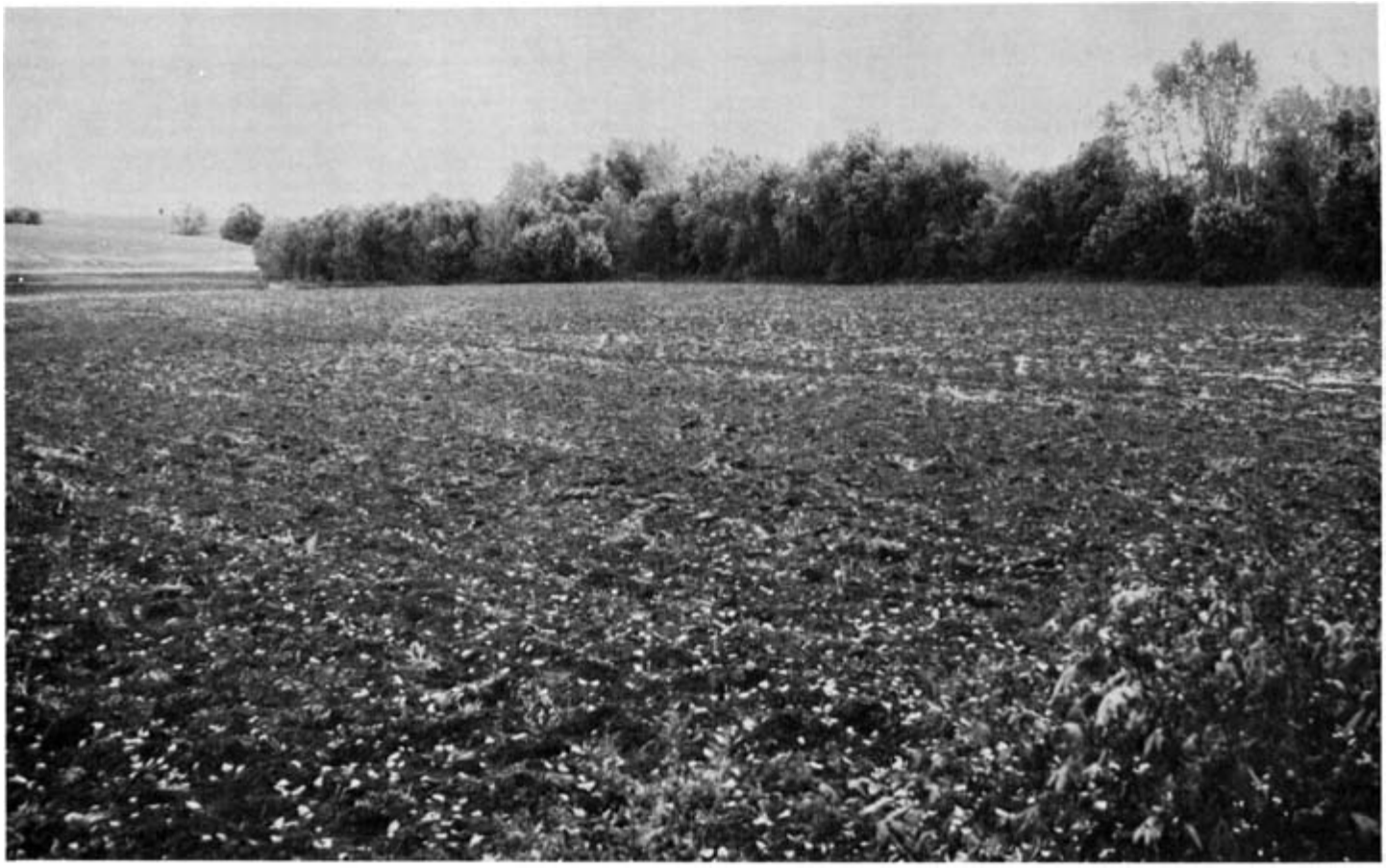

Figure 9.—**An area of Haymond silt loam. Hickory soils are in the background.**

dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear, smooth boundary.

B22t—22 to 31 inches, grayish-brown (2.5Y 5/2) heavy silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/4) and common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine and medium, prismatic structure parting to weak, medium, angular blocky; firm; nearly continuous very dark gray (10YR 3/1) clay films on faces of peds and channel linings; medium acid; gradual, smooth boundary.

B23t—31 to 36 inches, light brownish-gray (2.5Y 6/2) heavy silty clay loam; many, fine, distinct, yellowish-brown (10YR 5/4) and common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure parting to weak, medium, angular blocky; firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds and channel linings; slightly acid; gradual, smooth boundary.

B31t—36 to 48 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, coarse, prismatic structure parting to weak, coarse, angular blocky; firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds and channel linings; slightly acid; gradual, smooth boundary.

B32—48 to 59 inches, light olive-gray (5Y 6/2) light silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds and channel linings; slightly acid; gradual, smooth boundary.

C—59 to 70 inches, light olive-gray (5Y 6/2) silt loam; many, medium, distinct, light olive-brown (2.5Y 5/4) and common, fine, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; few, very dark gray (10YR 3/1) channel linings; slightly acid.

The solum is 45 inches to more than 60 inches thick. The Ap and A12 horizons are 10 to 16 inches thick and are black or very dark gray silt loam. The A2 horizon is dark-gray, very dark gray, or dark grayish-brown silt loam 4 to 6 inches thick. The B2 horizon is heavy silty clay loam or light silty clay. The B horizon is mainly medium acid and strongly acid, but it becomes less acid in the lower part.

Herrick soils are near Virden, Ipava, and Clarksdale soils on the landscape. They are better drained than Virden soils. Unlike Ipava soils, they have an A2 horizon, and they have thicker dark-colored Ap horizons than Clarksdale soils.

46A—Herrick silt loam, 0 to 2 percent slopes. This soil is in medium to large areas on uplands. It has the profile described as representative of the series.

Included with this soil in mappping are areas of Ipava soils. Also included are areas of soils that are poorly drained, small areas of soils that have high exchangeable sodium, and small wet spots that are shown by a spot symbol on the detailed soil map. The areas of soils that have exchangeable sodium have slow permeability.

The main concern of management is excess water. Most areas of this soil are in cultivated crops. This soil

is well suited to crops commonly grown in the county if excess water is removed. Capability unit I–7.

46B—Herrick silt loam, 2 to 4 percent slopes. This soil is in small to large areas on ridges and the sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is slightly thinner and has more yellowish-brown colors.

Included with this soil in mapping are small areas of Ipava soils that have a thicker dark-colored surface layer. Also included are areas of Clarksdale soils that have a thinner dark-colored surface layer and small areas of eroded soils.

The main concerns of management are excess water and a slight hazard of erosion. Most areas of this soil are used for cultivated crops. This soil is well suited to crops commonly grown in the county if excess water is removed and erosion is controlled. Capability unit IIe–13.

Hickory Series

The Hickory series consists of deep, well drained and moderately well drained, strongly sloping to very steep soils that formed in glacial till. They are mostly on the sides of stream valleys, commonly on the middle and lower parts. The native vegetation was hardwood forests.

The surface layer is very dark brown and very dark grayish-brown loam about 4 inches thick. The subsurface layer is brown and grayish brown loam about 7 inches thick. The subsoil is about 37 inches thick. For about 20 inches it is yellowish-brown clay loam. For about 7 inches it is brown clay loam mottled with light brownish gray. Below that for about 10 inches it is brown light clay loam mottled with light brownish gray. The underlying material is brown loam. It extends to a depth of 58 inches.

Hickory soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are suited mainly to hay, pasture, and woodland.

Representative profile of Hickory loam, 18 to 30 percent slopes, 785 feet west and 170 feet south of the northeast corner of SW¼ sec. 21, T. 1 N., R. 7 W., in a wooded area:

A11—0 to 2 inches, very dark brown (10YR 2/2) loam; moderate, fine, crumb structure; friable; medium acid; abrupt, smooth boundary.

A12—2 to 4 inches, very dark grayish-brown (10YR 3/2) loam and 30 percent brown (10YR 5/3) loam; weak, medium, crumb structure; friable; very strongly acid; clear, smooth boundary.

A21—4 to 8 inches, brown (10YR 5/3) and grayish-brown (10YR 5/2) loam; 10 percent very dark grayish-brown (10YR 3/2) fine to medium chunks and coatings on faces of peds; very weak, medium, platy structure parting to weak, medium, granular; friable; very strongly acid; clear, smooth boundary.

A22—8 to 11 inches, brown (10YR 5/3) loam; 3 percent very dark grayish-brown (10YR 3/2) hole fillings; very weak, medium, platy structure and weak, fine, subangular blocky; friable; very strongly acid; clear, smooth boundary.

B1t—11 to 16 inches, yellowish-brown (10YR 5/4) heavy loam; moderate, fine, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—16 to 23 inches, yellowish-brown (10YR 5/4) clay loam; moderate and strong, fine, angular blocky structure; firm; thin, continuous, brown (10YR 5/3) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

B22t—23 to 31 inches, yellowish-brown (10YR 5/4) clay loam; moderate, fine and medium, angular blocky structure; firm; thin, continuous, brown (10YR 5/3) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B23t—31 to 38 inches, brown (10YR 5/3) clay loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; moderate, medium, angular blocky structure; firm; thin, discontinuous clay films, ranging to dark grayish-brown, on faces of peds; common, small accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

B3t—38 to 48 inches, brown (10YR 5/3) light clay loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) and few, medium, prominent, strong-brown (7.5YR 5/8) mottles; weak, medium, angular blocky structure; firm; few, dark-brown (10YR 3/3) clay films on faces of peds and channel linings; slightly acid; abrupt, wavy boundary.

C—48 to 58 inches, brown (10YR 5/3) loam; massive; firm; common, secondary lime concretions; mildly alkaline.

The solum is 42 to 70 inches thick. The A1 horizon is about 4 inches thick. It is very dark brown or very dark grayish-brown loam or silt loam. Where plowed, the color is dark grayish brown or brown. The subsurface layer is commonly 3 to 7 inches thick. It is brown or yellowish-brown loam or silt loam. The B2 horizon is commonly medium clay loam, but in places the horizon of maximum clay is heavy clay loam. The lower part of the B horizon is free of mottles in places. The B horizon is slightly acid to very strongly acid. The C horizon is medium acid to moderately alkaline.

Hickory soils are near Ursa, Atlas, and Blair soils on the landscape. Their B2 horizon has less clay than Ursa and Atlas soils. Hickory soils are better drained than Atlas and Blair soils.

8C2—Hickory loam, 7 to 12 percent slopes, eroded. This soil is in small to large areas on sides of small streams and drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is 3 to 5 inches thinner. In cultivated areas the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of somewhat poorly drained Blair soils. Also included are small areas of soils that have a subsoil of grayish silty clay and other areas of soils that have a subsoil of sandy clay loam. Areas of severely eroded soils where the surface layer is mainly yellowish-brown clay loam are also included.

The main concerns of management are erosion and slope. This soil is used mainly for hay, pasture, and woodland. Some areas are used for cultivated crops. This soil is suited to crops if erosion is controlled. It is also well suited to hay, pasture, and woodland. Capability unit IIIe–1.

8C3—Hickory soils, 7 to 12 percent slopes, severely eroded. This soil is in small to large areas on sides of small streams and drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is yellowish-brown clay loam and dark grayish-brown loam.

Included with this soil in mapping are small areas of

Ursa soils that have slow to moderately slow permeability and of somewhat poorly drained Blair soils. Also included are areas of soils that have a subsoil of sandy clay loam. Small areas of soils that have limestone outcrops on the surface are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion, tilth, and slope. Most areas of this soil are used for cultivated crops. The rest are used for hay or pasture. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is better suited to hay, pasture, and woodland. Capability unit IVe–1.

8D2—Hickory loam, 12 to 18 percent slopes, eroded. This soil is in small to large areas on sides of small stream valleys. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsurface layer are 3 to 8 inches thinner. Where this soil is cultivated, the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of Ursa soils that have slow to moderately slow permeability and of somewhat poorly drained Blair soils. Also included are small areas of soils where the surface layer and the subsoil are sand and loamy sand. Small areas of soils that have chert fragments or limestone outcrops on the surface are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are used for pasture or woodland. A few areas are used for cultivated crops or hay. It is better suited to hay than to cultivated crops, to which it is poorly suited because erosion is difficult to control. It is well suited to pasture and woodland. Capability unit IVe–1.

8D3—Hickory soils, 12 to 18 percent slopes, severely eroded. This soil is in small to medium areas on sides of small stream valleys. It has a profile similar to the one described as representative of the series, but the combined thickness of the surface layer and subsurface layer is less than 3 inches. Where cultivated, the surface layer is mainly subsoil material and is yellowish-brown clay loam and dark-brown loam.

Included with this soil in mapping are small areas of Ursa soils that have slow to moderately slow permeability and of somewhat poorly drained Blair soils. Also included are small areas of soils that have a subsoil less than 10 inches thick. Small areas of soils that have limestone outcrops on the surface are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are used for hay or pasture. A few areas are used for cultivated crops. This soil is suited to hay and pasture. It is well suited to woodland. Capability unit VIe–1.

8E—Hickory loam, 18 to 30 percent slopes. This soil is in small to large areas on sides of stream valleys. It has the profile described as representative of the series (fig. 10).

Included with this soil in mapping are small areas of soils that have chert fragments or shale or limestone outcrops on the surface. These areas are shown by a spot symbol on the detailed soil map. Also included are small areas of soils that have a sandy or silty layer less than 6 inches thick in the surface layer or in the subsoil. About 10 percent of the soil mapped is severely eroded and the surface layer is silt loam to clay loam.

Figure 10.—**Profile of Hickory loam.**

The main concerns of management are erosion and slope. This soil is used mainly for pasture or woodland. It is well suited to these uses. If woodland is removed erosion is a severe hazard. Capability unit VIe–1.

8F—Hickory loam, 30 to 50 percent slopes. This soil is in small to large areas on sides of valleys of deeply entrenched streams. It has a profile similar to the one described as representative of the series, but the profile is a few inches thinner.

Included with this soil in mapping are areas of soils that have a subsoil of grayish silty clay and clay. Also included are small areas of soils that have a surface layer and subsurface layer of sandy loam and a subsoil of sandy clay loam. Small areas of severely eroded soils are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are used for woodland. Some areas are used for pasture. This soil is suited to pasture and is well suited to woodland. Capability unit VIIe–1.

Huntsville Series

The Huntsville series consists of deep, well drained and moderately well drained, nearly level soils that formed in alluvium. These soils are on the Mississippi River flood plain and on flood plains of small- and medium-sized streams of the upland. The native vegetation was prairie grasses and hardwood forests.

In a representative profile the surface layer is about 27 inches thick. For 10 inches it is very dark grayish-brown silt loam. Below that for 17 inches it is very dark brown silt loam. The underlying material extends to a depth of 70 inches. For about 5 inches it is dark-brown silt loam. For about 24 inches it is brown silt loam. Below that for about 14 inches it is dark-brown heavy silt loam.

Huntsville soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if protected from flooding.

Representative profile of Huntsville silt loam, 145 feet west and 936 feet north of the southeast corner of SW¼ sec. 35, T. 2 N., R. 9 W., in a cultivated field:

A11—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; slightly acid; smooth boundary.

A12—10 to 20 inches, very dark brown (10YR 2/2) silt loam; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

A13—20 to 27 inches, very dark brown (10YR 2/2) silt loam; very weak, medium and coarse, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

C1—27 to 32 inches, dark-brown (10YR 3/3) silt loam; very weak, coarse, angular blocky structure; friable; about 5 percent very dark grayish-brown (10YR 3/2) channel fillings; slightly acid; clear, smooth boundary.

C2—32 to 42 inches, brown (10YR 4/3) silt loam; very weak, coarse, angular blocky structure; friable; few, very dark grayish-brown (10YR 3/2) channel fillings and linings; slightly acid; gradual, smooth boundary.

C3—42 to 56 inches, brown (10YR 4/3) silt loam; very weak, coarse, angular blocky structure; friable; slightly acid; clear, smooth boundary.

C4—56 to 70 inches, dark-brown (10YR 3/3) heavy silt loam; very weak, coarse, subangular blocky structure; firm; few, light-gray (10YR 7/1), dry, silt grains on faces of peds; gradual, smooth boundary.

The A horizon and upper parts of the C horizon are 24 inches to more than 40 inches thick. They are dark in color. The A horizon is commonly very dark grayish brown, but in places is very dark brown, dark brown, and black. The C horizon is mottled below a depth of 30 inches in places. The A and C horizons are commonly slightly acid to mildly alkaline.

Huntsville soils are near Lawson, Haymond, and Worthen soils on the landscape. They are better drained than Lawson soils, and they are darker in color in the A horizon and upper parts of the C horizon than Haymond soils. Huntsville soils are similar in color and texture to Worthen soils, but they lack a B horizon and are weaker in structure in the lower parts of the A horizon.

77—Huntsville silt loam. This soil is in small to large areas on flood plains of the Mississippi River and other streams that drain the uplands, and it has a slope of 0 to 2 percent. Included in mapping are small areas of soils that have a surface layer and underlying material of sandy loam. Other areas of soils are included where the uppermost layer is dark grayish-brown and some very dark grayish-brown silt loam overwash 8 to 20 inches thick. Small areas of soils that have chert fragments or sand on the surface are shown by a spot symbol on the detailed soil map.

The main concern of management is flooding. Most areas of this soil are used for cultivated crops. A few areas are used for pasture. If protected from flooding, this soil is well suited to cultivated crops. Capability unit I–3.

Ipava Series

The Ipava series consists of deep, somewhat poorly drained, nearly level and gently sloping soils on uplands. These soils formed in loess and are on medium and wide drainage divides. The native vegetation was prairie grasses.

In a representative profile the surface layer is black silt loam about 15 inches thick. The subsoil is about 33 inches thick. For about 6 inches it is dark grayish-brown silty clay loam. For about 12 inches it is grayish brown heavy silty clay loam mottled with yellowish brown. Below that for about 15 inches it is grayish-brown and light-gray silty clay loam mottled with yellowish brown and strong brown. Underlying material extends to a depth of 60 inches. It is yellowish-brown silt loam mottled with grayish brown and yellowish brown.

Ipava soils are high in organic-matter content. They have moderate to moderately slow permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Ipava silt loam, 0 to 2 percent slopes, 460 feet west and 45 feet south of the northeast corner of SE¼ sec. 9, T. 2 N., R. 5 W., in a cultivated field:

Ap—0 to 7 inches, black (10YR 2/1) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A12—7 to 15 inches, black (10YR 2/1) silt loam; moderate, very fine, subangular blocky structure; friable; few, fine, dark concretions of iron and manganese; medium acid; clear, smooth boundary.

B1t—15 to 21 inches, dark grayish-brown (10YR 4/2) silty clay loam; very dark gray (10YR 3/1) exteriors of peds; moderate, fine and medium, subangular blocky structure; friable; few, medium, dark concretions of iron and manganese; medium acid; clear, smooth boundary.

B2t—21 to 33 inches, grayish-brown (10YR 5/2) heavy silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; very dark gray (10YR 3/1) and dark-gray (10YR 4/1) clay films on faces of peds; few, medium, dark concretions of iron and manganese; slightly acid; clear, smooth boundary.

B3t—33 to 48 inches, grayish-brown (10YR 5/2) and light-gray (10YR 6/1) silty clay loam; common, fine, distinct, strong-brown (7.5Y 5/6) and many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure; firm; very dark gray (10YR 3/1) and dark-gray (10YR 4/1) clay films on faces of peds; few, medium,

dark concretions of iron and manganese; slightly acid; gradual, smooth boundary.

C—48 to 60 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) mottles; massive; firm; few, fine, dark concretions of iron and manganese; neutral.

The solum is 45 to 60 inches thick. The A1 horizon is 14 to 18 inches thick where uneroded. It is commonly black, very dark gray, or very dark grayish brown. The B2 horizon is heavy silty clay loam or light silty clay. The B horizon is medium acid and slightly acid, and it becomes less acid with depth.

Ipava soils are near Virden, Tama, and Clarksdale soils on the landscape. They are better drained than Virden soils and more poorly drained than Tama soils. Ipava soils lack the A2 horizon that is in Clarksdale soils. Ipava soils have a profile similar to that of Muscatine soils, but their B2 horizon has more clay.

43A—Ipava silt loam, 0 to 2 percent slopes. This soil is in medium to large areas on medium to wide drainage divides. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of soils that have a subsurface layer and of poorly drained Virden soils. Also included are well drained and moderately well drained soils. Small areas of wet soils are shown by a spot symbol on the detailed soil map.

The main concern of management is excess water. Most areas of this soil are used for cultivated crops. Some areas are used for pasture. This soil is well suited to cultivated crops. Capability unit I–5.

43B—Ipava silt loam, 2 to 4 percent slopes. This soil is in small to large areas on ridges and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner. Included in mapping are small areas of Clarksdale soils that have a thick subsurface layer and of Herrick soils that have a thin subsurface layer.

Minor concerns of management are excess water and erosion. This soil is used mainly for cultivated crops. It is well suited to all crops commonly grown in the county. Capability unit IIe–5.

Joy Series

The Joy series consists of deep, somewhat poorly drained, nearly level soils on uplands. These soils formed in loess. They are commonly near the center of medium and wide drainage divides. The native vegetation was prairie grasses.

In a representative profile the surface layer is black silt loam about 18 inches thick. The subsoil is about 34 inches thick. For 5 inches it is very dark gray and brown heavy silt loam. For 18 inches it is yellowish-brown and grayish-brown heavy silt loam. Below that for about 11 inches it is light olive-gray silt loam mottled with yellowish brown. The underlying material extends to a depth of 70 inches. It is gray silt loam mottled with yellowish brown.

Joy soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if adequately drained.

Representative profile of Joy silt loam, 1,940 feet west and 680 feet north of the southeast corner of NW¼ sec. 31, T. 1 N., R. 8 W., in a cultivated field:

Ap—0 to 7 inches, black (10YR 2/1) silt loam; weak, very fine, granular structure; friable; slightly acid; clear, smooth boundary.

A1—7 to 13 inches, black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; widely scattered, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; clear, smooth boundary.

A3—13 to 18 inches, black (10YR 2/1) heavy silt loam; common, fine, distinct, brown (10YR 5/3) mottles; moderate, very fine, subangular blocky structure; friable; widely scattered, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; clear, smooth boundary.

B1—18 to 23 inches, mixed very dark gray (10YR 3/1) and brown (10YR 5/3) heavy silt loam; common, fine, faint, dark grayish-brown (10YR 4/2) mottles; moderate, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21—23 to 30 inches, yellowish-brown (10YR 5/4) heavy silt loam; many, fine, distinct, grayish-brown (10YR 5/2) and common, fine, distinct, very dark gray (10YR 3/1) mottles; moderate, fine, subangular blocky structure; friable; very dark gray (10YR 3/1) channel linings and fillings; medium acid; clear, smooth boundary.

B22—30 to 41 inches, grayish-brown (10YR 5/2) heavy silt loam; many, medium, distinct, yellowish-brown and common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure that has a weak prismatic tendency; friable; thin, patchy, dark-brown (10YR 3/3) clay films on faces of peds, more noticeable in the upper one-half of the horizon; few, very dark gray (10YR 3/1) hole fillings; medium acid; gradual, smooth boundary.

B3—41 to 52 inches, light olive-gray (5Y 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure parting to weak, coarse, subangular blocky; friable; medium acid; gradual, smooth boundary.

C—52 to 70 inches, gray (5Y 6/1) silt loam; common, medium, prominent, yellowish-brown (10YR 5/6) mottles; massive; friable; moderately alkaline; clear, smooth boundary.

The solum is about 40 to 60 inches thick. The A1 and A3 horizons are silt loam, and they are commonly black but may be very dark gray. The A1 and A3 horizons combined are 18 to 23 inches thick. The B horizon is heavy silt loam or silt loam. In some profiles it is mottled throughout, but in others the upper few inches are not mottled. The B horizon is slightly acid and medium acid, and it is commonly less acid in the lower part. The C horizon is commonly slightly acid to moderately alkaline.

Joy soils are near Port Byron and Mt. Carroll soils on the landscape. They are more poorly drained than Port Byron and Mt. Carroll soils. Joy soils have a profile similar to that of Muscatine soils, but their B horizon has less clay.

275—Joy silt loam (0 to 2 percent slopes). This soil is in small to medium areas on medium and wide drainage divides. Included in mapping are small areas of moderately well drained Port Byron soils.

A minor concern of management is excess water. Most areas of this soil are used for cultivated crops. This soil is well suited to all crops commonly grown in the county if excess water is removed. Capability unit I–5.

Keller Series

The Keller series consists of deep, somewhat poorly drained, sloping and strongly sloping soils. These soils commonly are on concave upper parts of drainageways. They formed in 20 to 40 inches of loess and glacial till.

An older, clayey buried soil is in the upper part of the glacial till. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark gray silt loam about 8 inches thick. The subsoil extends to a depth of at least 60 inches. For about 3 inches it is very dark gray light silty clay loam. For about 14 inches it is grayish-brown heavy silty clay loam mottled with yellowish-brown. Below that for about 35 inches it is gray clay and heavy clay loam.

Keller soils are moderate in organic-matter content. They have slow permeability and a high available water capacity.

These soils are suited to crops commonly grown in the county. The main limitations to the use of these soils are erosion and slope. Seeps and slow permeability are also limitations for some uses.

Representative profile of Keller silt loam, 4 to 7 percent slopes, eroded, 765 feet east and 185 feet north of the center of section 27, T. 1 N., R. 5 W., in a cultivated field in the center of a gravelled road intersection:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; weak, very fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

B1—8 to 11 inches, very dark gray (10YR 3/1) light silty clay loam; weak, fine, subangular blocky structure; firm; medium acid; clear, smooth boundary.

B21t—11 to 19 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, faint, yellowish-brown (10YR 5/4 and 10YR 5/6) mottles; moderate, fine, angular blocky structure; firm; thin, continuous, dark-gray (10YR 4/1) clay films on faces of peds; medium acid; clear, smooth boundary.

B22t—19 to 25 inches, grayish-brown (2.5Y 5/2) heavy silty clay loam; common, fine, distinct, gray (5Y 6/1) and many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium and coarse, angular blocky structure; firm; moderately thick, continuous, dark-gray (10YR 4/1) clay films on faces of peds; medium acid; clear, smooth boundary.

IIB21bt—25 to 41 inches, gray (5Y 6/1) light clay; fine, distinct, light olive-brown (2.5Y 5/4) mottles; moderate, medium, prismatic structure; very firm; thin, continuous, gray (5Y 5/1) clay films, shiny and glossy when wet, on faces of peds; medium acid; gradual, smooth boundary.

IIB22bt—41 to 60 inches, gray (5Y 6/1) heavy clay loam to clay; common, fine, prominent, yellowish-brown (10YR 5/4) mottles; weak and moderate, medium prismatic structure; very firm; thin, continuous, gray (5Y 5/1) clay films, shiny and glossy when wet, on faces of peds; medium acid; clear, smooth boundary.

The Ap horizon is 3 to 9 inches thick where not severely eroded. It is dark grayish brown to black. The B1 horizon is 3 to 5 inches thick and is very dark gray or very dark grayish brown. The B2t horizon is grayish brown and light brownish gray. The IIA and IIB horizons are light olive gray, gray, and grayish brown, and they are clay, silty clay, or heavy clay loam. The B horizon is medium acid or strongly acid in the upper part and medium acid to neutral in the lower part.

Keller soils are near Fishhook and Coatsburg soils on the landscape. They are darker in color in the Ap horizon than Fishhook soils. The upper part of their B horizon has less sand and less clay than Coatsburg soils. Keller and Clarksdale soils have similar drainage, but Keller soils have more clay and sand in the lower part of the B horizon.

470C2—Keller silt loam, 4 to 7 percent slopes, eroded. This soil is in small to medium areas on upper parts of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Clarksdale soils. Also included are small areas of soils that have a surface layer 9 to 11 inches thick.

The main concerns of management are erosion, somewhat poor natural drainage, seeps, and slow permeability. This soil is suited to crops commonly grown in the county if erosion is controlled. Capability unit IIe–10.

470D2—Keller silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on upper parts of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is about 40 inches thick.

Included with this soil in mapping are small areas of Coatsburg soils. In places near Adams, Payson, and Plainville, most areas of Keller soils have clay loam and loam in the lower part of the subsoil.

The main concerns of management are erosion and slope. Somewhat poor natural drainage, seeps, and slow permeability are limitations for some uses of this soil. This soil is suited to crops commonly grown in the county if erosion is controlled. Capability unit IIIe–7.

Keomah Series

The Keomah series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils on uplands. These soils formed in loess. They are commonly on narrow and medium-width drainage divides and on edges of wide divides. They are also on concave, gently sloping to moderately sloping upper parts of drainageways. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is grayish-brown silt loam about 4 inches thick. The subsoil is about 48 inches thick. For about 20 inches it is dark yellowish-brown, yellowish-brown, and grayish-brown heavy silty clay loam. Below that for about 28 inches it is light olive-gray silty clay loam mottled with yellowish brown. Underlying material is gray heavy silt loam that extends to a depth of about 72 inches.

Keomah soils are moderately low in organic-matter content. They have moderately slow permeability and a high available water capacity.

These soils are suited to crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Keomah silt loam, 2 to 4 percent slopes, 515 feet east and 295 feet north of the southwest corner of sec. 18, T. 2 N., R. 7 W., in a cultivated field:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, very fine and fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—7 to 11 inches, grayish-brown (10YR 5/2) silt loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; moderate, medium, platy structure; friable; few, patchy, light-gray (10YR 7/2), dry, silt grains on faces of peds; neutral; clear, smooth boundary.

B1t—11 to 15 inches, dark yellowish-brown (10YR 4/4) silty clay loam; few, fine, distinct, grayish-brown (10YR 5/2) mottles; strong, fine, subangular blocky structure; firm; nearly continuous, light-

gray (10YR 7/1), dry, silt grains on faces of peds; slightly acid; clear, smooth boundary.

B21t—15 to 21 inches, yellowish-brown (10YR 5/4) heavy silty clay loam; many, fine, distinct, grayish-brown (2.5Y 5/2) mottles; moderate, medium, angular blocky structure; firm; medium, nearly continuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; strongly acid; clear, smooth boundary.

B22t—21 to 31 inches, grayish-brown (2.5Y 5/2) heavy silty clay loam; many (40 percent), medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, prismatic structure parting to moderate, medium, angular blocky; very firm; medium, nearly continuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; common, fine, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

B23t—31 to 42 inches, light olive-gray (5Y 6/2) silty clay loam; many (35 percent), medium, prominent, yellowish-brown (10YR 5/4 and 10YR 5/6) mottles; moderate, coarse, angular blocky structure; firm; medium, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds and channels; common, fine, dark concretions of iron and manganese; medium acid; gradual, smooth boundary.

B3—42 to 59 inches, light olive-gray (5Y 6/2) light silty clay loam; common, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; medium, patchy, very dark-gray (10YR 3/1) clay films on faces of peds and channels; common, fine, dark concretions of iron and manganese; slightly acid; gradual, smooth boundary.

C—59 to 72 inches, gray (5Y 6/1) heavy silt loam; common, medium, prominent, yellowish-brown (10YR 5/4) mottles; massive; friable; few, dark-gray (10YR 4/1) channel linings; few, medium, dark concretions of iron and manganese; neutral.

The solum is 40 to 65 inches thick. The A horizon is 11 to 17 inches thick where uneroded. The Ap horizon, where plowed, is mainly dark grayish brown, but includes dark gray. The A2 horizon is grayish-brown, dark grayish-brown, or brown silt loam. The B2 horizon is heavy silty clay loam or light silty clay. The B horizon includes both brown and gray, but the upper few inches is free of mottles in places. It is slightly acid to strongly acid.

Keomah soils are near Clinton, Rushville, and Clarksdale soils on the landscape. They are more poorly drained than Clinton soils and better drained than Rushville soils. They are lighter in color in the Ap horizon than Clarksdale soils. Keomah soils have a profile similar to that of Stronghurst soils, but their B2 horizon has more clay.

17A—Keomah silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsurface layer are 3 to 5 inches thicker.

Included with this soil in mapping are small areas of Clarksdale soils that have a very dark grayish-brown surface layer and of poorly drained Rushville soils. Also included are small areas of wet soils that are shown by a spot symbol on the detailed soil map.

The main concern of management is excess water. Most areas of this soil are used for cultivated crops. Some areas are used for pasture, and a few are in woodland. This soil is well suited to all crops commonly grown in the county if excess water is removed. Capability unit IIw–13.

17B—Keomah silt loam, 2 to 4 percent slopes. This soil is in small to large areas on ridges and on side ridges and on sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Clarksdale soils that have a very dark grayish-brown surface layer and of moderately well drained Clinton soils. Also included are small areas of wet soils that are shown by a spot symbol on the detailed soil map. Small areas of soils where the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil are also included.

The main concerns of management are excess water and erosion. Most areas of this soil are used for cultivated crops. Some areas are used for pasture, and a few are in woodland. This soil is well suited to all crops commonly grown in the county if excess water is removed and erosion is controlled. Capability unit IIe–13.

17C2—Keomah silt loam, 4 to 7 percent slopes, eroded. This soil is in small areas on sides of drainageways near the drainageway head and in a few areas on ridges. It has a profile similar to the one described as representative of the series, but the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of Blair soils that have a light clay loam subsoil and of moderately well drained Clinton soils. Also included are areas of soils that have a thinner subsoil and areas of wet soils, 2 acres or less in size, that are shown by a spot symbol on the detailed soil map.

The main concern of management is erosion, but wetness in spring and temporary seeps are also concerns. Most areas of this soil are used for cultivated crops. A few areas are used for pasture. This soil is well suited to crops if erosion is controlled. Capability unit IIe–13.

17C3—Keomah soils, 4 to 7 percent slopes, severely eroded. This soil is in small areas on sides of drainageways near the drainageway head. It has a profile similar to the one described as representative of the series, but the plow layer is mainly yellowish-brown silty clay loam and dark grayish-brown silt loam, and the subsoil is thinner.

Included with this soil in mapping are small areas of Fishhook soils that have clayey buried soils in the lower part of the profile. Also included are small areas of soils where the subsoil is light silty clay loam 20 to 30 inches thick.

The main concerns of management are erosion and tilth. Most areas of this soil are used for cultivated crops. A few areas are used for pasture. This soil is suited to crops commonly grown in the county if erosion is controlled. It is also suited to pasture and woodland. Capability unit IIIe–13.

Lawson Series

The Lawson series consists of deep, somewhat poorly drained, nearly level soils that formed in alluvium. These soils are on the Mississippi River flood plain and on flood plains of small- and medium-sized upland streams. They are more common where small streams drain large areas of soils that have a native vegetation of prairie grasses. The native vegetation was mixed hardwood forest and prairie grasses.

In a representative profile the surface layer is about 42 inches thick. For 14 inches it is very dark grayish-brown silt loam. Below that for about 28 inches it is

very dark gray silt loam. Underlying material extends to a depth of 60 inches. It is dark-gray and dark grayish-brown silt loam mottled with dark brown.

Lawson soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Lawson silt loam, 740 feet west and 265 feet south of the northeast corner of NW¼ sec. 3, T. 1 S., R. 5 W., in a pasture:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine and medium, granular structure; friable; neutral; clear, smooth boundary.

A12—6 to 14 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, dark-brown (10YR 3/3) mottles; few, thin, pale-brown (10YR 6/3) layers; moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A13—14 to 22 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, dark-brown (10YR 3/3) mottles; few, thin, discontinuous, light brownish-gray (10YR 6/2) layers; very fine, granular structure; friable; neutral; gradual, smooth boundary.

A14—22 to 33 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, dark-brown (10YR 3/3) mottles; few, thin, discontinuous, light brownish-gray (10YR 6/2) layers; weak, fine, granular structure; friable; slightly acid; clear, smooth boundary.

A15—33 to 42 inches, very dark gray (10YR 3/1) silt loam; few, fine, faint, dark yellowish-brown (10YR 3/4) mottles; very weak, fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

C—42 to 60 inches, dark-gray (10YR 4/1) and dark grayish-brown (10YR 4/2) silt loam; common, medium, distinct, dark-brown (10YR 3/3) mottles; very weak, medium and coarse, angular blocky structure; friable; slightly acid.

The A horizon and the silty C horizon are 40 inches to several feet thick. The A horizon commonly is 24 to 40 inches thick, but in places it is up to 60 inches thick. It is very dark grayish brown, very dark gray, very dark brown, or black. The profile has thin lenses of sandy loam, sand, and silty clay loam in places. The A horizon and upper part of the C horizon are slightly acid to mildly alkaline.

Lawson soils are near Huntsville, Wakeland, and Newart soils on the landscape. They are more poorly drained than Huntsville soils. They are darker in color in the A horizon than Wakeland soils and have a thicker dark-colored A horizon than Newart soils. Their C horizon has more silt and less sand than Newart soils.

451—Lawson silt loam. This soil is in small to large areas on flood plains of the Mississippi River and other streams that drain the uplands, and it has a slope of 0 to 2 percent. Included in mapping are small areas of soils that are poorly drained or have sand or chert fragments on the surface. They are shown by a spot symbol on the detailed soil map. Also included are areas of soils where the uppermost layer is dark grayish-brown and some very dark grayish-brown silt loam overwash 8 to 20 inches thick.

The main concerns of management are excess water and flooding. This soil is used mainly for cultivated crops. A few areas are used for pasture. This soil is well suited to all crops commonly grown in the county if excess water is removed and if protected from flooding. Capability unit I–6.

Limestone Rock Land

94—Limestone rock land. This land type consists of steep and very steep, very shallow areas on the bluff bordering the Mississippi River and on valley walls in the upland part of the county. It has a slope of 15 to 60 percent. In most areas the rock is limestone, but in some small areas it is sandstone and shale (fig. 11).

Common to many stones are on the surface, and numerous limestone ledges are on the upper part of the areas. Crevices between the ledges are filled with limestone residuum and stones. On the lower part of the areas the material is 10 to 40 percent clayey or silty local wash, and the rest is fragments of limestone and chert. Included in mapping are small areas of material that is 40 to 90 percent silty or sandy loam local wash, and the rest is rocks.

This land type is low in organic-matter content and has low available water capacity. It is suited for use as limestone quarries in many places. It has some value for woodland and pasture. Tree growth is fair to poor, and pastures are difficult to establish or renovate. This land type has some potential for use as wildlife habitat and for recreational purposes. Capability unit VIIs–2.

Littleton Series

The Littleton series consists of deep, somewhat poorly drained soils that formed in silty water-deposited sediments. These soils are mainly in the Mississippi River valley adjacent to the upland. The native vegetation was prairie grasses.

In a representative profile the surface layer is black silt loam about 19 inches thick. The subsoil is about 34 inches thick. For about 13 inches it is very dark grayish-brown silt loam that has dark yellowish-brown and yellowish-brown mottles. For about 13 inches it is dark grayish-brown heavy silt loam that has yellowish-brown mottles. Below that for about 8 inches it is grayish-brown silt loam that has yellowish-brown mottles. Underlying material is gray and yellowish-brown silt loam that extends to a depth of 65 inches.

Littleton soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity. These soils are well suited to crops commonly grown in the county if adequately drained.

Representative profile of Littleton silt loam, 1,430 feet east and 740 feet south of northwest corner of SW¼ sec. 26, T. 3 S., R. 8 W., in a cultivated field:

Ap—0 to 9 inches, black (10YR 2/1) silt loam; very dark gray (10YR 3/1) crushed; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—9 to 19 inches, black (10YR 2/1) heavy silt loam; very dark grayish brown (10YR 3/2) crushed; few, fine, distinct, brown (7.5YR 4/4) and brownish-yellow (10YR 6/6) mottles; moderate; very fine and fine, subangular blocky structure; friable; few, very small, yellowish-brown (10YR 5/6) concretions of iron and manganese; slightly acid; clear, smooth boundary.

B21—19 to 32 inches, very dark gray (10YR 3/1) heavy silt loam; very dark grayish-brown (10YR 3/2) crushed; common, medium, distinct, dark yellowish-brown (10YR 4/4) and yellowish-brown

Figure 11.—**Wooded area of Limestone rock land.**

(10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; few, patchy clay films on faces of peds; few, very small, yellowish-brown (10YR 5/6) concretions of iron and manganese; slightly acid; gradual, smooth boundary.

B22—32 to 45 inches, dark grayish-brown (10YR 4/2) heavy silt loam; many, medium, distinct, yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), and dark yellowish-brown (10YR 4/4) mottles; few, fine, distinct, gray (10YR 5/1) mottles; weak, coarse, subangular blocky structure; friable; discontinuous very dark gray (10YR 3/1) coatings on faces of peds and on channel linings; few, dark concretions of iron and manganese; few patchy clay films on faces of peds; slightly acid; gradual, smooth boundary.

B3—45 to 53 inches, grayish-brown (10YR 5/2) silt loam; many, medium and coarse, distinct, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) mottles; few, fine, faint, light brownish-gray (10YR 6/2) mottles; weak, coarse, subangular blocky structure; friable; thin, discontinuous, gray (10YR 5/1) coatings on faces of peds; few, very dark gray (10YR 3/1) channel linings and fillings; few, dark concretions of iron and manganese; slightly acid; gradual, smooth boundary.

C—53 to 65 inches, gray (5Y 5/1), yellowish-brown (10YR 5/6), and some dark yellowish-brown (10YR 4/4) silt loam; massive; friable; dark-gray (5Y 4/1) channel fillings; common, dark concretions of iron and manganese; slightly acid.

The A horizon is commonly 18 to 30 inches thick, but it may be as much as 40 inches thick. It is very dark grayish-brown and black silt loam and heavy silt loam. The B horizon is silt loam and heavy silt loam. The B and C horizons are slightly acid to mildly alkaline.

Littleton soils are near Worthen, Lawson, and Beaucoup soils on the landscape. They are more poorly drained than Worthen soils and better drained than Beaucoup soils. Their A and B horizons have less clay than Beaucoup soils. Littleton soils have a B horizon that Lawson soils do not have.

81—Littleton silt loam. This soil is in medium to large areas on broad terraces and old alluvial fans in the Mississippi River flood plain, and it has a slope of 0 to 2 percent. Included in mapping are small areas of soils that have a dark surface layer and upper part of the subsoil less than 24 inches thick and other areas of soils where the subsoil has lenses of sandy loam. Also included are small areas of Lawson soils. Small areas of poorly drained soils are shown by a spot symbol on the detailed soil map.

The main concerns of management are excess water and runoff from higher lying areas. Most areas of this soil are used for crops. This soil is well suited to all

crops commonly grown in the county if excess water is removed. Capability unit I–5.

Mt. Carroll Series

The Mt. Carroll series consists of deep, well-drained, nearly level to strongly sloping soils on uplands. These soils formed in loess. The nearly level soils are near the center of medium-width drainage divides or on the edges of wider divides. The moderately sloping and strongly sloping soils are on sides of stream valleys that extend back into divides where the native vegetation was prairie grass. The native vegetation was mixed hardwood forest and prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 7 inches thick. The subsurface layer is brown silt loam about 2 inches thick. The subsoil is dark yellowish-brown silt loam about 40 inches thick. In the lower 13 inches it is mottled with grayish brown. Underlying material extends to a depth of about 63 inches. It is yellowish-brown silt loam mottled with light brownish gray.

Mt. Carroll soils are moderate in organic matter. They have moderate permeability and a high available water capacity. These soils are well suited to all crops commonly grown in the county if erosion is controlled.

Representative profile of Mt. Carroll silt loam, 2 to 7 percent slopes, 1,055 feet west and 65 feet south of the northeast corner of sec. 26, T. 2 N., R. 9 W., in a pasture:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, platy structure parting to moderate, very fine, granular; friable; neutral; abrupt, smooth boundary.

A2—7 to 9 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure parting to weak, fine, granular; friable; discontinuous very dark grayish-brown (10YR 3/2) coatings on faces of peds; neutral; clear, smooth boundary.

B1—9 to 12 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, fine, subangular blocky structure; friable, thin, patchy, dark yellowish-brown (10YR 3/4) clay films and few, thin, patchy, light-gray (10YR 7/1), dry, silt grains on faces of peds; slightly acid; clear, smooth boundary.

B21t—12 to 18 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; thin, patchy, dark yellowish-brown (10YR 3/4) clay films and common, thin, light-gray (10YR 7/1), dry, silt grains on faces of peds; slightly acid; clear, smooth boundary.

B22t—18 to 27 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, coarse, subangular blocky structure; friable; medium, nearly continuous, dark yellowish-brown (10YR 3/4) clay films on faces of peds; slightly acid; clear, smooth boundary.

B23t—27 to 36 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, coarse, subangular blocky structure; friable; medium, discontinuous, dark yellowish-brown (10YR 3/4) clay films on faces of peds; medium acid; gradual, smooth boundary.

B3—36 to 49 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, grayish-brown (2.5Y 5/2) mottles; weak, coarse, angular blocky structure; friable; few, medium, dark yellowish-brown (10YR 3/4) clay films on faces of peds; medium acid; gradual, smooth boundary.

C—49 to 63 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct, light brownish-gray (2.5Y 6/2) mottles; massive; friable; medium acid; gradual, smooth boundary.

The solum is 40 to 60 inches thick. The Ap or A1 horizon is 6 to 10 inches thick. The Ap or A1 horizon is commonly very dark grayish brown, but in places it is dark brown and very dark brown. The A2 horizon is commonly brown, but in places it is dark grayish brown and grayish brown .The combined A1 and A2 horizons, where uneroded, are 9 to 16 inches thick. The B horizon is silt loam or heavy silt loam. The lower part of the B horizon is mottled in some places. The B horizon is mainly slightly acid and medium acid. The C horizon is medium acid to moderately alkaline.

Mt. Carroll soils are near Seaton and Port Byron soils on the landscape. They are darker in color in the Ap horizon than Seaton soils and have a thinner A horizon than Port Byron soils. Mt. Carroll soils have a profile similar to that of Downs soils, but their B horizon has less clay and less mottling.

268A—Mt. Carroll silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has a profile similar to the one described as representative of the series, but the combined surface layer and subsurface layer are about 5 inches thicker.

Included with this soil in mapping are small areas of Seaton soils that have a very dark grayish-brown surface layer and of Port Byron soils that have no subsurface layer. Also included are a few small areas of wet soils that are shown by a spot symbol on the detailed soil map.

This soil is used mainly for cultivated crops. A few areas are used for pasture. This soil is well suited to all crops commonly grown in the county. It is also well suited to vegetable and orchard crops. Capability unit I–1.

268B—Mt. Carroll silt loam, 2 to 7 percent slopes. This soil is in small to medium areas on ridges and drainage divides. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Seaton soils that have a dark grayish-brown surface layer and of Port Byron soils that have no subsurface layer. Also included are areas of Mt. Carroll soils where the combined surface layer and subsurface layer are 4 to 8 inches thick and the surface layer is a mixture of the original surface layer, subsurface layer, and the subsoil. These areas make up about 30 percent of the acreage of this soil.

The main concern of management is erosion. This soil is used mainly for cultivated crops. A few areas are used for pasture or are in woodland. This soil is well suited to all crops commonly grown in the county if erosion is controlled. It is also well suited to vegetable and orchard crops. Capability unit IIe–14.

268C2—Mt. Carroll silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is about 10 inches thinner, and the plow layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil. Included in mapping are small areas of Seaton soils that have a dark grayish-brown surface layer and of Port Byron soils that have no subsurface layer.

The main concerns of management are erosion and slope. Most areas of this soil are used for cultivated crops. A few areas are used for pasture. If erosion is controlled, this soil is suited to all crops commonly grown in the county. It is also suited to orchards and pasture. Capability unit IIIe–14.

Muscatine Series

The Muscatine series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loess. They are on medium and wide drainage divides mainly in the western part of the county. The native vegetation was prairie grasses.

In a representative profile the surface layer is black silt loam about 18 inches thick. The subsoil is about 42 inches thick. In the upper 5 inches it is grayish-brown light silty clay loam. Below that, for about 17 inches, it is grayish-brown and light olive-gray silty clay loam mottled with yellowish brown. And below that, for about 20 inches, it is gray light silty clay loam mottled with yellowish brown. The underlying material extends to a depth of 67 inches. It is light olive-gray silt loam mottled with yellowish brown.

Muscatine soils are high in organic matter. They have moderate permeability and a high available water capacity.

These soils are well suited to all crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Muscatine silt loam, 0 to 2 percent slopes, 1,660 feet west and 640 feet south of the northeast corner of SE¼ sec. 9, T. 1 S., R. 8 W., in a cultivated field:

Ap—0 to 8 inches, black (10YR 2/1) silt loam; weak, very fine, granular structure; friable; slightly acid; clear, smooth boundary.

A1—8 to 13 inches, black (10YR 2/1) silt loam; moderate, very fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

A3—13 to 18 inches, black (10YR 2/1) heavy silt loam; moderate, very fine, subangular blocky structure; friable; very few, thin, patchy, light-gray (10YR 7/1), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

B1t—18 to 23 inches, grayish-brown (10YR 5/2) light silty clay loam; very dark gray (10YR 3/1) coatings on exteriors of peds; moderate, fine, subangular blocky structure; firm; few, small, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

B21t—23 to 31 inches, grayish-brown (10YR 5/2) silty clay loam; common, fine, faint, brown (10YR 5/3) and few, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; nearly continuous, thin, gray (10YR 5/1) and dark-gray (10YR 4/1) clay films on faces of peds; few, small, dark concretions of iron and manganese; medium acid; gradual, smooth boundary.

B22t—31 to 40 inches, light olive-gray (5Y 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, subangular blocky structure; firm; thin, discontinuous, gray (10YR 5/1) and dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; common, medium, dark concretions of iron and manganese; medium acid; gradual, smooth boundary.

B31t—40 to 52 inches, gray (5Y 6/1) light silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; thin, discontinuous, gray (10YR 5/1) and dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; common, medium, dark concretions of iron and manganese; medium acid; gradual, smooth boundary.

B32t—52 to 60 inches, gray (5Y 6/1) light silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; thin, grayish-brown (10YR 5/2) and some discontinuous dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; few, medium, soft accumulations of iron and manganese; slightly acid; gradual, smooth boundary.

C—60 to 67 inches, light olive-gray (5Y 6/2) silt loam; many (40 percent) medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; few, thin, patchy, grayish-brown (10YR 5/2) and some dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; few, medium, dark accumulations of iron and manganese; slightly acid.

The solum is 45 to 60 inches thick. The A horizon is 13 to 18 inches thick. It is black, very dark gray, or very dark brown. The A3 horizon is heavy silt loam, silt loam, and light silty clay loam. The dark-colored A horizon is 14 to 23 inches thick.

The B horizon in the upper part is very dark gray to brown mottled with grayish brown. The B2 horizon is light silty clay loam or silty clay loam. The B horizon is medium acid and strongly acid in the upper part and medium acid to neutral in the lower part. The upper part of the C horizon is commonly medium acid to neutral.

Muscatine soils are near Atterberry and Tama soils on the landscape. They have thicker Ap and A1 horizons than Atterberry soils and are more poorly drained than Tama soils. Muscatine soils have a profile similar to that of Ipava soils, but their B2 horizon has less clay.

Muscatine soils in Adams County contain slightly more clay in the B horizon than do Muscatine soils located west of the Mississippi River.

41A—Muscatine silt loam, 0 to 2 percent slopes. This soil is in small to large areas on wide drainage divides. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of moderately well drained Tama soils on gently sloping ridges. Also included are small areas of poorly drained soils that are shown by a spot symbol on the detailed soil map and a few small areas of soils that have a thin, dark-gray subsurface layer.

The main concern of management is excess water. This soil is used mainly for cultivated crops. A few areas are used for pasture. If the excess water is removed, this soil is well suited to all crops commonly grown in the county. It is also suited to vegetable crops. Capability unit I–5.

41B—Muscatine silt loam, 2 to 4 percent slopes. This soil is in small to medium areas on ridges and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner and the subsoil has fewer gray mottles.

Included with this soil in mapping are small areas of moderately well drained Tama soils on ridges. Also included are small areas of poorly drained soils that have a dark-gray subsoil and are in depressions.

The main concern of management is erosion, but excess water is also a concern. Most areas of this soil are used for cultivated crops. A few areas are used for pasture. If erosion is controlled and excess water is removed, this soil is well suited to all crops commonly grown in the county. It is also suited to vegetable crops. Capability unit IIe–5.

NewGlarus Series

The NewGlarus series consists of moderately deep, well-drained strongly sloping and moderately steep soils on uplands. These soils formed in loess and ma-

terial weathered from limestone. They are on sides of mounds, ridges, and stream valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown light silty clay loam about 8 inches thick. The subsoil is about 27 inches thick. In the upper 10 inches it is brown silty clay loam. Below that, for about 12 inches, it is yellowish-red silty clay. And below that, for about 5 inches, it is reddish-yellow silty clay. Underlying the subsoil is limestone bedrock.

NewGlarus soils are moderately low in organic matter. They have moderate to moderately slow permeability and a moderate available water capacity.

These soils are suited mainly to hay, pasture, and woodland.

Representative profile of NewGlarus soils in an area of NewGlarus-Palsgrove silt loams, 12 to 18 percent slopes, eroded, 1,500 feet south and 90 feet east of the northwest corner of sec. 23, T. 2 N., R. 8 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) and about 20 percent yellowish-brown (10YR 5/6) light silty clay loam; weak, fine, granular structure; firm; slightly acid; abrupt, smooth boundary.

B21t—8 to 12 inches, brown (7.5YR 5/4) silty clay loam; moderate, fine, subangular blocky structure; firm; slightly acid; clear, smooth boundary.

B22t—12 to 18 inches, brown (7.5YR 5/4) silty clay loam, and some reddish-brown (5YR 5/4) silty clay loam, mainly in lower 3 inches; moderate, fine, subangular blocky structure; firm; few, very small, black (10YR 2/1) concretions; thin, discontinuous, dark yellowish-brown (10YR 4/4) clay films on faces of peds; slightly acid; clear, wavy boundary.

IIB23t—18 to 24 inches, yellowish-red (5YR 5/6) silty clay; moderate, medium and coarse, subangular blocky structure; firm; thin, discontinuous, reddish-brown (5YR 4/4) clay films on faces of peds; medium acid; gradual, smooth boundary.

IIB31t—24 to 30 inches; yellowish-red (5YR 5/6) silty clay; weak, coarse, angular blocky structure; firm; thin, discontinuous, dark reddish-brown (5YR 3/3) and reddish-brown (5YR 4/3) clay films on faces of peds; medium acid; gradual, wavy boundary.

IIB32t—30 to 35 inches, reddish-yellow (5YR 6/8) silty clay; weak, coarse, angular blocky structure; very firm; few, dark grayish-brown (10YR 4/2) channel fillings; thin, discontinuous, reddish-brown (5YR 4/3) clay films on faces of peds; slightly acid.

R—35 inches, limestone bedrock and some interlayered shale in places.

The solum is 24 to 40 inches thick. The loess is 15 to 30 inches thick. The Ap horizon is dark grayish brown, brown, or dark brown where eroded. Some profiles have a brown or yellowish-brown A2 horizon.

The B horizon is commonly brown or yellowish-brown silty clay loam in the upper part and is yellowish-red, reddish-brown, or dark-red silty clay or clay in the lower part. The IIB horizon is 10 to 20 inches thick. The B and IIB horizons are slightly acid to strongly acid.

NewGlarus soils are near Palsgrove and Fayette soils and Limestone rock land on the landscape. They have a thinner solum than Palsgrove and Fayette soils and a thicker solum than Limestone rock land. NewGlarus and Baylis soils both formed in loess and material weathered from limestone, but NewGlarus soils formed in generally thinner loess and the material weathered from limestone is not cherty.

NewGlarus soils are mapped in a complex with Palsgrove soils.

928C2—NewGlarus-Palsgrove silt loams, 7 to 12 percent slopes, eroded. This complex is about 55 percent NewGlarus silt loam and about 45 percent Palsgrove silt loam. These soils are in small to medium areas on sides of ridges, large mounds, and valleys. Palsgrove soils are commonly on the upper part of the sides and NewGlarus soils on the lower part, but in places this order is reversed.

The soils in this complex have a profile similar to the one described as representative of their series, but the surface layer is commonly silt loam in most areas. Included in mapping are areas of soils that have a surface layer of silty clay loam and a few areas of soils that have a surface layer of silty clay. Also included are small areas of soils that have bedrock at or near the surface (fig. 12) and small areas of soils that have 10 to 15 inches of loess and 20 to 40 inches of reddish-yellow silty clay. Small areas of Fayette soils are also included.

The main concern of management is erosion. Most of the soils in this complex are cultivated. Some areas are in pasture, and others are in woodland. Soils in this complex are poorly suited to cultivated crops because of the difficulty in controlling erosion. They are suited to hay, pasture, and woodland. Capability unit IVe–1.

928D2—NewGlarus-Palsgrove silt loams, 12 to 18

Figure 12.—**Outcrop of limestone bedrock in an area of strongly sloping NewGlarus silt loam.**

percent slopes, eroded. This complex is about 60 percent NewGlarus silt loam and about 40 percent Palsgrove silt loam. These soils are in small to medium areas on sides of ridges, large mounds, and valleys. Palsgrove soils are commonly on the upper part of the sides and NewGlarus soils on the lower part, but this order is reversed in places.

The soils in this complex have a profile similar to the one described as representative of their series, but the surface layer is a mixture of silt loam and some silty clay loam subsoil in most areas. Included in mapping are small areas of soils that have limestone bedrock at a depth of less than 24 inches. In places there are outcrops of limestone bedrock. Most of these areas are shown by a spot symbol on the detailed soil map. Also included are small areas of soils that have 10 to 15 inches of loess and 20 to 40 inches of reddish-yellow silty clay. About 20 percent of the soil area is severely eroded and has a surface layer of silty clay loam and silt loam.

The main concern of management is erosion. Most areas of soils in this complex are in pasture, but sizable areas are cultivated, and some are in woodland. Soils in this complex are suited to hay, pasture, and woodland. Capability unit VIe–2.

Orion Series

The Orion series consists of deep, somewhat poorly drained, nearly level soils on the Mississippi River flood plain and on the flood plains of small and medium-sized upland streams. These soils formed in alluvium. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 16 inches thick. Underlying the surface layer is dark grayish-brown silt loam that extends to a depth of about 29 inches. The buried surface horizon is very dark gray light silty clay loam about 19 inches thick. The buried subsoil extends to a depth of about 70 inches. For about 13 inches it is very dark gray light silty clay loam mottled with dark brown and brown. Below that for about 9 inches it is dark-gray and gray heavy silt loam mottled with dark brown and dark yellowish brown.

Orion soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity. These soils are well suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Orion silt loam, 575 feet south and 280 feet west of the northeast corner of SE¼ sec. 28, T. 3 S., R. 8 W., in a cultivated field:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—10 to 16 inches, dark grayish-brown (10YR 4/2) and some very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; neutral; clear, smooth boundary.

C—16 to 29 inches, dark grayish-brown (10YR 4/2) silt loam, mixed in layers with very dark-gray (10YR 3/1) and grayish-brown (10YR 5/2) silt loam; weak, medium, platy structure parting to weak, fine, granular; friable; mildly alkaline; abrupt, smooth boundary.

IIA1b—29 to 48 inches, very dark gray (10YR 3/1) light silty clay loam; few, fine, faint, brown (10YR 4/3) mottles; weak, medium, subangular blocky structure; firm; mildly alkaline; gradual, smooth boundary.

IIB11b—48 to 61 inches, very dark gray (10YR 3/1) light silty clay loam; dark-gray (10YR 4/1) crushed; common, medium, distinct, dark-brown (10YR 3/3) and brown (10YR 4/3) mottles; weak, medium, subangular blocky structure; friable; neutral; gradual, smooth boundary.

IIB12b—61 to 70 inches, dark-gray (10YR 4/1) and gray (10YR 5/1) heavy silt loam; common, medium, distinct, dark-brown (10YR 3/3) and dark yellowish-brown (10YR 3/4) mottles; weak, coarse, subangular blocky structure; friable; very dark gray (10YR 3/1) coatings on faces of peds and on channel linings; neutral.

The profile is 40 inches to more than 60 inches thick. The A and C horizons are 20 to 40 inches thick. The A horizon is commonly dark grayish brown, but it has thin layers of very dark grayish brown, very dark gray, and other colors in places. The C horizon is dark grayish brown and grayish brown and has thin layers of other colors. The IIAb horizon is commonly 10 to 25 inches thick. It is commonly very dark gray or very dark grayish brown light silty clay loam or silt loam. The solum and C horizon are slightly acid to mildly alkaline.

Orion soils are near Wakeland, Dupo, and Beaucoup soils on the landscape. They have a dark-colored Ab horizon that Wakeland soils do not have. Their Ab horizon has less clay than Dupo soils, and their surface horizon has less clay than Beaucoup soils.

415—Orion silt loam. This soil is in small to medium areas on flood plains of the Mississippi River and of smaller streams that drain the upland, and it has a slope of 0 to 1 percent. Included in mapping are small areas of wet soils, areas of soils that have a sandy surface layer, and areas that have outcrops of limestone bedrock, mainly in streambeds. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are excess water and flooding. Most areas of this soil are used for cultivated crops. This soil is well suited to all crops commonly grown in the county if excess water is removed and if it is protected from flooding. Capability unit I–6.

Palsgrove Series

The Palsgrove series consists of deep, well-drained, strongly sloping and moderately steep soils on uplands. These soils formed in loess and material weathered from limestone. They are on sides of mounds, ridges, and stream valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is brown heavy silt loam about 9 inches thick. The subsoil is about 51 inches thick. For about 31 inches it is yellowish-brown silty clay loam. For about 9 inches it is reddish-brown silty clay. Below that for about 11 inches it is yellowish-red silty clay. Underlying the subsoil is limestone bedrock.

Palsgrove soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity. These soils are suited mainly to hay, pasture, and woodland.

Representative profile of Palsgrove silt loam in an area of NewGlarus-Palsgrove silt loams, 7 to 12 percent slopes, eroded, 745 feet north and 385 feet west of the southeast corner of SW¼ sec. 15, T. 2 N., R. 8 W.:

Ap—0 to 9 inches, brown (10YR 4/3) heavy silt loam;

massive; slightly firm; neutral; abrupt, smooth boundary.

B21t—9 to 19 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; thin, discontinuous, dark-brown to brown (10YR 4/3) clay films on faces of peds; slightly acid; clear, smooth boundary.

B22t—19 to 28 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, coarse, subangular blocky structure; firm; thin, discontinuous, dark-brown (10YR 3/3) clay films on faces of peds; slightly acid; gradual, smooth boundary.

B3t—28 to 40 inches, yellowish-brown (10YR 5/4) silty clay loam, and brown (7.5YR 4/4) mixed soil material in lower 2 to 3 inches of horizon; firm; thin, discontinuous, brown (10YR 4/3) clay films on faces of peds; medium acid; clear, smooth boundary.

IIB21tb—40 to 49 inches, reddish-brown (5YR 4/4) silty clay; weak, coarse, subangular blocky structure; firm; thin, patchy, reddish-brown (5YR 4/3) clay films on faces of peds; medium acid; gradual, smooth boundary.

IIB22tb—49 to 60 inches, yellowish-red (5YR 4/6) silty clay; weak, coarse, subangular blocky structure; firm; slightly acid; abrupt, irregular boundary.

R—60 inches, limestone bedrock.

The solum is 40 inches to more than 60 inches thick. The loess is from 36 to 45 inches thick. The Ap horizon, if eroded, is dark grayish brown, brown, or dark brown. Some profiles have a brown or yellowish-brown A2 horizon. The B horizon is yellowish-brown or brown silty clay loam. The IIBb horizon is about 6 to 24 inches or more thick. It is yellowish-red, reddish-brown, or dark-red silty clay or clay. The B and IIBb horizons are slightly acid to strongly acid.

Palsgrove soils are near NewGlarus and Fayette soils and Limestone rock land on the landscape. They have a IIBb horizon formed in limestone residuum that is lacking in Fayette soils. They have a thicker solum than NewGlarus soil and Limestone rock land. Palsgrove and Baylis soils both formed in loess and limestone residuum, but Palsgrove soils formed in generally thicker loess, and the limestone residuum is not cherty.

Palsgrove soils are mapped in a complex with NewGlarus soils.

Port Byron Series

The Port Byron series consists of deep, well drained and moderately well drained soils on uplands mainly in the western part of the county. These soils formed in loess. They are mostly on nearly level, medium to wide drainage divides and on gently sloping to moderately sloping sides of drainageways that extend back into divides. The native vegetation was prairie grass.

In a representative profile the surface layer is very dark grayish-brown silt loam about 16 inches thick. The subsoil is about 47 inches thick and is mostly brown silt loam that has light brownish-gray mottles in the lower part. The underlying material is brown and light brownish-gray silt loam. It extends to a depth of about 70 inches.

Port Byron soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are suited to all crops commonly grown in the county if erosion is controlled.

Representative profile of Port Byron silt loam, 0 to 2 percent slopes, 965 feet west and 275 feet north of the southeast corner of NW¼ sec. 31, T. 1 N., R. 8 W., in a cultivated field:

Ap—0 to 5 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; neutral; abrupt, smooth boundary.

A1—5 to 11 inches, very dark grayish-brown (10YR 3/2) silt loam; very dark brown (10YR 2/2) ped exteriors; moderate, fine, granular structure; friable; very thin patches of light-gray (10YR 7/1), dry, silt grains on faces of some peds; neutral; clear, smooth boundary.

A3—11 to 16 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; very thin patches of light-gray (10YR 7/1), dry, silt grains on faces of some peds; slightly acid; clear, smooth boundary.

B1—16 to 21 inches, dark-brown (10YR 3/3) silt loam; very dark grayish-brown (10YR 3/2) coatings on faces of peds; weak, fine, subangular blocky structure; friable; very thin patches of light-gray (10YR 7/1), dry, silt grains on faces of some peds; slightly acid; clear, smooth boundary.

B21—21 to 30 inches, brown (10YR 4/3) silt loam; moderate, fine and medium, subangular blocky structure; friable; nearly continuous dark yellowish-brown (10YR 3/4) coatings on faces of peds; very thin patches of light-gray (10YR 7/1), dry, silt grains on faces of some peds; slightly acid; gradual, smooth boundary.

B22—30 to 39 inches, brown (10YR 4/3) silt loam; few, fine, distinct, light brownish-gray (2.5Y 6/2) mottles in lower 4 inches; moderate, medium, subangular blocky structure; firm; discontinuous dark yellowish-brown (10YR 3/4) coatings on faces of peds; very thin patches of light-gray (10YR 7/1), dry, silt grains on faces of some peds; few, small, dark accumulations of iron and manganese; slightly acid; gradual, smooth boundary.

B23—39 to 48 inches, brown (10YR 5/3) silt loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; weak and moderate, medium, subangular blocky structure; firm; discontinuous dark yellowish-brown (10YR 4/4) coatings on faces of peds; few, small, dark accumulations of iron and manganese; slightly acid; gradual, smooth boundary.

B3—48 to 63 inches, brown (10YR 5/3) silt loam; many, fine, distinct, light brownish-gray (2.5Y 6/2) mottles; weak, coarse, subangular blocky structure; friable; patchy dark yellowish-brown (10YR 4/4) coatings on faces of peds; few, small, dark accumulations of iron and manganese; slightly acid; gradual, smooth boundary.

C—63 to 70 inches, brown (10YR 5/3) and light brownish-gray (2.5Y 6/2) silt loam; massive; friable; few, small and medium, dark accumulations of iron and manganese; slightly acid.

The solum is 40 to about 70 inches thick. The A horizon is very dark grayish brown, very dark brown, and dark brown. It is 14 to about 20 inches thick. The lower part of the B horizon is mottled in places. The B horizon is commonly slightly acid or medium acid. The C horizon is slightly acid to moderately alkaline.

Port Byron soils are near Joy and Mt. Carroll soils on the landscape. They are better drained than Joy soils and have a thicker dark-colored A horizon than Mt. Carroll soils. They have a profile similar to that of Tama soils, but their B2 horizon has less clay.

277A—Port Byron silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has the profile described as representative of the series. Included in mapping are small areas of somewhat poorly drained Joy soils and Mt. Carroll soils.

The only concern of management is a very slight hazard of erosion in some areas. This soil is used mainly for cultivated crops. It is well suited to all crops commonly grown in the county. It is also well suited to vegetable and orchard crops. Capability unit I–1.

277B—Port Byron silt loam, 2 to 6 percent slopes. This soil is in medium to large areas on ridges and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner.

Included with this soil in mapping are small areas of Mt. Carroll soils and of Tama soils that have more clay in the subsoil. Also included are a few small areas of wet soils that are shown by a spot symbol on the detailed soil map and small areas where the soils are eroded and the plow layer is a mixture of the surface layer and the subsoil.

The main concern of management is erosion. This soil is used mainly for cultivated crops. If erosion is controlled, it is well suited to all crops commonly grown in the county. It is also well suited to vegetable and orchard crops. Capability unit IIe–14.

858B—Port Byron-Mt. Carroll-Urban land complex, 1 to 6 percent slopes. This complex consists of Port Byron and Mt. Carroll soils and Urban land. These soils are on wide drainage divides within the city of Quincy and are used as sites for buildings, streets, and sidewalks. They have a profile similar to the one described as representative of their series, but much of the soil has been disturbed by urban development. Drainageways have been filled in places, and cuts have been made in landscaping for urban use. Soil material excavated is used for fill. It is mostly a mixture of surface layer, subsoil, and underlying material. In places the fill contains broken bricks, concrete, and cinders. Included with this complex in mapping are areas of light-colored Seaton soils.

Applying fertilizer in amounts based on soil tests is necessary to grow plants in disturbed areas. A top dressing of topsoil or mulch can help start new seedings. Engineering interpretations of the Port Byron and Mt. Carroll soils are generally applicable for the disturbed areas. Not placed in a capability unit.

Quarry

Q.U.—Quarry. This mapping unit consists of areas that are being or have been surface mined for limestone. A few small areas have been mined for gravel, but these are now abandoned. Most of the quarries take in 5 to 15 acres, but one takes in 50 acres.

The surface material is hard rock throughout most of the area. In many places the rock has been excavated to a depth of 10 to 30 feet. Some of these excavations now contain water. Adjacent to most quarries is soil material that was removed during excavation, and this spoil is included as part of the quarry. Not placed in a capability unit.

Racoon Series

The Racoon series consists of deep, nearly level, poorly drained soils. These soils formed in water-deposited silt loams and loams. They are commonly on terraces on the flood plains of small- and medium-sized streams that dissect the uplands. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsurface layer is gray silt loam about 15 inches thick. The subsoil is about 28 inches thick. For about 9 inches it is light-gray light silty clay loam mottled with dark yellowish brown. Below that for about 19 inches it is gray light silty clay loam mottled with dark yellowish brown. The underlying material is gray silt loam mottled with yellowish brown. It extends to a depth of 66 inches.

Racoon soils are moderately low in organic-matter content. They have slow permeability and a high available water capacity.

These soils are suited to crops commonly grown in the county if adequately drained.

Representative profile of Racoon silt loam, 977 feet west and 530 feet south of the northeast corner of sec. 27, T. 1 S., R. 8 W., in a formerly cultivated pasture:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure parting to weak, very fine, granular; friable; slightly acid; abrupt, smooth boundary.

A1—6 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure parting to moderate, fine, granular; friable; slightly acid; abrupt, smooth boundary.

A21—10 to 16 inches, gray (10YR 5/1) silt loam; many, fine, distinct, gray (10YR 4/1) mottles; moderate, medium, platy structure; friable; few, small dark concretions of iron and manganese; very strongly acid; clear, smooth boundary.

A22—16 to 25 inches, gray (10YR 5/1) silt loam; common, fine, distinct, dark grayish-brown (10YR 4/2) mottles; moderate, medium, platy structure; friable; common, medium, dark concretions of iron and manganese; very strongly acid; clear, smooth boundary.

B21t—25 to 34 inches, light-gray (10YR 6/1) light silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, prismatic structure; firm; thin, discontinuous, dark-gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds; white (10YR 8/1) silty grains on faces of peds, continuous in upper part and patchy in lower part; common, medium, dark concretions of iron and manganese; very strongly acid; gradual, smooth boundary.

B22t—34 to 45 inches, gray (10YR 5/1 and 10YR 6/1) light silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, coarse, prismatic structure; firm; thin, discontinuous, dark-gray (10YR 4/1) and gray (5/1) clay films on faces of peds; common, medium, dark concretions of iron and manganese; strongly acid; gradual, smooth boundary.

B3t—45 to 53 inches, gray (5Y 5/1) light silty clay loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles around soft accumulations of iron and manganese; weak, coarse, prismatic structure; few, medium, dark concretions of iron and manganese; common, dark-gray (10YR 4/1) clay films on channels and on faces of peds; firm; medium acid; gradual, smooth boundary.

C—53 to 66 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; few, medium, dark concretions of iron and manganese; few, dark-gray (10YR 4/1) clay films on channels; slightly acid.

The solum is 36 to 60 inches thick. The combined A horizons are commonly 24 to 30 inches thick, but in places they are 35 inches thick or more. The Ap horizon is dark grayish brown, dark gray, or grayish brown. The A2 horizon is commonly gray, light gray, grayish brown, and light brownish gray. The B horizon is light or medium silty clay loam. It is mainly strongly or very strongly acid, but it becomes less acid in the lower part.

Racoon soils are near Starks, Camden, and Birds soils on the landscape. They are more poorly drained than Starks and Camden soils. They have a B horizon that is not present

in Birds soils. Racoon soils have natural drainage similar to that of Rushville soils, but their B2 horizon has less clay, and their lower B horizon commonly has more sand.

109—Racoon silt loam. This soil is in small to large areas on terraces on flood plains of streams that drain the uplands, and it has a slope of 0 to 1 percent. Included in mapping are a few areas of very wet soils that are shown by a spot symbol on the detailed soil map. Also included are areas of soils that have a surface layer of very dark gray silt loam. One medium-sized area of soil, 4 miles east of Lima, has a subsoil of heavy silty clay loam, and a few small areas of similar soils are in other parts of the county.

The main concern of management is excess water. Most areas of this soil are used for cultivated crops. A few areas are in woodland. If excess water is removed, this soil is suited to most crops commonly grown in the county, except for some legumes. Capability unit IIIw–1.

Riley Series

The Riley series consists of deep, somewhat poorly drained, nearly level soils, mainly on the Mississippi River flood plain. These soils formed in alluvium. The native vegetation was hardwood forest.

In a representative profile the surface layer is very dark gray and very dark grayish-brown silty clay loam about 13 inches thick. The subsoil is about 14 inches thick. For about 6 inches it is dark grayish-brown light silty clay loam. Below that for about 8 inches it is grayish-brown loam mottled with yellowish brown. Underlying material is dark-brown loamy sand in the upper part and brown sand in the lower part. It extends to a depth of about 76 inches.

Riley soils are moderate in organic-matter content. They have moderate permeability and a moderate available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Riley silty clay loam, 1,045 feet west and 490 feet south of the northeast corner of NW¼ sec. 2, T. 3 S., R. 9 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1), very dark grayish-brown (10YR 3/2) crushed, silty clay loam; moderate, fine, granular structure and moderate, fine, subangular blocky; firm; slightly acid; abrupt, smooth boundary.

A12—7 to 13 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; slightly acid; abrupt, smooth boundary.

B1—13 to 19 inches, dark grayish-brown (10YR 4/2) light silty clay loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; firm; medium acid; clear, smooth boundary.

B2—19 to 27 inches, grayish-brown (10YR 5/2) heavy loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, coarse, subangular blocky structure; firm; many, fine, dark accumulations of iron and manganese; medium acid; clear, smooth boundary.

IIC1—27 to 36 inches, dark-brown (10YR 4/3) loamy sand; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; very weak, coarse, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

IIC2—36 to 76 inches, brown (10YR 5/3) sand; single grained; noncoherent; slightly acid; gradual, smooth boundary.

The solum is 15 to 30 inches thick. The A horizon is 10 to 24 inches thick. It is commonly very dark gray and very dark grayish brown but in places is very dark brown. The B horizon is clay loam, light silty clay loam, heavy silt loam, or heavy loam. The IIC horizon is loamy sand or sand and commonly has layers of loam, sandy loam, and silt loam. The solum is medium acid to mildly alkaline.

Riley soils are near Gorham and Beaucoup soils on the landscape. They have a thinner solum than Gorham and Beaucoup soils. They are more poorly drained than Beaucoup soils.

452—Riley silty clay loam. This soil is in small to medium areas on flood plains in the Mississippi River valley, and it has a slope of 0 to 2 percent. Included in mapping are small areas of Gorham soils. Also included in places are small areas of soils that have a sandy surface layer and are shown by a spot symbol on the detailed soil map. Areas of soils that have a surface layer and subsoil of silt loam or loam and underlying material of sandy loam are also included.

The main concerns of management are excess water and flooding. Most areas of this soil are used for cultivated crops. This soil is well suited to all crops commonly grown in the county if excess water is removed and if it is protected from flooding. Capability unit IIw–6.

Riverwash, Sand and Gravel

123—Riverwash, sand and gravel. This mapping unit commonly consists of sandy areas in old and recent levee breaks bordering the Mississippi River and areas of dredged sand deposited on islands in the Mississippi River. It is near streams on parts of the bottom land, on beaches and bars of the former Lima Lake (now drained) west of Lima, and on the bluff of the Mississippi River.

The materials in this unit are mainly loose sand or loamy sand and some gravel in places. Some of the sand in old Lima Lake is underlain by loam and silty clay loam at a depth of 40 to 60 inches. Included in mapping are small areas of silt loam to sandy loam soil material.

This mapping unit has low organic-matter content and a very low available water capacity. It has little or no value for cultivated crops or hay. It has some value for woodland. It has a small value for use as wildlife habitat and for recreational purposes in places, and it can be a source of sand and, to a lesser extent, gravel for local use. Capability unit VIIs–3.

Rozetta Series

The Rozetta series consists of deep, moderately well drained, nearly level to strongly sloping soils on uplands. These soils formed in loess. They are on medium-width drainage divides and on sides of stream valleys, mainly in the western part of the county. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 5 inches thick. The subsurface layer is brown silt loam about 5 inches thick. The subsoil is about 50 inches thick. For about 17 inches it is brown and yellowish-brown light silty clay loam that is mottled in the lower 8 inches. For about

23 inches it is yellowish-brown light silty clay loam mottled with light olive gray and light brownish gray. Below that for about 10 inches it is dark yellowish-brown, yellowish-brown, and light brownish-gray heavy silt loam. Underlying the subsoil is yellowish-brown and light brownish-gray silt loam. It extends to a depth of about 70 inches.

Rozetta soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity. The water table is 3 or 4 feet below the surface for part of most years.

The more gently sloping Rozetta soils are well suited to crops commonly grown in the county if erosion is controlled. The more strongly sloping and eroded soils are poorly suited to crops.

Representative profile of Rozetta silt loam, 2 to 7 percent slopes, 845 feet west and 400 feet north of the southeast corner of sec. 4, T. 2 S., R. 8 W., in a cultivated field:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, very fine and fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—5 to 10 inches, brown (10YR 5/3) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, medium, platy structure; friable; neutral; abrupt, smooth boundary.

B1t—10 to 14 inches, yellowish-brown (10YR 5/4) heavy silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, fine, subangular blocky structure; friable; thin, discontinuous, light-gray (10YR 7/2) silt grains on faces of peds; strongly acid; clear, smooth boundary.

B21t—14 to 19 inches, brown (7.5YR 5/4) light silty clay loam; strong, fine, subangular blocky structure; firm; thick, continuous, light-gray (10YR 7/2) silt grains on faces of peds; few, fine, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

B22t—19 to 27 inches, brown (7.5YR 5/4) and yellowish-brown (10YR 5/4) light silty clay loam; common, fine, distinct, light brownish-gray (2.5Y 6/2) and yellowish-brown (10YR 5/6) mottles in lower half of horizon; moderate, medium, angular blocky structure; firm; thin, discontinuous, light-gray (7.5YR 5/2) clay films on faces of peds; few, fine, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

B23t—27 to 38 inches, yellowish-brown (10YR 5/4) light silty clay loam; medium, fine, distinct, light brownish-gray (2.5Y 6/2) and common, fine and medium, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, coarse, angular blocky structure; firm; thin, continuous, brown (7.5YR 5/2) clay films on faces of peds; few, fine, dark concretions of iron and manganese; strongly acid; gradual, smooth boundary.

B31t—38 to 50 inches, yellowish-brown (10YR 5/4) light silty clay loam; many, fine and medium, distinct, dark grayish-brown (10YR 4/2) and light brownish-gray (2.5Y 6/2) mottles; weak, medium, prismatic structure; firm; thick, continuous, brown (7.5YR 5/2) clay films on faces of peds; few, fine, dark concretions of iron and manganese; medium acid; gradual, smooth boundary.

B32—50 to 60 inches, dark yellowish-brown (10YR 5/4) and light brownish-gray (10YR 6/2) heavy silt loam; very weak, coarse, prismatic structure; friable; few, very dark grayish-brown (10YR 3/2) stains; thick, continuous, dark-gray (10YR 4/1) clay films on faces of peds and on channel fillings; few, fine, dark concretions of iron and manganese; slightly acid; gradual, smooth boundary.

C—60 to 70 inches, yellowish-brown (10YR 5/4) and light brownish-gray (10YR 6/2) silt loam; few, fine, distinct, very dark grayish-brown (10YR 3/2) mottles; massive; friable; grayish-brown (10YR 5/2) channel fillings and linings; neutral.

The solum is commonly 36 to 65 inches thick. The combined A horizons are 9 to 14 inches thick where uneroded. The Ap or A1 horizon is commonly dark grayish brown, but it is very dark grayish brown in places if less than 6 inches thick. The A2 horizon is dark grayish brown to brown. The B2 horizon is light to medium silty clay loam. The B horizon is mainly medium acid to strongly acid. The C horizon is neutral to medium acid.

Rozetta soils are near Fayette and Stronghurst soils on the landscape. They are more poorly drained than Fayette soils and better drained than Stronghurst soils. They have a profile similar to that of Clinton soils, but their B2 horizon has less clay.

279A—Rozetta silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thicker.

Included with this soil in mapping are small areas of well-drained Fayette soils and of somewhat poorly drained Stronghurst soils. Also included are small areas of soils where the surface layer is very dark grayish brown silt loam more than 6 inches thick.

The only concern of management is a very slight hazard of erosion on soils that have a slope of 1 to 2 percent. This soil is used mainly for cultivated crops. A few areas are used for pasture. It is well suited to all crops commonly grown in the county. It is also suited to vegetable and orchard crops. Capability unit I–1.

279B—Rozetta silt loam, 2 to 7 percent slopes. This soil is in small to large areas on ridges and sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of well-drained Fayette soils and of sloping, somewhat poorly drained Stronghurst soils. Also included are relatively large areas of soils where the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil. Also, a few areas of severely eroded soils that have a silty clay loam surface layer are included.

A minor concern of management is erosion. Most areas of this soil are used for cultivated crops. A few areas are used for pasture or are in woodland. If erosion is controlled, this soil is well suited to all crops commonly grown in the county. It is also suited to vegetable and orchard crops. Capability unit IIe–1.

279C2—Rozetta silt loam, 7 to 12 percent slopes, eroded. This soil is in small to large areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the plow layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil and the subsoil is thinner.

Included with this soil in mapping are areas of soils where the subsoil is less than 36 inches thick and other areas of soils where the surface layer and subsurface layer are 8 to 14 inches thick.

The main concerns of management are erosion and slope. Most areas of this soil are used for cultivated crops. A few areas are used for pasture, and some are in woodland. If erosion is controlled, this soil is suited to all crops commonly grown in the county. It is also

suited to pasture, orchards, and woodland. Capability unit IIIe–1.

279C3—Rozetta soils, 7 to 12 percent slopes, severely eroded. This soil is in small to large areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is mainly yellowish-brown light silty clay loam and dark grayish-brown silt loam, and the subsoil is thinner.

Included with this soil in mapping are a few areas of wet or sandy soils that are shown by a spot symbol on the detailed soil map. Also included are a few areas of soils where shale or clayey buried soil is below a depth of 40 inches and the subsoil has many gray mottles. A few areas of soils where the subsoil is dark-red heavy silty clay loam are also included.

The main concern of management is erosion, but slope is also a concern. Most areas of this soil are used for cultivated crops. This soil is poorly suited to crops commonly grown in the county, because erosion is difficult to control. It is suited to hay, pasture, orchards, and woodland. Capability unit IVe–1.

Rushville Series

The Rushville series consists of deep, poorly drained, nearly level soils on uplands. These soils formed in loess. They are on medium-width drainage divides and in slight depressions. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is gray silt loam about 8 inches thick. The subsoil is about 41 inches thick. For about 13 inches it is gray silty clay mottled with yellowish brown. For about 22 inches it is gray silty clay loam mottled with yellowish brown. Below that for about 6 inches it is gray light silty clay loam mottled with yellowish brown. Underlying material extends to a depth of about 6 inches. It is gray silt loam mottled with yellowish brown.

Rushville soils are moderately low in organic-matter content. They have slow to very slow permeability and a high available water capacity.

These soils are suited to most crops commonly grown in the county except those most sensitive to excess water, such as alfalfa.

Representative profile of Rushville silt loam, 1,110 feet west and 490 feet north of the southeast corner of SW¼ sec. 13, T. 1 S., R. 6 W., in a cultivated field:

Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam; dark grayish-brown (10YR 4/2) crushed; moderate, fine, granular structure; friable; few, small, dark concretions of iron and manganese; slightly acid; abrupt, smooth boundary.

A2—7 to 15 inches, gray (5YR 6/1) silt loam; many, medium, faint, gray (10YR 5/1) mottles; weak, medium, platy structure; friable; common, small, dark concretions of iron and manganese; slightly acid; clear, smooth boundary.

B21tg—15 to 28 inches, gray (5Y 5/1) silty clay; gray (2.5Y 5/1) and grayish-brown (2.5Y 5/2) exteriors of peds; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, prismatic structure parting to moderate, medium, angular blocky; firm; nearly continuous, white (5Y 8/1), dry, silt grains on faces of peds in the upper 3 inches; common, medium, dark concretions of iron; few slickensides at a 30 degree angle from the horizontal; strongly acid; clear, smooth boundary.

B22tg—28 to 36 inches, gray (5Y 5/1-6/1) heavy silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, coarse, angular blocky structure; firm; moderately thick, continuous, clay films on faces of peds; common, medium, dark concretions of iron and manganese; strongly acid; gradual, smooth boundary.

B31tg—36 to 50 inches, gray (5Y 6/1) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/8) mottles; weak, coarse, angular blocky structure; firm; concretions of iron and manganese increase in number in this horizon, and there are also long streaks and pockets of concretions; discontinuous dark-gray (N 4/0) clay films on faces of peds and channels; strongly acid; gradual, smooth boundary.

B32tg—50 to 56 inches, gray (5Y 6/1) light silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; very weak, coarse, angular blocky structure; firm; many, medium, dark concretions of iron and manganese; many, dark-gray (N 4/0) clay films on faces of peds and channel fillings; strongly acid; gradual, smooth boundary.

C—56 to 66 inches, gray (5Y 5/1-6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; predominantly strong-brown (7.5YR 5/8) pockets; dark-gray (N 4/0) clay films on sides of cracks; common, medium, dark concretions of iron and manganese; medium acid.

The solum is commonly 45 to 56 inches thick. The A and A2 horizons combined are 12 to 16 inches thick. The Ap horizon is dark grayish brown, dark gray, and grayish brown. The A2 horizon is commonly light gray, gray, light brownish gray, and grayish brown. The B2 horizon is heavy silty clay loam or silty clay. The B horizon is medium acid to very strongly acid and becomes less acid in the lower part in some places. The C horizon is medium acid to neutral.

Rushville soils are near Keomah and Clarksdale soils on the landscape but are more poorly drained. Rushville soils have natural drainage similar to that of Cowden soils but are lighter in color in the Ap horizon.

16—Rushville silt loam. This soil is in small areas on medium-width drainage divides, and it has a slope of 0 to 2 percent. Included in mapping are areas of slightly sloping, somewhat poorly drained Keomah soils. Also included are a few areas of very wet soils that are shown by a spot symbol on the detailed soil map. A few areas of soils where the surface layer is very dark gray are also included.

The main concern of management is excess water, but slow to very slow permeability is also a concern. Most areas of this soil are used for cultivated crops. Other areas are used for pasture, and some are in woodland. This soil is suited to most crops commonly grown in the county if excess water is removed. It is also suited to pasture. It is less suited to crops sensitive to soil wetness, because excess water is difficult to remove. Capability unit IIIw–1.

Sandy Alluvial Land

604—Sandy alluvial land. This mapping unit consists of nearly level sandy alluvial areas adjacent to small and medium upland streams and on the flood plain of the Mississippi River. The surface layer is mainly dark grayish brown, but it is very dark grayish brown in places. It is mainly sandy loam, but in places it is silt loam, loamy sand, and sand. The underlying

material is commonly sandy loam or loamy sand, but in places it is sand and silt loam. Many areas have alternating lenses of sandy loam, silt loam, loamy sand, and sand. Most areas are well drained to somewhat excessively drained, but two areas, one about 4 miles east of Meyer and the other about 3 miles southeast of Meyer, are somewhat poorly drained.

The main concerns of management are low available water capacity and a hazard of flooding. This soil has low organic-matter content and a moderate to low available water capacity. It is suited to cultivated crops if protected by levees. Capability unit IIIs–3.

Seaton Series

The Seaton series consists of deep, well drained, nearly level to very steep soils on uplands on and near the bluff bordering the Mississippi River flood plain. These soils formed in loess. They are on narrow and medium-width drainage divides and on sides of stream valleys. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is brown silt loam about 3 inches thick. The subsoil is mainly brown and yellowish-brown silt loam about 32 inches thick. Underlying the subsoil is yellowish-brown silt loam that extends to a depth of about 60 inches.

Seaton soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity.

The less sloping Seaton soils are well suited to cultivated crops if erosion is controlled. More steeply sloping Seaton soils are suited to hay, pasture, and woodland.

Representative profile of Seaton silt loam, 2 to 7 percent slopes, 660 feet west and 530 feet south of the northeast corner of NW¼ sec. 23, T. 1 S., R. 9 W., in a cultivated field:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—8 to 11 inches, brown (10YR 4/3) silt loam; weak, thin, platy structure; friable; thin, patchy, gray (10YR 6/1), dry, silt grains on faces of peds; few, small, dark grayish-brown chunks; slightly acid; clear, smooth boundary.

B1—11 to 14 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—14 to 27 inches, brown (7.5YR 5/4) heavy silt loam; moderate, fine, subangular blocky structure; friable; few, thin, discontinuous, dark-brown (7.5YR 4/4) clay films and thin, patchy, light-gray (10YR 7/1), dry, silt grains on faces of peds; medium acid; gradual, smooth boundary.

B22t—27 to 38 inches, yellowish-brown (10YR 5/4) heavy silt loam; weak, medium, subangular blocky structure; friable; few, thin, discontinuous, dark-brown (7.5YR 4/4) clay films and thin, patchy, light-gray (10YR 7/1) silt grains on faces of peds; medium acid; gradual, smooth boundary.

B3—38 to 43 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; weak, coarse, prismatic structure; friable; thin, discontinuous, light-gray (10YR 7/1) silt grains on faces of peds; medium acid; gradual, smooth boundary.

C—43 to 60 inches, yellowish-brown (10YR 5/6) silt loam; massive; slightly acid.

The solum is 36 to 65 inches thick. The Ap and A2 horizons combined are 10 to 16 inches thick where uneroded. The Ap horizon is commonly dark grayish brown, but it is brown or dark brown in places. The A2 horizon is commonly brown, but it is grayish brown in places. The B horizon is commonly yellowish brown, but single horizons are brown in places. The B2 horizon is heavy silt loam or silt loam. The B horizon is slightly acid and medium acid. The C horizon is medium acid to moderately alkaline.

Seaton soils are near Timula and Mt. Carroll soils on the landscape. They are more acid in the lower part of the B horizon and have a thicker solum than Timula soils. They are lighter in color in the Ap horizon than Mt. Carroll soils.

274A—Seaton silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides that are near the Mississippi River bluff. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thicker. Included in mapping are small areas of Mt. Carroll soils that have a very dark grayish-brown surface layer.

The only concern of management is a very slight hazard of erosion on soils that have slopes of 1 to 2 percent. Most areas of this soil are used for cultivated crops. Other areas are used for pasture, and a few are in woodland. This soil is well suited to all crops commonly grown in the county. It is also well suited to vegetable and orchard crops. Capability unit I–1.

274B—Seaton silt loam, 2 to 7 percent slopes. This soil is in small to large areas on ridges and sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Mt. Carroll soils that have a very dark grayish-brown surface layer. In about 40 percent of the soil area, the plow layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil. Also included are small areas of soils where the surface and subsoil layers are fine sand or are mixed with chert fragments. These areas are shown by a spot symbol on the detailed soil map.

The only concern of management is a slight hazard of erosion. Most areas of this soil are used for cultivated crops. A few areas are used for pasture, and a few are in woodland. This soil is well suited to all crops commonly grown in the county if erosion is controlled. It is also well suited to vegetable and orchard crops. Capability unit IIe–1.

274C2—Seaton silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the plow layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil.

Included with this soil in mapping are small areas of Timula soils. Also included are small areas of severely eroded soils where the plow layer is mainly subsoil and is yellowish-brown heavy silt loam. In these areas the subsoil is 15 to 32 inches thick. In addition, there is a 20-acre area about 2 miles northwest of Marcelline of soils that are sand and loamy sand throughout the profile. This area is shown by several sand spot symbols on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are used for cultivated crops or pasture. A few areas are in woodland. If

erosion is controlled, this soil is suited to all crops commonly grown in the county. It is well suited to pasture, woodland, and orchards. Capability unit IIIe–1.

274D2—Seaton silt loam, 12 to 18 percent slopes, eroded. This soil is in small to medium areas on sides of streams and drainageways. It has a profile similar to the one described as representative of the series, but the surface layer, the subsurface layer, and the subsoil are thinner.

Included with this soil in mapping are areas of Timula soils that have a thinner profile and of Hickory loam soils. Also included are areas of severely eroded soils where the plow layer is yellowish-brown heavy silt loam. Small areas of excessively wet soils and other areas of soils that have limestone outcrops are shown by a spot symbol on the detailed soil map. Small areas of soils that have a surface layer 8 to 12 inches thick and other areas of soils that have a yellowish-brown surface layer are also included.

The main concerns of management are erosion and slope. Most areas of this soil are used for hay or pasture. Other areas are used for cultivated crops, and some are in woodland. This soil is poorly suited to cultivated crops because erosion is difficult to control. It is suited to hay, pasture, and orchards, and it is well suited to woodland. Capability unit IVe–1.

274E—Seaton silt loam, 18 to 30 percent slopes. This soil is in small to large areas on sides of stream valleys and near bluffs bordering the Mississippi River flood plains. It has a profile similar to the one described as representative of the series, but the subsoil is thinner and has less clay.

Included with this soil in mapping are areas of Timula soils that have a thinner profile and of Hickory loam and Goss cherty silt loam soils. Also included are areas of soils that have limestone rock outcrops on the surface. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are used for woodland. Other areas are used for hay or pasture. This soil is well suited to woodland if erosion is controlled. It is also suited to pasture, but it is poorly suited to hay because of slope. Capability unit VIe–1.

274F—Seaton silt loam, 30 to 50 percent slopes. This soil is in small to large areas on sides of stream valleys and near bluffs bordering the Mississippi River flood plains. It has a profile similar to the one described as representative of the series, but the surface layer and subsoil are thinner, and the subsoil has less clay. Included in mapping are small areas of Timula soils that have a thinner profile and of Hickory loam and Goss cherty silt loam soils.

The main concerns of management are erosion and slope. Most areas of this soil are used for woodland. A few areas are used for pasture. This soil is well suited to woodland. If erosion is controlled, it is also suited to pasture. Capability unit VIIe–1.

931E—Seaton-Goss complex, 18 to 30 percent slopes. This complex consists of about 50 percent Seaton silt loam and about 40 percent Goss cherty silt loam. These soils are on sides of valleys cut by streams. Goss soils are on the lower part of the valley sides. The soils on lower lying parts of this complex have common to many stones on the surface and, in a few places, outcrops of limestone rock.

The Seaton and Goss soils have a profile similar to the one described as representative of their series. They have a surface layer that is commonly 8 to 12 inches thick. Included in mapping are small areas of Timula soils.

The main concerns of management are slope and erosion. The soils in this complex are suited to pasture and woodland. Pasture and woodland growth is less rapid on the lower parts of the valley sides than on higher positions. Capability unit VIe–1.

931F—Seaton-Goss complex, 30 to 50 percent slopes. This complex consists of about 55 percent Seaton silt loam and about 40 percent Goss cherty silt loam. These soils are on sides of valleys cut by streams. Goss soils are on the lower parts of the valley sides. The soils in this complex have common to many stones on the surface and, in places, a few outcrops of rock.

The Seaton and Goss soils have a profile similar to the one described as representative of their series. They have a surface layer that is commonly 7 to 10 inches thick. Included in mapping are small areas of Timula and Hamburg soils.

The main concerns of management are slope and erosion. The soils in this complex are suited to woodland. Woodland growth is less rapid on the lower part of the valley sides than on higher positions. Capability unit VIIe–1.

937E—Seaton-Hickory complex, 18 to 30 percent slopes. This complex consists of about 60 percent Seaton silt loam and 40 percent Hickory loam. These soils are in medium to large areas of valleys cut by streams. Hickory soils are on the lower part of the valley sides and have few to many pebbles and small stones on the surface.

The Seaton and Hickory soils have a profile similar to the one described as representative of their series. Included in mapping are small areas of Ursa soils and Timula soils.

The main concerns of management are slope and erosion. The soils in this complex are suited to pasture and woodland. Capability unit VIe–1.

937F—Seaton-Hickory complex, 30 to 50 percent slopes. This complex consists of about 55 percent Seaton silt loam and about 45 percent Hickory loam. These soils are in medium to large areas on sides of valleys cut by streams. Hickory soils are on the lower part of the valley sides and have few to many pebbles and small stones on the surface.

The Seaton and Hickory soils have a profile similar to the one described as representative of their series. Included in mapping are small areas of Camden soils and small areas of Timula soils.

The main concerns of management are slope and erosion. The soils in this complex are suited to woodland. Capability unit VIIe–1.

U274C—Seaton-Urban land complex, 1 to 7 percent slopes. This complex consists of Seaton soils and Urban land. The areas are mainly along small drainageways and medium-width divides within the city of Quincy and are used as sites for buildings, streets, and sidewalks. The Seaton soils have a profile like the one described as representative of the series, but much of the soil has been disturbed by urban development. Drain-

ageways have been filled in places, and cuts have been made in landscaping for urban use. Soil material excavated is used for fill. It is mostly a mixture of surface layer, subsoil, and underlying material. In places the fill contains broken bricks, concrete, and cinders. Included with this complex in mapping are areas of Mt. Carroll soils, mainly on the wider drainage divides.

Applying fertilizer in amounts based on soil tests is necessary to grow plants in disturbed areas. A top dressing of topsoil or mulch can help start new seedings. Engineering interpretations of the Seaton soils are generally applicable. Not placed in a capability unit.

U274D—Seaton-Urban land complex, 7 to 15 percent slopes. This complex consists of Seaton soils and Urban land. The areas are on sides of drainageways and along the bluff within the city of Quincy and are used as sites for buildings, streets, and sidewalks. The Seaton soil has a profile similar to the one described as representative of the series, but the surface layer and subsoil are thinner, and much of the soil has been disturbed by urban development. Drainageways have been filled in places, and cuts have been made in landscaping for urban use. Soil material excavated is used for fill. It is mostly a mixture of surface layer, subsoil, and underlying material. In places the fill contains broken bricks, concrete, and cinders. Included with this complex in mapping are small areas of Hickory soils along drainageways, outcrops of limestone, and soils steeper than defined for this complex. Narrow strips of bottom land soils that flood for short periods after heavy rainfall are also included.

Applying fertilizer in amounts based on soil tests is necessary to grow plants in disturbed areas. A top dressing of topsoil or mulch can help start new seedings. Engineering interpretations of the Seaton soils are generally applicable for the disturbed areas. Not placed in a capability unit.

Shiloh Series

The Shiloh series consists of deep, very poorly drained, nearly level soils in the Mississippi River flood plain. These soils formed in water-deposited clayey sediments. The native vegetation was mixed prairie grasses and hardwood forest.

In a representative profile the surface layer is very dark gray light silty clay about 19 inches thick. The subsoil is about 43 inches thick. For 13 inches it is very dark gray light silty clay mottled with dark yellowish brown. Below that for 30 inches it is dark-gray silty clay mottled with dark yellowish brown. The underlying material is gray silty clay loam mottled with yellowish brown. It extends to a depth of 70 inches.

Shiloh soils are high in organic-matter content. They have slow to moderately slow permeability and a moderate to high available water capacity.

These soils are suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Shiloh silty clay, 1,135 feet west and 91 feet south of the northeast corner of sec. 7, T. 2 N., R. 9 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) light silty clay; weak, fine, granular structure; firm; few, fine, dark concretions of iron and manganese; neutral; abrupt, smooth boundary.

A12—7 to 19 inches, very dark gray (10YR 3/1) light silty clay; weak, medium and coarse, prismatic structure; firm; few, fine, dark concretions of iron and manganese; neutral; clear, smooth boundary.

B21—19 to 32 inches, very dark gray (10YR 3/1) light silty clay; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium and coarse, prismatic structure; firm; few, fine, dark concretions of iron and manganese; neutral; clear, smooth boundary.

B22g—32 to 48 inches, dark-gray (10YR 4/1) light silty clay; moderate, medium, prismatic structure parting to moderate, fine and medium, angular blocky; firm; few, fine concretions of iron and manganese; neutral; clear, smooth boundary.

B23g—48 to 62 inches, dark-gray (5Y 4/1) light silty clay; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, prismatic structure parting to moderate, fine and medium, subangular blocky; firm; common, fine concretions of iron and manganese; neutral; gradual, smooth boundary.

C—62 to 70 inches, gray (5Y 5/1) light silty clay loam; common, medium and coarse, distinct, yellowish-brown (10YR 5/6) mottles; very weak, coarse, prismatic structure; firm; neutral.

The solum is light silty clay, heavy silty clay loam, and in places, light silty clay loam in the lower part. The A horizon is very dark gray or black. The lower part of the B horizon is black to gray. The solum is mildly alkaline and neutral.

Shiloh soils are near Darwin, Beaucoup, and Gorham soils on the landscape. Their solum has less clay than Darwin soils and more clay than Beaucoup soils. Their B horizon has less sand in the lower part than Gorham soils. Shiloh soils formed in the same kind of material as Titus soils, but they have thicker layers of very dark gray or black.

138—Shiloh silty clay. This soil is in medium to large areas on the Mississippi River flood plain, and it has a slope of 0 to 1 percent. Included in mapping are small to medium areas of soils that have a surface layer or subsoil of light silty clay loam. Other small areas of soils have lenses of silt loam and sandy loam in the surface layer and subsoil. In places these lenses of silt loam in the surface layer are 8 to 20 inches thick. Also included in mapping are small areas of soils that are subject to frequent flooding or ponding.

The main concerns of management are very poor drainage, flooding, ponding, slow to moderately slow permeability, and tilth. This soil is suited to crops commonly grown in the county if protected from flooding and adequately drained. Capability unit IIw–1.

Sparta Series

The Sparta series consists of deep, excessively drained, nearly level and gently sloping soils on terraces. These soils formed in water-deposited sandy material. They are on terraces or benches on the Mississippi River flood plain. The native vegetation was prairie grasses.

In a representative profile the upper part of the surface layer is very dark brown loamy sand about 17 inches thick. The lower part is very dark grayish-brown loamy sand about 6 inches thick. The subsoil is dark-brown and dark yellowish-brown sand about 17 inches thick. The underlying material is yellowish-brown sand that extends to a depth of about 60 inches.

Sparta soils are moderately low in organic-matter

content. They have rapid permeability and a low available water capacity.

These soils are suited to hay, pasture, and woodland. They are poorly suited to crops, because of low available water capacity.

Representative profile of Sparta loamy sand, 1,915 feet west and 200 feet south of the northeast corner of sec. 8, T. 1 N., R. 9 W., in a cultivated field:

Ap—0 to 8 inches, very dark brown (10YR 2/2) loamy sand; weak, fine, subangular blocky structure; very friable; neutral; clear, smooth boundary.

A1—8 to 17 inches, very dark brown (10YR 2/2) loamy sand; very weak, coarse, angular blocky structure; very friable; neutral; clear, smooth boundary.

A3—17 to 23 inches, very dark grayish-brown (10YR 3/2) loamy sand; very weak, medium, angular blocky structure; very friable; medium acid; clear, smooth boundary.

B2—23 to 34 inches, dark-brown (10YR 4/3) and dark yellowish-brown (10YR 4/4) sand; very weak, medium, subangular blocky structure; noncoherent; few, dark-brown (10YR 3/3) channel fillings; medium acid; gradual, smooth boundary.

B3—34 to 40 inches, dark yellowish-brown (10YR 4/4) sand; single grained; noncoherent; dark-brown (10YR 3/3) irregular bands one-tenth to one-fourth inch thick that have total thickness of three-fourths inch; medium acid; gradual, smooth boundary.

C—40 to 60 inches, yellowish-brown (10YR 5/4 and 10YR 5/6) sand; single grained; noncoherent; brown (7.5YR 4/4) sandy loam in one-fourth to one-half inch horizontal bands that have total thickness of 2-1/2 inches; medium acid.

The solum is about 30 to 40 inches thick. The A horizon is 15 to 24 inches thick where uneroded. The A1 horizon is commonly very dark brown or very dark grayish brown in the upper part and very dark grayish brown or dark brown in the lower part. It is loamy sand or sand. The B horizon is sand or loamy sand. It is medium acid.

Sparta soils are near Dickinson soils on the landscape. Their solum has less clay and silt than Dickinson soils. These soils have thin bands and stratification in the B and C horizons that are not in the defined range for this series, but this does not significantly alter their usefulness and behavior.

88B—Sparta loamy sand, 0 to 4 percent slopes. This soil is in medium to large areas on terraces on the Mississippi River flood plain, mainly south of Marblehead and west of Ursa. It has a slope of 0 to 4 percent. Included in mapping are small areas of well-drained to somewhat excessively drained Dickinson soils that have a surface layer of sandy loam. Also included are long, narrow areas of soils on the edge of terraces that commonly have slopes of 7 to 12 percent. Other areas of soils are included where the surface layer is very dark grayish-brown loam 8 to 25 inches thick.

The main concerns of management are droughtiness, low fertility, and soil blowing. Most areas of this soil are used for hay or pasture. This soil is poorly suited to cultivated crops, because it is droughty. It is suited to hay and pasture, and it is well suited to woodland. Capability unit IVs–1.

Starks Series

The Starks series consists of deep, somewhat poorly drained, nearly level to gently sloping soils on terraces. These soils formed in loess and water-deposited, mainly silty materials. They are now on benches above the adjacent flood plain. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is grayish-brown, brown, and pale-brown silt loam about 10 inches thick. The subsoil is about 37 inches thick. For 14 inches it is brown silty clay loam mottled with grayish brown. For 12 inches it is grayish-brown silty clay loam mottled with yellowish brown. Below that for 11 inches it is light brownish-gray light silty clay loam mottled with yellowish brown. The underlying material is light brownish-gray silt loam and layers of loam. It extends to a depth of 70 inches.

Starks soils are moderately low in organic-matter content. They have moderate to moderately slow permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained.

Representative profile of Starks silt loam, 390 feet east and 415 feet south of the northwest corner of SW¼ sec. 28, T. 2 S., R. 8 W., in a cultivated field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) and some brown (10YR 5/3) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; moderate, fine, granular structure; friable; few concretions of iron and manganese; slightly acid; abrupt, smooth boundary.

A21—6 to 10 inches, grayish-brown (10YR 5/2) and some brown (10YR 5/3) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, thin, platy structure; friable; few concretions of iron and manganese; slightly acid; clear, smooth boundary.

A22—10 to 13 inches, brown (10YR 5/3) silt loam; moderate, thin, platy structure; friable; very few concretions of iron and manganese; slightly acid; clear, smooth boundary.

A23—13 to 16 inches, pale-brown (10YR 6/3), very pale brown (10YR 7/3), and some brown (10YR 5/3) silt loam; weak, thick, platy structure parting to weak, very fine, subangular blocky; friable; few concretions of iron and manganese; slightly acid; clear, smooth boundary.

B1—16 to 20 inches, brown (10YR 5/3) light silty clay loam; few, fine, distinct, grayish-brown (10YR 5/2) and common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; firm; discontinuous, light-gray (10YR 7/1), dry, coatings on faces of peds and lining channels; strongly acid; clear, smooth boundary.

B21t—20 to 30 inches, brown (10YR 5/3) light silty clay loam; many, fine, faint, grayish-brown (10YR 5/2) and common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, angular blocky structure; firm; few, small accumulations of iron and manganese; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; strongly acid; clear, smooth boundary.

IIB22t—30 to 42 inches, grayish-brown (10YR 5/2) light silty clay loam and some sand; many, medium, distinct, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure parting to moderate, medium, angular blocky; firm; few, small accumulations of iron and manganese; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds and channel linings; strongly acid; clear, smooth boundary.

IIB3—42 to 53 inches, light brownish-gray (10YR 6/2) light silty clay loam and some sand; many, medium, distinct, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) mottles; weak, coarse, prismatic structure; firm; few, dark-gray

(10YR 4/1) channel linings; strongly acid; gradual, smooth boundary.

IIC—53 to 70 inches, light brownish-gray (10YR 6/2) silt loam that has some sand and layers of loam, especially in the lower part; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; a 6-inch zone near the center of the horizon has common, medium, prominent, brown to dark-brown (7.5YR 4/4) mottles and accumulations of iron; medium acid; abrupt, smooth boundary.

The solum is 45 to 60 inches thick. The loess is commonly 24 to 36 inches thick. The A horizons combined are about 12 to 16 inches thick where uneroded. The A2 horizon is generally grayish brown or brown in the upper part and light brownish gray or pale brown in the lower part. The B2 horizon is light or medium silty clay loam. The B horizon is generally mottled throughout, but in places the upper few inches are unmottled. It is medium acid and strongly acid. The C horizon is medium acid to mildly alkaline.

Starks soils are near Racoon, Camden, and Wakeland soils on the landscape. They are better drained and have a thinner A horizon than Racoon soils. They are more poorly drained than Camden soils and have a B horizon that is lacking in Wakeland soils.

132A—Starks silt loam, 0 to 3 percent slopes. This soil is in small to large areas on terraces, and it has a slope of 0 to 3 percent. Included in mapping are low-lying areas of poorly drained Racoon soils and gently sloping areas of well drained and moderately well drained Camden soils on ridges. Also included are areas of soils where the subsoil is heavy silt loam. Other small areas of soils are included that have slopes of 3 to 5 percent.

The main concern of management is excess water. This soil is used mainly for cultivated crops. It is well suited to all crops commonly grown in the county if excess water is removed. Capability unit IIw–13.

Strip Mine

S.M.—Strip mine. This mapping unit consists of areas where deep cuts and fills have been made. Most of these areas are in the northeastern part of the county. The underlying bedrock is commonly shale that has some sandstone and a small amount of limestone. In these areas it has been mixed with the surface layer and exposed. Slopes are mainly steep and very steep. In many places long, narrow bodies of water cover the land. Common to many rocks are on the surface and throughout the material. Some of the rocks are relatively soft and break up from weathering in 3 to 10 years. The material is alkaline to extremely acid, but it is more commonly medium acid to neutral.

Most strip mine can be vegetated if slopes are not too steep. This land is low in nitrogen. Legumes grow well, but some may require addition of limestone. Trees can be grown in most strip mined areas. Not placed in a capability unit.

Stronghurst Series

The Stronghurst series consists of deep, somewhat poorly drained, nearly level to moderately sloping soils on uplands mainly in the western part of the county. These soils formed in loess. They are on medium-width drainageways and near heads of drainageways. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark-gray silt loam about 7 inches thick. The subsurface layer is grayish-brown and dark grayish-brown silt loam about 12 inches thick. The subsoil is about 43 inches thick. For 4 inches it is brown heavy silt loam. For 25 inches it is grayish-brown silty clay loam mottled with dark yellowish brown. Below that for about 14 inches it is mixed grayish-brown and dark yellowish-brown light silty clay loam. The underlying material is mixed light brownish-gray and yellowish-brown heavy silt loam. It extends to a depth of about 72 inches.

Stronghurst soils are moderately low in organic-matter content. They have moderate to moderately slow permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained and if erosion is controlled.

Representative profile of Stronghurst silt loam, 0 to 2 percent slopes, 1,170 feet north and 1,010 feet east of the southwest corner of NE¼ sec. 33, T. 1 S., R. 8 W.:

Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, very fine, granular structure; friable; neutral; abrupt, smooth boundary.

A21—7 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, medium, platy structure parting to weak, fine, granular; friable; slightly acid; abrupt, smooth boundary.

A22—12 to 19 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) and very dark grayish-brown (10YR 3/2) mottles; moderate, thin and medium, platy structure; friable; medium acid; clear, smooth boundary.

B1—19 to 23 inches, brown (10YR 5/3) heavy silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) and very dark grayish-brown (10YR 3/2) mottles; moderate, very fine, subangular blocky structure; friable; thick, continuous, light-gray (10YR 7/2) silt grains on faces of peds; strongly acid; clear, smooth boundary.

B21t—23 to 33 inches, grayish-brown (10YR 5/2) and brown (10YR 5/3) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) mottles; strong, medium and coarse, angular blocky structure; firm; few, fine, prominent, black (10YR 2/1) stains; thin, continuous, grayish-brown (10YR 5/2) clay films on faces of peds; some light-gray (10YR 7/2) silt grains on faces of peds in upper 4 inches of horizon; strongly acid; clear, smooth boundary.

B22t—33 to 48 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, coarse, angular blocky structure; firm; thick, continuous, grayish-brown (10YR 5/2) clay films on faces of peds; common, black (10YR 2/1) concretions of iron and manganese; strongly acid; gradual, smooth boundary.

B3t—48 to 62 inches, mixed grayish-brown (10YR 5/2) and dark yellowish-brown (10YR 4/4) light silty clay loam; weak, coarse, prismatic structure; firm; thin, discontinuous, dark-gray (10YR 4/1) clay films on faces of peds and on channel linings; few, black (10YR 2/1) concretions of iron and manganese; slightly acid; gradual, smooth boundary.

C—62 to 72 inches, mixed light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/6 and 5/8) heavy silt loam; massive; friable; dark-gray (10YR 4/1) channel linings; few, black (10YR 2/1) concretions of iron and manganese; slightly acid.

The solum is about 45 to 65 inches thick. The A horizons combined are 12 to 19 inches thick where uneroded. The Ap horizon is commonly dark grayish brown, dark gray, or grayish brown. The A2 horizon is grayish brown, brown, or dark grayish brown.

The B2 horizon is light to medium silty clay loam. In the eastern part of the area are Stronghurst soils that have thin horizons of heavy silty clay loam. The B horizon is generally mottled throughout, but in places the upper few inches are unmottled. It is medium acid and strongly acid. The C horizon is commonly slightly acid or neutral.

Stronghurst soils are near Rozetta and Atterberry soils on the landscape. They are more poorly drained than Rozetta soils and are lighter in color in the Ap horizon than Atterberry soils. Stronghurst soils have a profile similar to that of Keomah soils, but their B2 horizon has less clay.

278A—Stronghurst silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on drainage divides. It has the profile described as representative of the series. Included in mapping are small areas of Atterberry soils that have a very dark grayish-brown surface layer 6 to 10 inches thick. Also included are small areas of moderately well drained Rozetta soils on low ridges or mounds.

The main concern of management is excess water. Most areas of this soil are used for cultivated crops. Some areas are used for pasture. If excess water is removed, this soil is well suited to crops commonly grown in the county. Capability unit IIw–13.

278B—Stronghurst silt loam, 2 to 6 percent slopes. This soil is in small to medium areas on ridges and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner.

Included with this soil in mapping are small areas of moderately well drained Rozetta soils. Also included are small areas of Downs soils that have a very dark grayish-brown surface layer. About 30 percent of the areas mapped are eroded, and the surface layer is a mixture of the original surface layer, the subsurface layer, and some of the subsoil. Small areas of soils that have a surface layer of grayish-brown silty clay loam are also included.

The main concerns of management are erosion and excess water. Most areas of this soil are used for cultivated crops. Some areas are used for pasture. If erosion is controlled and excess water is removed, this soil is well suited to all crops commonly grown in the county. Capability unit IIe–13.

Tama Series

The Tama series consists of deep, well-drained, nearly level to moderately sloping soils on uplands. These soils formed in loess. They are on crests of low ridges, on gently sloping and moderately sloping drainage divides, and on sides of valleys. In the western part of the county, Tama soils are also on medium to wide, nearly level drainage divides. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark grayish-brown and brown silt loam about 16 inches thick. The subsoil is about 46 inches thick. For 14 inches it is brown silty clay loam. For 23 inches it is yellowish-brown silty clay loam that has light brownish-gray mottles in the lower part. Below that for about 9 inches it is yellowish-brown heavy silt loam mottled with light brownish gray. The underlying material is yellowish-brown silt loam mottled with light brownish gray. It extends to a depth of about 70 inches.

Tama soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if erosion is controlled.

Representative profile of Tama silt loam, 0 to 2 percent slopes, 800 feet east and 1,070 feet south of the northwest corner of sec. 21, T. 1 N., R. 8 W., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A1—7 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, granular structure; friable; neutral; clear, smooth boundary.

A3—12 to 16 inches, dark-brown (10YR 3/3) heavy silt loam; weak, fine, subangular blocky structure; friable; discontinuous dark yellowish-brown (10YR 3/4) coatings on faces of peds; slightly acid; clear, smooth boundary.

B1t—16 to 21 inches, brown (10YR 4/3) light silty clay loam; moderate, fine, subangular blocky structure; firm; very few, light-gray (10YR 7/1) silt grains on faces of some peds; medium acid; clear, smooth boundary.

B21t—21 to 30 inches, brown (10YR 4/3) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; thin, discontinuous, dark yellowish-brown (10YR 3/4) clay films on faces of peds; medium acid; clear, smooth boundary.

B22t—30 to 40 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, faint, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; firm; thin, discontinuous, dark yellowish-brown (10YR 3/4) clay films on faces of peds; few, small, dark accumulations of iron and manganese; medium acid; gradual, smooth boundary.

B31t—40 to 53 inches, yellowish-brown (10YR 5/4) light silty clay loam; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, subangular blocky structure; firm; patchy dark yellowish-brown (10YR 3/4) clay films on faces of peds; few, medium, dark accumulations of iron and manganese; medium acid; gradual, smooth boundary.

B32—53 to 62 inches, yellowish-brown (10YR 5/4) heavy silt loam; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, subangular blocky structure; friable; very few, patchy, dark yellowish-brown (10YR 3/4) clay films on faces of peds; few, medium accumulations of iron and manganese; medium acid; gradual, smooth boundary.

C—62 to 70 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; massive; friable; few, medium accumulations of iron and manganese; slightly acid.

The solum is 40 to 65 inches thick. The A horizon is 14 to 20 inches thick where uneroded. It is commonly very dark grayish brown, but in places it is very dark brown and black. The B2 horizon is light or medium silty clay loam. In places the B horizon is mottled with gray in the lower part. It is mainly medium acid to strongly acid. The C horizon is commonly slightly acid or neutral.

Tama soils are near Muscatine, Ipava, and Downs soils on the landscape. They are better drained than Muscatine or Ipava soils and have a thicker dark-colored A horizon than Downs soils.

36A—Tama silt loam, 0 to 2 percent slopes. This soil is in small to medium areas on medium and wide

drainage divides. It has the profile described as representative of the series. Included in mapping are small areas of somewhat poorly drained Muscatine soils in nearly level areas and of Port Byron soils on slightly sloping ridges that have a subsoil of silt loam. Also included are small areas of wet soils that are shown by a spot symbol on the detailed soil map.

The only concern of management is a very slight hazard of erosion on soils that have slopes of 1 to 2 percent. This soil is used mainly for cultivated crops. It is well suited to all crops commonly grown in the county. It is also well suited to vegetable and orchard crops. Capability unit I–1.

36B—Tama silt loam, 2 to 6 percent slopes. This soil is in small to large areas on ridges and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is a few inches thinner.

Included with this soil in mapping are small areas of Downs soils that have a dark-colored surface layer 6 to 10 inches thick. Also included are small areas of wet soils that are shown by a spot symbol on the detailed soil map. In about 15 percent of the areas mapped the plow layer is a mixture of the original surface layer and some of the subsoil.

The main concern of management is erosion. This soil is used mainly for cultivated crops. If erosion is controlled, this soil is well suited to all crops commonly grown in the county. It is also suited to vegetable and orchard crops. Capability unit IIe–14.

Tice Series

The Tice series consists of deep, somewhat poorly drained, nearly level soils mainly on the Mississippi River flood plain. These soils formed in alluvium. They commonly are slightly higher on the landscape than nearby soils. The native vegetation was mixed hardwood forest and prairie grasses.

In a representative profile the surface layer is very dark grayish-brown light silty clay loam about 13 inches thick. The subsoil is about 47 inches thick. For 16 inches it is dark grayish-brown light silty clay loam. For about 21 inches it is grayish-brown light silty clay loam and loam. Below that for about 10 inches it is gray silty clay loam and loam mottled with dark brown. The underlying material is gray stratified silty clay loam and loam mottled with dark brown. It extends to a depth of 70 inches.

Tice soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are well suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Tice silty clay loam, 610 feet west and 55 feet north of the southeast corner of SW¼ sec. 15 T. 2 S., R. 9 W., in a cultivated field:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; weak, fine, granular structure; firm; mildly alkaline; abrupt, smooth boundary.

A12—7 to 13 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; weak, fine, very fine, subangular blocky structure; firm; mildly alkaline; clear, smooth boundary.

B1—13 to 20 inches, dark grayish-brown (10YR 4/2) light silty clay loam; moderate, very fine, subangular blocky structure; firm; continuous, very dark gray (10YR 3/1) coatings on faces of peds; mildly alkaline; clear, smooth boundary.

B21—20 to 29 inches, dark grayish-brown (10YR 4/2) light silty clay loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; fine and medium, angular blocky structure; firm; continuous very dark gray (10YR 3/1) coatings on faces of peds; neutral; clear, smooth boundary.

B22—29 to 41 inches, grayish-brown (10YR 5/2) light silty clay loam; common, medium, distinct, dark-brown (10YR 3/3) mottles; moderate, medium and coarse, angular blocky structure; firm; thin, continuous, dark-gray (10YR 4/1) coatings on faces of peds; neutral; clear, smooth boundary.

B31—41 to 50 inches, grayish-brown (10YR 5/2) heavy loam; common, fine and medium, distinct, dark yellowish-brown (10YR 3/4) and dark-brown (10YR 3/3) mottles; weak, coarse, angular blocky structure; firm; thin, discontinuous, dark-gray (10YR 4/1) coatings on faces of peds; few concretions of iron and manganese; neutral; gradual, smooth boundary.

B32—50 to 60 inches, gray (5Y 5/1) stratified silty clay loam and loam; common, fine and medium, distinct, dark-brown (10YR 3/3) and dark yellowish-brown (10YR 3/4) mottles; weak, coarse, angular blocky structure; firm and friable; few concretions of iron and manganese; neutral; gradual, smooth boundary.

C—60 to 70 inches, gray (5Y 5/1) stratified silty clay loam and loam; common, fine and medium, distinct, dark-brown (10YR 3/3) mottles; massive; firm and friable; few concretions of iron and manganese; neutral.

The solum is 35 to 60 inches thick. The A horizons combined are commonly 10 to 15 inches thick, but they are as much as 24 inches thick in places. They are commonly very dark grayish brown but in places are very dark brown and very dark gray. The A and B horizons are light or medium silty clay loam or loam. The lower part of the B horizon and the C horizon have lenses of silt loam, loam, sandy loam, or sand as well as silty clay loam. The B and C horizons are slightly acid to mildly alkaline.

Tice soils are near Beaucoup, Gorham, and Lawson soils on the landscape. They are better drained than Beaucoup soils and have less sand in the lower part of the solum than Gorham soils. They have more clay throughout the solum and have a thinner A horizon than Lawson soils.

284—Tice silty clay loam. This soil is in small to large areas on flood plains mainly in the Mississippi River valley, and it has a slope of 0 to 2 percent. Included in mapping are small areas of poorly drained Beaucoup soils and of Wakeland soils that have a surface layer of dark grayish brown. Also included are small areas of wet soils and other areas of sandy soils that are shown by a spot symbol on the detailed soil map. Areas of soils where the subsoil is as thin as 25 inches and other areas of soils that have a layer of silt loam 15 to 50 inches thick are also included.

The main concerns of management are excess water and flooding. Most areas of this soil are used for cultivated crops, but large areas near the Mississippi River are in woodland. If excess water is removed and if it is protected from flooding, this soil is well suited to all crops commonly grown in the county. Capability unit I–6.

Timula Series

The Timula series consists of deep, well-drained, strongly sloping to very steep soils on uplands. These

soils formed in loess. They are on the bluff bordering the Mississippi River flood plain and on sides of valleys adjacent to the bluff. The native vegetation was hardwood forest.

In a representative profile the surface layer is brown silt loam about 5 inches thick. The subsoil is about 16 inches thick. For 6 inches it is yellowish-brown silt loam. Below that for about 10 inches it is yellowish-brown silt loam mottled with light olive gray. The underlying material is light olive-gray silt loam mottled with yellowish brown and strong brown. It extends to a depth of 60 inches.

Timula soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity. Most Timula soils are suited to hay, pasture, and woodland. Less sloping Timula soils are poorly suited to cultivated crops, because erosion is a hazard.

Representative profile of Timula silt loam, 12 to 18 percent slopes, eroded, 1,485 feet west and 395 feet south of the northeast corner of sec. 11, T. 2 N., R. 9 W.

Ap—0 to 5 inches, dark-brown to brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

B2—5 to 11 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B3—11 to 21 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct, light olive-gray (5Y 6/2) mottles; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

C—21 to 60 inches, light olive-gray (5Y 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/6) mottles; massive; friable; few concretions of lime; strong effervescence, moderately alkaline.

The solum is 18 to 36 inches thick. The A horizons combined are commonly 7 to 12 inches thick where uneroded. The Ap horizon is dark grayish brown, dark brown, or brown. Where unplowed, the A1 horizon is commonly very dark grayish brown or very dark brown and is less than 5 inches thick. The B horizon is medium or heavy silt loam. It is slightly acid to moderately alkaline. The C horizon is moderately alkaline and has slight to strong effervescence.

Timula soils are near Seaton and Hamburg soils on the landscape. They have a thinner solum than Seaton soils and a thicker solum than Hamburg soils.

271C2—Timula silt loam, 7 to 12 percent slopes, eroded. This soil is in small to medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thicker. Included in mapping are small areas of Seaton soils that have a thicker subsoil than Timula soils. Also included are areas of soils where the surface layer is yellowish brown.

The main concerns of management are erosion and slope. Most areas of this soil are used for cultivated crops. Some areas are used for pasture, and some are in woodland. This soil is suited to all crops commonly grown in the county if erosion is controlled. It is also suited to pasture, orchards, and woodland. Capability unit IIIe–1.

271D2—Timula silt loam, 12 to 18 percent slopes, eroded. This soil is in small to medium areas on sides of stream valleys and sides of drainageways. It has the profile described as representative of the series. Included in mapping are small areas of Seaton soils that have a thicker subsoil than Timula soils. Also included are areas of soils where the subsoil is less than 10 inches thick and small areas of soils that have a yellowish-brown surface layer.

The main concerns of management are erosion and slope. This soil is used mainly for hay and pasture. Other areas are used for cultivated crops, and some are in woodland. This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, orchards, and woodland. Capability unit IVe–1.

271E2—Timula silt loam, 18 to 30 percent slopes, eroded. This soil is in small to medium areas on sides of stream valleys and on the bluffs bordering the Mississippi River flood plain. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thinner.

Included with this soil in mapping are small areas of Seaton soils that have a thicker subsoil than Timula soils. Also included are small areas of soils that have a surface layer and subsoil of fine sand. These areas are shown by a symbol on the detailed soil map. Small areas of soils that have a moderately alkaline surface layer are also mapped.

The main concerns of management are erosion and slope. This soil is used mainly for pasture or woodland. If erosion is controlled, it is suited to pasture. It is well suited to woodland. Capability unit VIe–1.

271F—Timula silt loam, 30 to 50 percent slopes. This soil is in small to medium areas on sides of stream valleys and on bluffs bordering the Mississippi River flood plain. It has a profile similar to the one described as representative of the series, but the subsoil is a few inches thinner.

Included with this soil in mapping are small areas of Hamburg soils that have a moderately alkaline surface layer and subsoil. Also included are a few areas of soils that have outcrops of limestone rock on the surface. These areas are shown by a symbol on the detailed soil map.

The main concerns of management are erosion and slope. Most areas of this soil are used for woodland. A few areas are used for pasture. If erosion is controlled, this soil is suited to pasture. It is well suited to woodland. Capability unit VIIe–1.

Titus Series

The Titus series consists of deep, nearly level, poorly drained soils mainly on the Mississippi River flood plain. These soils formed in water-deposited clayey sediments. The native vegetation was hardwood forest.

In a representative profile the surface layer is very dark gray light silty clay about 18 inches thick. The subsoil is about 35 inches thick. For 17 inches it is dark-gray light silty clay. Below that for 18 inches it is dark-gray heavy silty clay loam. The underlying material is dark-gray silty clay loam that extends to a depth of 68 inches.

Titus soils are high in organic-matter content. They have slow permeability and a moderate to high available water capacity. These soils are suited to crops commonly grown in the county if adequately drained and protected from flooding.

Representative profile of Titus silty clay, 645 feet north and 37 feet west of the center of sec. 20, T. 2 N., R. 9 W., in a cultivated field:

Ap—0 to 7 inches, very dark gray (10YR 3/1) light silty clay; weak, fine, granular structure and some weak, fine, angular blocky; friable; slightly acid; abrupt, smooth boundary.

A12—7 to 12 inches, very dark gray (10YR 3/1) light silty clay; moderate, fine and medium, angular blocky structure; firm; few, fine, dark yellowish-brown (10YR 4/4) accumulations of iron and manganese; neutral; clear, smooth boundary.

A13—12 to 18 inches, very dark gray (10YR 3/1) light silty clay; weak, fine and medium, angular blocky structure; firm; few, fine, dark-brown (10YR 4/3) accumulations of iron and manganese; neutral; gradual, smooth boundary.

B21g—18 to 24 inches, dark gray (5Y 4/1) light silty clay; moderate, fine, angular blocky structure; firm; few, fine, dark yellowish-brown (10YR 4/4) accumulations of iron and manganese; neutral; gradual, smooth boundary.

B22g—24 to 35 inches, dark-gray (5Y 4/1) light silty clay; few, fine, distinct, light olive-brown (2.5Y 5/4) mottles; moderate, fine and medium, angular blocky structure; firm; few, fine, very dark gray (10YR 3/1) concretions of iron and manganese; shiny pressure faces on peds when moist; neutral; gradual, smooth boundary.

B23g—35 to 46 inches, dark-gray (5Y 4/1) heavy silty clay loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, angular blocky structure; firm; common, fine, very dark gray (10YR 3/1) concretions of manganese and iron; shiny pressure faces on peds when moist; neutral; gradual, smooth boundary.

B3g—46 to 53 inches, dark-gray (5Y 4/1) heavy silty clay loam; common, medium, faint, dark-brown (10YR 4/3) mottles; weak, medium, prismatic structure; firm; few, fine, very dark gray (10YR 3/1) concretions of iron and manganese; neutral; gradual, smooth boundary.

Cg—53 to 68 inches, dark-gray (5Y 4/1) silty clay loam; small light-gray (10YR 7/1) areas; common, medium, distinct, dark yellowish-brown (10YR 4/4) and dark-brown (10YR 4/3) mottles; massive; firm; few, fine, very dark gray (10YR 3/1) concretions of iron and manganese; neutral.

The A horizon is 15 to 24 inches thick. It is very dark gray or black. The A and B horizons are heavy silty clay loam or light silty clay. The B horizon is dark gray to light olive gray. The C horizon is silt loam to silty clay and is commonly stratified. The solum is mildly alkaline to slightly acid throughout.

Titus soils are near Darwin and Beaucoup soils on the landscape. They have less clay in the solum than Darwin soils and more clay than Beaucoup soils. They formed in the same kind of material as Shiloh soils, but they have thinner horizons that are very dark gray or black.

404—Titus silty clay. This soil is mainly in medium to large areas on the Mississippi River flood plain, and it has a slope of 0 to 1 percent. Included in mapping are small areas of soils that have a subsoil of medium and light silty clay loam. Nearly 10 percent of the mapped areas has a surface layer of silt loam 8 to 20 inches thick.

The main concerns of management are poor soil drainage, flooding, ponding, slow permeability, and tilth. This soil is suited to crops commonly grown in the county if protected from flooding and adequately drained. Capability unit IIIw–2.

Ursa Series

The Ursa series consists of deep, moderately well drained, strongly sloping to very steep soils on uplands. These soils formed in less than 20 inches of loess and buried or formerly buried clayey soils. They are on sides of valleys generally near the upper parts of watersheds. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 4 inches thick. The subsurface layer is brown heavy silt loam about 4 inches thick. The subsoil is 55 inches thick. For 18 inches it is brown and yellowish-brown light clay that has light olive-gray mottles in the lower part. For about 19 inches it is light olive-gray clay loam mottled with yellowish brown. Below that for about 18 inches it is light-gray clay loam mottled with yellowish brown. The underlying material is greenish-gray light clay loam that extends to a depth of 70 inches.

Ursa soils are moderately low in organic-matter content. They have moderately slow permeability and a high available water capacity.

The less sloping eroded Ursa soils are suited to cultivated crops if erosion is controlled. The more sloping Ursa soils are suited to hay, pasture, and woodland.

Representative profile of Ursa silt loam, 12 to 18 percent slopes, eroded, 1,790 feet west and 580 feet south of the northeast corner of SE¼ sec. 5, T. 2 S., R. 7 W., in a formerly cultivated pasture:

Ap—0 to 4 inches, dark grayish-brown (10YR 4/2) silt loam and some sand; weak, thick, platy structure parting to weak, fine, granular; friable; thin, discontinuous, light-gray (10YR 7/1) silt grains on faces of peds; neutral; abrupt, wavy boundary.

A2—4 to 8 inches, brown (10YR 5/3) heavy silt loam; weak, medium, platy structure; friable; thin, discontinuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

B2t—8 to 12 inches, yellowish-brown (10YR 5/4) light clay loam; moderate and strong, fine, subangular blocky structure; firm; thin, discontinuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; strongly acid; clear, smooth boundary.

IIB21t—12 to 17 inches, brown (10YR 4/3) light clay; common, fine, distinct, grayish-brown (2.5Y 5/2) mottles and few, fine, distinct, yellowish-red (5Y 4/6) mottles in lower half of horizon; moderate, medium, angular blocky structure; very firm; thin, discontinuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; few, fine, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIB22t—17 to 26 inches, yellowish-brown (10YR 5/4) light clay; many (35 percent), medium, distinct, light olive-gray (5Y 6/2) and few, fine, prominent, dark-red (2.5Y 3/6) mottles; weak, coarse, angular blocky structure; very firm; thin, discontinuous, light-gray (10YR 7/1), dry, silt grains on faces of peds; few, thin, dark concretions of iron and manganese; strongly acid; clear, smooth boundary.

IIB23t—26 to 36 inches, light olive-gray (5Y 6/2) heavy clay loam; many (40 percent), medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; very firm; few, medium, gray (10YR 5/1) clay films on faces of peds; few, medium, dark concretions of iron and manganese; strongly acid; gradual, smooth boundary.

IIB24t—36 to 45 inches, light olive-gray (5Y 6/2) clay loam; many (30 percent), medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; few, medium, gray (10YR 5/1) clay films on faces of peds; few, medium, dark concretions of iron and

manganese; mildly alkaline; gradual, smooth boundary.

IIB3—45 to 63 inches, light-gray (5Y 6/1) clay loam; many, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; few, medium, gray (10YR 5/1) clay films on faces of peds; few, medium, dark concretions of iron and manganese; moderately alkaline; gradual, smooth boundary.

IIC—63 to 70 inches, greenish-gray (5GY 6/1) light clay loam; massive; firm; moderately alkaline; abrupt, smooth boundary.

The solum is 50 inches to more than 70 inches thick. The Ap horizon is mainly dark grayish brown or brown. The A2 horizon is grayish brown, brown, and yellowish brown. The B2 horizon is heavy silty clay loam, heavy clay loam, silty clay, or clay. The B horizon is medium acid to very strongly acid in the upper part and medium acid to moderately alkaline in the lower part. The C horizon is moderately alkaline to medium acid.

Ursa soils are near Atlas, Blair, and Fishhook soils on the landscape. They are better drained than all of these soils, and their B horizon has more clay than Blair soils. They have more sand in the upper part of the B horizon than Fishhook soils. They commonly are lower on the landscape than Atlas soils.

605D2—Ursa silt loam, 7 to 12 percent slopes, eroded. This soil is in small and medium areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is thicker. Included in mapping are small areas of somewhat poorly drained Blair and Atlas soils. Also included are small areas of soils that have a surface layer of silt loam 8 to 14 inches thick.

The main concerns of management are erosion and slope. Most areas of this soil are used for crops, hay, and pasture. Some areas are in woodland. This soil is poorly suited to crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit IVe–7.

605D3—Ursa soils, 7 to 12 percent slopes, severely eroded. This soil is in small areas on sides of drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is at the surface in most places. The surface layer is yellowish-brown light clay loam and dark grayish-brown silt loam. The surface of this soil has wide cracks when dry.

Included with this soil in mapping are small areas of somewhat poorly drained Blair and Atlas soils. Also included are small areas of soils that have a sandy surface layer, and in some places, a sandy subsoil layer or outcrops of limestone. These areas are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are in crops or hay. Some areas are in woodland. This soil is poorly suited to crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit VIe–7.

605E2—Ursa silt loam, 12 to 18 percent slopes, eroded. This soil is in small to large areas on sides of stream valleys and sides of drainageways. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of somewhat poorly drained Blair and Atlas soils. Also included are small areas of Hickory soils, commonly on lower positions, that have a subsoil of medium clay loam. Small areas of soils that have outcrops of shale and limestone are shown by a spot symbol on the detailed soil map. Soils that have a surface layer of silt loam 8 to 14 inches thick are also mapped.

The main concerns of management are erosion and slope. Most areas of this soil are used for pasture and woodland, but some are used for cultivated crops. This soil is not suited to cultivated crops, because erosion is difficult to control. It is suited to hay, pasture, and woodland. Capability unit VIe–7.

605E3—Ursa soils, 12 to 18 percent slopes, severely eroded. This soil is in small to medium areas on sides of stream valleys and sides of drainageways. It has a profile similar to the one described as representative of the series, but the surface layer is yellowish-brown light clay loam, brown light clay, or dark grayish-brown silt loam. The surface of this soil has wide cracks when dry.

Included with this soil in mapping are small areas of somewhat poorly drained Blair and Atlas soils. Also included are small areas of Hickory soils, commonly on lower positions, that have a subsoil of medium clay loam. Small areas of soils that are seasonally wet and other areas of soils that have chert fragments and shale outcrops on the surface are shown by a spot symbol on the detailed soil map.

The main concerns of management are erosion, slope, and tilth. Most areas of this soil are used for cultivated crops, pasture, and woodland. It is suited to pasture and woodland. Capability unit VIIe–3.

605F2—Ursa silt loam, 18 to 30 percent slopes, eroded. This soil is in medium to large areas on sides of stream valleys. It has a profile similar to the one described as representative of the series, but the surface layer and subsoil are thinner, and there is more yellowish brown in the subsoil.

Included with this soil in mapping are small areas of Hickory soils, commonly on lower positions, that have a subsoil of medium clay loam. Also included are small areas of soils that have shale at the surface. They are shown by a spot symbol on the detailed soil map. About 10 percent of the mapped areas is severely eroded and has yellowish-brown light clay loam or brown light clay at the surface.

The main concerns of management are erosion and slope. Most of this soil is in pasture and woodland. It is better suited to pasture and woodland than to other uses. Capability unit VIIe–3.

Virden Series

The Virden series consists of deep, poorly drained, nearly level soils on uplands. These soils formed in loess. They are on medium and wide drainage divides and in shallow depressions. The native vegetation was prairie grasses.

In a representative profile the surface layer is black silt loam about 12 inches thick. The subsoil is about 41 inches thick. For 9 inches it is heavy silty clay loam that is black mottled with grayish brown in the upper part and very dark gray mottled with grayish brown in the lower part. Below that for about 32 inches it is light olive-gray silty clay loam mottled with light olive brown and dark yellowish brown. The underlying material is gray silt loam mottled with light olive brown. It extends to a depth of about 64 inches.

Virden soils are high in organic-matter content. They have moderately slow permeability and a high available water capacity. If drained, these soils are well suited to crops commonly grown in the county, except for crops, such as alfalfa, that are especially sensitive to excess water.

Representative profile of Virden silt loam, 650 feet east and 380 feet south of the northwest corner of SW¼ sec. 27, T. 1 N., R. 5 W., in a cultivated field:

Ap—0 to 8 inches, black (10YR 2/1) silt loam; weak, fine, granular structure; friable; thin, discontinuous, light-gray (10YR 7/1), dry, coatings on faces of peds; common, small concretions of iron and manganese; neutral; abrupt, smooth boundary.

A3—8 to 12 inches, black (10YR 2/1) heavy silt loam; moderate, very fine, angular blocky structure; firm; common, medium concretions of iron and manganese; medium acid; clear, smooth boundary.

B21t—12 to 16 inches, black (10YR 2/1) heavy silty clay loam; few, fine, distinct, grayish-brown (2.5Y 5/2) and light olive-brown (2.5Y 5/4) mottles; moderate, fine, angular blocky structure; firm; discontinuous black (10YR 2/1) clay films on faces of peds; common, medium concretions of iron and manganese; medium acid; clear, smooth boundary.

B22t—16 to 21 inches, very dark gray (10YR 3/1) heavy silty clay loam; many, fine, distinct, grayish-brown (2.5Y 5/2) and common, fine, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium, prismatic structure parting to moderate, medium, blocky; very firm; nearly continuous very dark gray (10YR 3/1) clay films on faces of peds and lining channels; common, medium, dark concretions of iron and manganese; slightly acid; clear, smooth boundary.

B23tg—21 to 32 inches, light olive-gray (5Y 6/2) heavy silty clay loam; common, fine, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium, prismatic structure parting of moderate, medium, angular blocky; firm; discontinuous very dark gray (10YR 3/1) clay films on faces of peds; common, medium concretions of iron and manganese; slightly acid; gradual, smooth boundary.

B31tg—32 to 40 inches, light olive-gray (5Y 6/2) silty clay loam; common, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure; firm; discontinuous very dark gray (10YR 4/1) clay films on faces of peds; common, medium concretions of iron and manganese; slightly acid; gradual, smooth boundary.

B32tg—40 to 53 inches, light olive-gray (5Y 6/2) light silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure; firm; few, discontinuous, very dark gray (10YR 3/1) clay films on faces of peds and lining channels; common, medium concretions of iron and manganese; slightly acid; gradual, smooth boundary.

Cg—53 to 64 inches, gray (5Y 6/1) silt loam, common, medium, distinct, light olive-brown (2.5Y 5/6) mottles; massive; friable; numerous concretions of iron and manganese in the upper 5 inches; predominantly yellowish-brown (10YR 5/6) 5-inch band in the upper part; slightly acid.

The solum is generally 45 to 55 inches thick. The combined A horizons are 10 to 18 inches thick. The A horizon is black or very dark gray silt loam or light silty clay loam. The B2 horizon is heavy silty clay loam or light silty clay. The B horizon is medium acid or slightly acid. The C horizon is slightly acid to mildly alkaline.

Virden soils are near Ipava, Cowden, and Herrick soils on the landscape. They are more poorly drained than Ipava and Herrick soils. They lack the A2 horizon that is present in Cowden and Herrick soils.

50—Virden silt loam. This soil is in small to large areas on broad drainage divides, and it has a slope of 0 to 1 percent. Included in mapping are small areas of soils that have a subsurface layer of dark-gray silt loam about 4 inches thick. About 25 percent of the mapped areas has a surface layer of light silty clay loam. Also included are small areas of somewhat poorly drained Ipava soils. Areas of excessively wet soils or of soils that are high in exchangeable sodium are shown by a spot symbol on the detailed soil map. Small areas of soils that have a moderately alkaline subsoil are also included.

The main concern of management is excess water, but soil tilth is also a concern. This soil is used mainly for cultivated crops. If excess water is removed, it is well suited to all crops commonly grown in the county except for some legumes. Capability unit IIw–1.

Wakeland Series

The Wakeland series consists of deep, somewhat poorly drained, nearly level soils. These soils formed in alluvium. They are mainly on flood plains of small and medium streams, but are also on the Mississippi flood plain. The native vegetation was hardwood forest.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The underlying material is dark grayish-brown and grayish-brown silt loam mottled with gray. It extends to a depth of 68 inches.

Wakeland soils are moderately low in organic-matter content. They have moderate permeability and a high available water capacity.

These soils are suited to corn and soybeans. They are suited to small grain and hay where flooding is less frequent. In some places, frequent flooding and small field size limit the suitability of Wakeland soils to permanent pasture or to woodland. The small field size is commonly caused by meandering streams that cannot be crossed by farm equipment.

Representative profile of Wakeland silt loam, 1,240 feet east and 840 feet north of the southwest corner of sec. 5, T. 1 S., R. 6 W., in a cultivated area:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, very fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—6 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; common, fine, distinct, grayish-brown (10YR 5/2) mottles; weak, very fine, granular structure; common, small, dark-brown accumulations and stains of iron and manganese; neutral; abrupt, smooth boundary.

C1g—10 to 21 inches, dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) silt loam; many, fine, distinct, gray (10YR 5/1) mottles; weak, very fine, granular structure; friable; common, small, dark-brown accumulations and stains of iron and manganese; neutral; gradual, smooth boundary.

C2g—21 to 35 inches, dark grayish-brown (10YR 4/2) silt loam; many, medium, distinct, gray (10YR 5/1) mottles; very weak, fine, granular structure; friable; common, small, dark-brown accumulations and stains of iron and manganese; neutral; gradual, smooth boundary.

C3g—35 to 50 inches, dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) silt loam; many, medium, distinct, gray (10YR 5/1) mottles; massive; friable; common, small, dark-brown accumulations and stains of iron and manganese; neutral; gradual, smooth boundary.

C4g—50 to 68 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, distinct, gray (10YR

5/1) mottles; massive; friable; few, small dark-brown accumulations and stains of iron and manganese; neutral.

The Ap horizon is 5 to 9 inches thick. It is mainly dark grayish brown, but in places it is very dark gray and very dark grayish brown. The C horizon below a depth of 3 feet is dark grayish brown or grayish brown mottled with gray. It is gray mottled with grayish brown in places. The solum is silt loam, but in places it has thin layers of sandy loam and sand. The A and C horizons are neutral to medium acid.

Wakeland soils formed in the same kind of material as Haymond and Birds soils. They are more poorly drained than Haymond soils and better drained than Birds soils. Wakeland soils have drainage similar to that of Lawson soils, but they have a thinner and lighter-colored A1 horizon.

333—Wakeland silt loam. This soil is in small to large areas mainly on flood plains of small- and medium-sized streams, but it is also on the Mississippi River flood plain. It has a slope of 0 to 2 percent. It has the profile described as representative of the series.

Included with this soil in mapping at slightly higher elevations are small areas of soils that are strongly acid and have a subsoil of heavy silt loam. Also included are small areas of soils that have a very dark brown surface layer 10 to 20 inches thick.

The main concerns of management are flooding and a seasonal high water table. Erosion is not a hazard. This soil is well suited to crops commonly grown in the county if excess water is removed and if flooding is not too frequent. Capability unit IIw–4.

Worthen Series

The Worthen series consists of deep, well drained and moderately well drained, nearly level to moderately sloping soils. These soils formed in water-deposited, mainly silty material. They are on terraces, old alluvial fans, and alluvial or colluvial wash from the bluffs bordering the Mississippi River flood plain. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark brown silt loam about 19 inches thick. The subsoil is about 37 inches thick. For 14 inches it is very dark grayish-brown silt loam. Below that for about 23 inches it is brown silt loam. The underlying material is brown silt loam that extends to a depth of 70 inches.

Worthen soils are moderate in organic-matter content. They have moderate permeability and a high available water capacity. These soils are well suited to all crops commonly grown in the county if erosion is controlled.

Representative profile of Worthen silt loam, 0 to 2 percent slopes, 860 feet south and 1,000 feet west of the northeast corner of sec. 27, T. 3 S., R. 8 W., in a cultivated field:

Ap—0 to 8 inches, very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A12—8 to 19 inches, very dark brown (10YR 2/2) silt loam; moderate, fine and medium, granular structure; friable; medium acid; clear, smooth boundary.

B21—19 to 33 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, subangular blocky structure; friable; patchy, light-gray (10YR 7/2), dry, silt grains on faces of peds, more common in lower 10 inches; medium acid; gradual, smooth boundary.

B22—33 to 45 inches, brown (10YR 4/3) silt loam; very dark grayish-brown (10YR 3/2) exteriors of peds; moderate, coarse, subangular blocky structure; friable; thin, patchy, very dark grayish-brown (10YR 3/2) clay films and patchy, light-gray (10YR 7/2), dry, silt grains on faces of peds; slightly acid; gradual, smooth boundary.

B3—45 to 56 inches, brown (10YR 4/3) silt loam; weak, coarse, subangular blocky structure; friable; thin, nearly continuous, very dark grayish-brown (10YR 3/2) and dark-brown (10YR 3/3) clay films and very few, patchy, light-brown (10YR 7/2), dry silt grains on faces of peds; slightly acid; gradual, smooth boundary.

C—56 to 70 inches, brown (10YR 4/3) silt loam; massive; friable; slightly acid.

The solum is commonly 35 to 60 inches thick. The A horizons combined are 18 to 28 inches thick. They are very dark brown, very dark grayish brown, dark brown, or black. In places where the A horizons are less than 24 inches thick, the upper part of the B horizon is very dark grayish brown or dark brown. The B horizon is medium or heavy silt loam. It is mottled with gray in the lower part in some places. It is medium acid to mildly alkaline. The C horizon is commonly slightly acid to mildly alkaline.

Worthen soils are near Littleton and Huntsville soils on the landscape. They are better drained than Littleton soils and have a B horizon that is lacking in Huntsville soils.

37A—Worthen silt loam, 0 to 2 percent slopes. This soil is in medium to large areas on terraces and on old alluvial fans on the Mississippi River flood plains. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of wet soils, of soils that have chert fragments in the surface layer and the subsoil, and of soils that have a sandy surface layer. These areas are shown by a symbol on the detailed soil map. Also included are small areas of soils that have a surface layer and subsoil of sandy loam and areas of soils where the very dark grayish-brown surface layer and upper part of the subsoil are less than 24 inches thick.

Most areas of this soil are in cultivated crops. It is well suited to all crops commonly grown in the county. Capability unit I–1.

37B—Worthen silt loam, 2 to 6 percent slopes. This soil is in small to medium areas on terraces and on old alluvial fans on the Mississippi River flood plains. It has a profile similar to the one described as representative of the series, but the surface layer and subsoil are thinner.

Included with this soil in mapping are small areas of soils where the surface layer and subsoil are either sand or have as much as a 20 percent content of chert fragments or rounded gravel. These areas are shown by a spot symbol on the detailed soil map. Also included are areas of soils where the dark grayish-brown surface layer and upper part of the subsoil are less than 24 inches thick. Small areas of soils that have a slope of 6 to 8 percent are also included.

The main concern of management is erosion. Most areas of this soil are used for cultivated crops. This soil is well suited to all crops commonly grown in the county if erosion is controlled. Capability unit IIe–14.

Use and Management of the Soils

This section has six main parts. The first part groups the soils into capability units and discusses the

suitability of each unit for mainly farming uses. Then the predicted yields for crops under a high level of management are given. The third part groups the soils into woodland suitability groups and gives information needed to manage these groups. The suitability of the soils for wildlife uses and recreational uses of the soils are discussed. The last part consists of tables of engineering soil test data, estimated engineering properties of soils, and engineering interpretations of soils.

Capability Grouping[6]

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects, and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

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

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

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use.

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are 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.

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

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

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

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e,w,s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States and not in Adams County shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w, s,* and *c,* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–1 or IIIe–6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Adams County are described and suggestions are given for use and management of the soils in the groups. Soils used for cultivated crops, hay, and pasture generally need lime and fertilizers. Soil tests will give valuable information on how much to apply on a given soil. For those units with more than one series, refer to the "Guide To Mapping Units" at the end of this survey.

CAPABILITY UNIT I–1

This unit consists of deep, well drained and moderately well drained, nearly level soils on uplands and terraces. These soils have a surface layer of silt loam and a subsoil of silty clay loam or silt loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate and moderately low. The main concern of management is improving organic-matter content and fertility. Soil crusting after heavy rains is a concern of management for newly planted crops on some of these soils.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop

[6] J. F. STEINKAMP, soil scientist, Soil Conservation Service, helped prepare this section.

help improve organic-matter content and fertility and decrease soil crusting. Using a rotary hoe also relieves soil crusting. Small areas of these soils should be managed like the surrounding soils.

These soils are well suited to corn, soybeans, small grain, legumes, and grasses. They are suited to continuous row crops if properly managed. Most of these soils are well suited to vegetable and orchard crops.

CAPABILITY UNIT I-3

This unit consists of deep, well drained and moderately well drained, nearly level soils on flood plains. These soils have a surface layer and a subsoil of silt loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderately low and moderate. The main concerns of management are improving organic-matter content and fertility and controlling flooding. In places these soils form crusts after heavy rains.

These soils are subject to soil blowing when fallplowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help improve organic-matter content and fertility and decrease soil crusting. Using a rotary hoe also relieves soil crusting. Most areas of these soils on the Mississippi River flood plains are protected by levees, but the areas on flood plains of upland streams are generally not protected from flooding. Small areas of these soils should be managed like surrounding soils.

These soils are well suited to corn, soybeans, small grain, legumes, and grasses if flooding is not too frequent. In areas where there is a greater hazard of flooding, these soils are poorly suited to small grain and hay. If properly managed, they are suited to continuous row crops. Many small areas of these soils that are subject to frequent flooding or are not accessible for farm machinery, are better suited to pasture or woodland than to other uses.

CAPABILITY UNIT I-5

This unit consists of deep, somewhat poorly drained, nearly level soils on uplands and on some terraces. These soils have a surface layer of silt loam and a subsoil of silty clay loam or silt loam.

Permeability is moderate to moderately slow, and the available water capacity is high. The organic-matter content is moderate or high. The main concern of management is removing excess water.

These soils are subject to soil blowing when fallplowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Tile drains or open ditches can provide adequate drainage where needed.

These soils are well suited to corn, soybeans, small grain, legumes, and grasses if excess water is removed. They are suited to continuous row crops if crop residue is returned to the soil and other good management practices are applied.

CAPABILITY UNIT I-6

This unit consists of deep, somewhat poorly drained, nearly level soils on flood plains. These soils have a surface layer of silt loam or light silty clay loam. The subsoil or material under the surface layer is silt loam, loam, and light silty clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate and moderately low. The main concerns of management are removing excess water and controlling flooding.

These soils are subject to soil blowing when fallplowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Tile drains or open ditches can provide adequate drainage where needed, but in a few sandy areas it is difficult to maintain ditches and tile lines. Most areas of these soils on flood plains of the Mississippi River are protected by levees, but areas on flood plains of upland streams are subject to flooding.

These soils are well suited to corn, soybeans, small grain, legumes, and grasses if excess water is removed and if they are protected from flooding. They are suited to continuous row crops if crop residue is returned to the soil and other good management practices are applied. Where there is a severe hazard of flooding, these soils are poorly suited to hay and small grain. Areas of soils that are subject to frequent flooding should be kept in pasture and woodland.

CAPABILITY UNIT I-7

This unit consists of deep, somewhat poorly drained, nearly level soils on uplands. These soils have a surface layer of silt loam and a subsoil of heavy silty clay loam.

Permeability is moderately slow, and the available water capacity is high. The organic-matter content is moderate. The main concern of management is removing excess water.

These soils are subject to soil blowing when fallplowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Close spacing of tile drains is needed to provide adequate drainage because of moderately slow permeability.

These soils are well suited to corn, soybeans, small grain, legumes, and grasses if excess water is removed. They are suited to continuous row crops if properly managed.

CAPABILITY UNIT IIe-1

This unit consists of deep, well drained and moderately well drained, gently sloping to moderately sloping, uneroded to eroded soils. These soils are mainly on uplands, but some are on terraces. They have a surface layer of silt loam and a subsoil of silty clay loam or heavy silt loam.

Permeability is moderate or moderately slow, and the available water capacity is high. The organic-matter content is moderately low. The main concern of management is controlling erosion.

Maintaining a cropping system that includes green manure crops or legumes and grasses and returning

Figure 13.—**Planting on a contour, terracing, and using a grassed waterway in an area of Fayette soils that has been planted to soybeans.**

crop residue to the soil help control erosion and help maintain or improve organic-matter content. Terracing, using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, and using grassed waterways help control erosion and runoff (fig. 13).

These soils are well suited to corn, soybeans, small grain, legumes, and grasses if erosion is controlled. They are also suited to vegetable and orchard crops.

CAPABILITY UNIT IIe–5

This unit consists of deep, somewhat poorly drained, gently sloping to moderately sloping, uneroded soils on uplands. These soils have a surface layer of silt loam and a subsoil of silty clay loam.

Permeability is moderate to moderately slow, and the available water capacity is high. The organic-matter content is moderate to high. The main concerns of management are controlling erosion and, in some areas, removing excess water.

Using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help maintain and improve organic-matter content. Tile drains or surface ditches can provide subsurface drainage where needed.

These soils are well suited to corn, soybeans, and small grain. They are also suited to legumes and grasses grown for hay and pasture.

CAPABILITY UNIT IIe–10

This unit consists only of Keller silt loam, 4 to 7 percent slopes, eroded, which is a deep, moderately sloping, somewhat poorly drained soil on uplands. This soil has a surface layer of silt loam and a subsoil of heavy silty clay loam.

Permeability is slow, and the available water capacity is high. The organic-matter content is moderate. The main limitations to the use of this soil are erosion, excess water in places, and slow permeability. The main concerns of management are controlling erosion and maintaining organic-matter content and fertility. Artificial drainage is needed in small areas of wet soils.

Using minimum tillage, farming on the contour, terracing, leaving cover crops during winter, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Soil seeps are a hazard during

wet seasons. Tile drains do not function well in most areas.

This soil is well suited to corn, soybeans, and small grain. It is also suited to hay and pasture.

CAPABILITY UNIT IIe–13

This unit consists of deep, somewhat poorly drained, gently sloping, uneroded soils and moderately sloping, eroded soils, on uplands. These soils have a surface layer of silt loam and a subsoil of silty clay loam to heavy silty clay loam.

Permeability is moderate to moderately slow, and the available water capacity is high. The organic-matter content is moderate and moderately low. The main limitations to the use of these soils are erosion and, in some areas, excess water. The main concerns of management are controlling erosion and improving or maintaining organic-matter content and fertility.

Using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Tile drains or open drainage ditches can provide adequate drainage for most wet areas.

These soils are well suited to corn, soybeans, and small grain. They are also suited to hay and pasture.

CAPABILITY UNIT IIe–14

This unit consists of deep, well drained and moderately well drained, gently sloping and moderately sloping, uneroded soils on uplands. These soils have a surface layer of silt loam and a subsoil of silt loam and silty clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate. The main limitation to the use of these soils is erosion. The main concerns of management are controlling erosion and maintaining organic-matter content and fertility.

Using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Some areas of these soils are especially well suited to terracing, contouring, and stripcropping. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility.

These soils are well suited to corn, soybeans, small grain, alfalfa, and red clover and to grasses and legumes grown for pasture. They are suited to vegetable and orchard crops.

CAPABILITY UNIT IIw–1

This unit consists of deep, poorly drained and very poorly drained, nearly level soils on uplands and flood plains. These soils have a surface layer of light silty clay, silty clay loam, and some silt loam. They have a subsoil of heavy silty clay loam and light silty clay.

Permeability is slow to moderately slow, and the available water capacity is moderate to high. The organic-matter content is high. The main limitations to the use of this soil are excess water, a hazard of flooding and ponding, restricted permeability, and poor soil tilth. The main concerns of management are improving drainage and soil tilth.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil helps maintain or improve soil tilth, organic-matter content, and fertility. Open ditches or closely spaced tile drains can provide effective drainage. Most areas of these soils on the Mississippi River flood plains are protected from flooding by levees, but after heavy rains most areas of these soils are subject to ponding. It is especially important that areas of these soils that have a surface layer of silty clay loam or light silty clay not be tilled when wet.

These soils are well suited to corn and soybeans. They are also suited to small grain and pasture. These soils are suited to continuous row crops if properly managed.

CAPABILITY UNIT IIw–2

This unit consists of deep, poorly drained, nearly level soils on flood plains, mainly of the Mississippi River. These soils are mainly silty clay loam, but some have a surface layer and subsoil of silt loam.

Permeability is moderate, and the available water capacity is high to moderate. The organic-matter content is moderate to high. The main limitations to use of these soils are excess water, a hazard of flooding, and tilth. The main concerns of management are improving drainage and maintaining organic-matter content, fertility, and tilth.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content, fertility, and tilth. These soils should not be tilled when wet. Tile drains function well if these soils are properly managed. Because of sand layers in some places, special precautions should be used when installing tile drains. Open ditches can also be used to provide drainage.

These soils are well suited to corn and soybeans. They are suited to wheat and oats, and they are suited to continuous row crops if properly managed.

CAPABILITY UNIT IIw–3

This unit consists only of Cowden silt loam, 0 to 1 percent slopes, which is a deep, poorly drained, nearly level soil on uplands. This soil has a surface layer of silt loam and a subsoil of silty clay.

Permeability is slow, and the available water capacity is moderate to high. The organic-matter content is moderate. Most areas of this soil have a seasonal high water table. Some areas are subject to ponding. The main limitations to the use of this soil are excess water and slow permeability.

This soil is subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Open ditches remove excess surface water, but tile

drains function poorly because of slow permeability.

This soil is well suited to corn and soybeans. It is suited to small grain and to legumes and grasses grown for pasture, and it is suited to continuous row crops when properly managed.

CAPABILITY UNIT IIw–4

This unit consists of deep, somewhat poorly drained, nearly level soils on flood plains. These soils have a surface layer of silt loam and a subsoil of silt loam and silty clay loam.

Permeability is moderate to slow, and the available water capacity is high. The organic-matter content is moderately low. The main limitations to the use of these soils are excess water, a hazard of flooding, and, in places, slow permeability. The main concerns of management are improving drainage, preventing flooding, and improving organic-matter content.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and by planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Soil crusting after heavy rains is a hazard for emerging crops. Using a rotary hoe relieves soil crusting. Tile drains provide adequate subsurface drainage in most places where outlets are available, but in some places the layers of sand clog the drains. In other areas, open ditches can be used to drain excess surface water. Small areas of these soils should be managed like surrounding soils.

These soils are well suited to corn, soybeans, and small grain. They are suited to legumes and grasses grown for hay and pasture, and they are suited to continuous row crops if properly managed. Areas where the hazard of flooding is more severe are not well suited to small grain and hay. A few small areas that are not accessible to farm machinery are suited to pasture or woodland.

CAPABILITY UNIT IIw–6

This unit consists only of Riley silty clay loam. It is a deep, nearly level, somewhat poorly drained soil on the flood plain of the Mississippi River. This soil has a surface layer of silty clay loam and a subsoil of loam and silty clay loam.

Permeability, available water capacity, and organic-matter content are all moderate. The main limitations to the use of this soil are excess water and a hazard of flooding. The main concerns of management are removing excess water, protecting from flooding, and maintaining organic-matter content and fertility.

This soil is subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain and improve organic-matter content, tilth, and fertility. Tile drains provide adequate drainage, but special precautions should be used when installing tile lines because of the underlying sandy material. The open ditches provide outlets for tile drains. Ditchbanks may not be stable because the underlying material is sandy. Most areas of this soil are protected by levees.

This soil is well suited to corn, soybeans, and small grain. It is suited to legumes and grasses grown for hay or pasture, and it is suited to continuous row crops when properly managed.

CAPABILITY UNIT IIw–13

This unit consists of deep, somewhat poorly drained, nearly level and some gently sloping soils on uplands and terraces. These soils have a surface layer of silt loam and a subsoil of silty clay loam.

Permeability is moderate to moderately slow, and the available water capacity is high. The organic-matter content is moderately low. The main limitation to the use of these soils is excess water. Erosion is a minor limitation on the gently sloping soils. Soil crusting is a hazard after heavy rains to emerging crops in places. The main concerns of management are removing excess water and maintaining organic-matter content and fertility.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content, fertility, and resistance to soil crusting. Using a rotary hoe relieves soil crusting. Using minimum tillage, farming on the contour, and terracing help control erosion on areas of gently sloping soils. Tile drains can provide adequate subsurface drainage if outlets are available. The open ditches are used in places to remove excess surface water. Small areas of these soils should be managed like surrounding soils.

These soils are well suited to corn, soybeans, and small grain and to legumes and grasses grown for hay or pasture. They are suited to continuous row crops if properly managed.

CAPABILITY UNIT IIIe–1

This unit consists of deep, well drained and moderately well drained, moderately sloping, severely eroded soils and strongly sloping, moderately eroded soils on uplands and terraces. These soils have a surface layer of silt loam, loam, sandy loam, and some silty clay loam and a subsoil of silt loam, silty clay loam, and clay loam.

Permeability is moderate to moderately slow, and the available water capacity is moderate to high. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion and slope. The main concerns of management are controlling erosion, improving or maintaining organic-matter content and fertility, and improving tilth on severely eroded soils.

Using minimum tillage, farming on the contour, rotating crops, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Soils of this unit in areas where slope is irregular are better suited to minimum tillage than to contouring, terracing, or stripcropping. Returning crop residue to the soil and growing a green manure crop help improve or maintain organic-matter content, fertility, and tilth.

These soils are suited to corn, soybeans, and small grain. They are also suited to grasses and legumes grown for hay and pasture and to woodland.

CAPABILITY UNIT IIIe–6

This unit consists only of El Dara sandy loam, 7 to 12 percent slopes, which is a deep, well drained and moderately well drained, strongly sloping soil on uplands. This soil has a surface layer of sandy loam and a subsoil of sandy clay loam.

Permeability is moderate, and the available water capacity is moderate. The organic-matter content is moderately low. The main limitations to the use of this soil are erosion, slope, and low fertility. The main concerns of management are improving or maintaining organic-matter content and fertility and controlling water erosion and soil blowing.

Using minimum tillage, farming on the contour, rotating crops, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Soils of this unit in areas where slope is irregular are better suited to minimum tillage than to contouring or terracing. Stripcropping, minimum tillage, and leaving cover crops during winter are effective in protecting against water erosion and soil blowing. Returning crop residue to the soil and growing a green manure crop help improve or maintain organic-matter content, fertility, and tilth and control soil blowing. Grassed waterways on these soils require good management. Gullies form easily, and once entrenched they are difficult to control.

This soil is suited to corn, soybeans, and small grain. It is also suited to grasses and legumes grown for hay and pasture and to woodland.

CAPABILITY UNIT IIIe–7

This unit consists of deep, somewhat poorly drained and poorly drained, moderately sloping and strongly sloping, eroded soils on uplands. These soils have a surface layer of silt loam and a subsoil of heavy silty clay loam and clay.

Permeability is slow to very slow, and the available water capacity is moderate to high. The organic-matter content is moderate to moderately low. The main limitations to the use of these soils are erosion, excess water in some areas, slope, and restricted permeability. The main concerns of management are controlling erosion and draining wet or seepy areas.

Using minimum tillage, farming on the contour, rotating crops, leaving cover crops during winter, stripcropping, terracing, and using grassed waterways help control erosion and runoff. Constructing terraces can bring clayey subsoil material to the surface. In these areas it is difficult to grow plants. The soils of this unit that are in areas where slope is irregular are better suited to minimum tillage than to contouring, terracing, or stripcropping. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility. Tile drains function poorly in most of these areas, except in places near the towns of Adams, Payson, and Plainville. Seepy areas where permeability is restricted should be kept in a permanent stand of water-tolerant plants, such as reed canarygrass and alsike clover. Soils subject to wetness can be cultivated, but in places the excess water can damage crops.

These soils are suited to corn, soybeans, small grain, and grasses and legumes for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IIIe–13

This unit consists of deep, somewhat poorly drained, moderately sloping, severely eroded soils and strongly sloping, eroded soils on uplands. These soils have a surface layer of silt loam and a subsoil of heavy silty clay loam or clay loam.

Permeability is moderately slow, and the available water capacity is high. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, seasonal wetness, slope, and tilth. The main concerns of management are controlling erosion, draining wet areas, and improving soil tilth.

Using minimum tillage, farming on the contour, rotating crops, leaving cover crops during winter, stripcropping, terracing, and using grassed waterways help control erosion and runoff. Soils in areas where slope is irregular are better suited to minimum tillage than to contouring, terracing, or stripcropping. Returning crop residue to the soil and growing a green manure crop help improve organic-matter content, fertility, and tilth. The severely eroded soils should not be tilled when wet. Tile drains can be used effectively for most of these soils.

These soils are suited to corn, soybeans, and small grain and to grasses and legumes grown for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IIIe–14

This unit consists of deep, well drained and moderately well drained, strongly sloping, eroded soils on uplands. These soils have a surface layer of silt loam and a subsoil of silt loam and silty clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate. The main limitations to the use of these soils are erosion and slope. The main concern of management is controlling erosion.

Using minimum tillage, farming on the contour, rotating crops, leaving cover crops during winter, stripcropping, terracing, and using grassed waterways help control erosion and runoff. Many areas of these soils are especially well suited to terracing, contouring, and stripcropping. Returning crop residue to the soil and growing a green manure crop help maintain organic-matter content and fertility. Using tile drains can help improve drainage in the few small areas of wet soils in this unit.

These soils are suited to corn, soybeans, and small grain and to grasses and legumes grown for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IIIw–1

This unit consists of deep, poorly drained, nearly level soils on uplands and terraces. These soils have a surface layer of silt loam and a subsoil of silty clay loam to silty clay.

Permeability is slow to very slow, and the organic-matter content is moderately low. The main limitations

to the use of these soils are a seasonal high water table and slow permeability. The main concern of management is improving drainage.

Returning crop residue to the soil and growing a green manure crop help improve organic-matter content, fertility, and tilth and help reduce soil crusting. Using a rotary hoe also relieves soil crusting. These soils are subject to ponding and, in places, to local flooding. In places diversions are needed to protect soils on terraces from runoff coming from nearby upland areas. Open ditches help improve drainage. Tile drains do not draw effectively.

These soils are suited to corn, soybeans, small grain, grasses, and some legumes. They are not well suited to legumes that are sensitive to excess soil moisture.

CAPABILITY UNIT IIIw-2

This unit consists of deep, poorly drained, nearly level soils on flood plains, mainly of the Mississippi River. These soils have a surface layer and subsoil mainly of silty clay.

Permeability is slow to very slow, and the available water capacity is moderate to high. The organic-matter content is high. The main limitations to the use of these soils are a seasonal high water table, flooding, ponding, slow to very slow permeability, and tilth. The main concerns of management are artificial drainage, preventing flooding, and improving tilth.

These soils are subject to soil blowing when fall-plowed. Soil blowing can be reduced by leaving alternate strips of standing crop residues and planting winter cover crops or field windbreaks. Returning crop residue to the soil and growing a green manure crop help maintain organic-matter content, fertility, and tilth. It is especially important that these clayey soils not be tilled when wet. A few areas of these soils have a surface layer of silt loam and have a smaller hazard of tilth. Most areas of these soils are protected by levees, but they are subject to some flooding and ponding in wet seasons. Open ditches help improve drainage. Tile drains do not draw effectively in many places because of restricted permeability.

These soils are suited to corn, soybeans, small grain, grasses, and some legumes. They are not well suited to legumes that are sensitive to excess soil moisture.

CAPABILITY UNIT IIIw-4

This unit consists only of Birds silt loam, 0 to 2 percent slopes. It is a deep, poorly drained, nearly level soil on the Mississippi River flood plain and on flood plains of small streams. This soil is silt loam throughout.

Permeability is moderately slow, and the available water capacity is high. The organic-matter content is moderately low. The main limitations to the use of this soil are a seasonal high water table, a hazard of flooding and ponding, and slow permeability. The main concern of management is improving drainage.

Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content, fertility, and tilth and help prevent soil crusting. Using a rotary hoe also relieves soil crusting. Open ditches help improve drainage. Tile drains do not function effectively in many places because of restricted permeability.

This soil is suited to corn, soybeans, small grain, grasses, and some legumes. It is not well suited to legumes that are sensitive to excess soil moisture. Areas of this soil where the hazard of flooding is more severe are not well suited to small grain and hay.

CAPABILITY UNIT IIIs-3

This unit consists of deep, well drained to somewhat excessively drained, nearly level sandy alluvial soils. These soils are on benches and the flood plain of the Mississippi River. They are also on flood plains of small- and medium-sized streams. They have a surface layer that is mainly sandy loam and underlying material that is mainly loamy sand and sandy loam.

Permeability is mainly moderately rapid to rapid, and the available water capacity is moderate to low. The organic-matter content is moderate and low. The main limitations to the use of these soils are low available water capacity, soil blowing, and a hazard of flooding. The main concerns of management are reducing damage caused by flooding and lack of moisture and preventing soil blowing.

Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content and fertility and help prevent soil blowing. Applying fertilizer frequently in small amounts helps prevent excessive leaching. Planting field windbreaks and stripcropping uncultivated crops help prevent soil blowing in cultivated fields.

These soils are suited to corn, soybeans, small grain, and grasses and legumes. In areas where flooding is frequent, they are suited to pasture or woodland. Areas where the hazard of flooding is intermediate are not well suited to small grain and hay. These soils are well suited to alfalfa where flooding is not a hazard.

CAPABILITY UNIT IVe-1

This unit consists of deep and moderately deep, well drained to moderately well drained, strongly sloping, eroded and severely eroded soils and moderately steep, eroded soils. They are mainly on uplands, but some are on terraces. These soils have a surface layer of silt loam, sandy loam, loam, silty clay loam, and clay loam and a subsoil of silt loam, sandy clay loam, clay loam, and silty clay loam.

Permeability is mainly moderate, but in small areas it is moderately slow. Available water capacity is mainly high, but it is moderate in a few places. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, slope, tilth, and low fertility. The main concerns of management are preventing erosion and improving tilth and fertility.

Where cultivated crops can be grown, using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help maintain or improve organic-matter content, fertility, and tilth. Careful management is needed on the severely eroded soils, especially those that have a surface layer of silty clay loam, to insure seeding establishment and crop emergence. Rock outcrops and coarse fragments of chert hinder cultivation of these soils in a few places. Deep gullies in places ex-

Figure 14.—**Large gullies in an area of El Dara soils.**

pose limestone bedrock or coarse fragments of chert.

These soils are poorly suited to cultivated crops, because erosion is difficult to control. These soils are suited to small grain and to grasses and legumes grown for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IVe–6

This unit consists of deep, well drained and moderately well drained, strongly sloping, severely eroded and moderately steep, slightly eroded soils of the El Dara series. These soils have a surface layer of sandy loam and sandy clay loam and a subsoil of sandy clay loam.

Permeability is moderate, and the available water capacity is also moderate. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, slope, and low fertility. The main concerns of management are reducing water erosion and soil blowing and maintaining organic-matter content and fertility.

Where corn and soybeans can be grown on these soils, using minimum tillage, farming on the contour, stripcropping, leaving cover crops in winter, terracing, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help improve and maintain organic-matter content, fertility, and tilth. Stripcropping, minimum tillage, and leaving cover crops during winter are effective in protecting against water erosion or soil blowing. Grassed waterways on these soils require good management. Gullies form easily, and once formed they are difficult to control (fig. 14). Careful management is needed on the severely eroded soils that have a surface layer of sandy clay loam to insure seeding establishment and crop emergence.

These soils are poorly suited to cultivated crops, because erosion is difficult to control. They are suited to small grain and to grasses and legumes grown for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IVe–7

The unit consists of deep, moderately well drained to poorly drained, moderately sloping, severely eroded soils and strongly sloping, eroded and slightly eroded soils, on uplands. These soils have a surface layer of silt loam and silty clay loam and a subsoil of heavy silty clay loam to clay.

Permeability is moderately slow to very slow, and the available water capacity is moderate or high. The organic-matter content is moderately low or moderate. The main limitations to the use of these soils are erosion, slope, slow permeability, seeps, and tilth. The

main concerns of management are controlling erosion, draining seeps, and maintaining organic-matter content.

The clayey subsoil and restricted permeability of these soils increase the hazard of erosion and runoff. Where corn and soybeans can be grown, using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Constructing terraces commonly brings clayey material to the surface. In these areas it is difficult to grow plants. The severely eroded soils of this unit that have a surface layer of silty clay loam require careful management to insure seeding establishment and crop emergence.

These soils are poorly suited to cultivated crops, because erosion is difficult to control. They are suited to small grain and to grasses and legumes grown for hay and pasture. They are also suited to woodland.

CAPABILITY UNIT IVe–13

This unit consists only of Blair soils, 7 to 12 percent slopes, severely eroded. It is a deep, somewhat poorly drained, strongly sloping soil on uplands. This soil has a surface layer of clay loam and silt loam and a subsoil of clay loam.

Permeability is moderately slow, and the available water capacity is high. The organic-matter content is moderately low. The main limitations to the use of this soil are erosion, slope, tilth, and seasonal wetness. The main concerns of management are controlling erosion, improving organic-matter content, fertility, and tilth, and draining wet areas.

Where corn and soybeans can be grown on this soil, using minimum tillage, farming on the contour, stripcropping, leaving cover crops during winter, terracing, and using grassed waterways help control erosion and runoff. Returning crop residue to the soil and growing a green manure crop help improve organic-matter content, fertility, and tilth. The areas of severely eroded soil that have a surface layer of clay loam require careful management to insure seeding establishment and crop emergence. Tile drains can be used in wet areas.

This soil is poorly suited to cultivated crops, because erosion is difficult to control. It is suited to small grain and to grasses and legumes grown for hay and pasture. It is also suited to woodland.

CAPABILITY UNIT IVs–1

This unit consists only of Sparta loamy sand, 0 to 4 percent slopes. It is a deep, excessively drained, nearly level and gently sloping soil on terraces. This soil has a surface layer of loamy sand and a sandy subsoil.

Permeability is rapid, and the available water capacity is low. The organic-matter content is moderately low. The main limitations to the use of this soil are droughtiness, low fertility, and soil blowing. The main concerns of management are controlling soil blowing, maintaining organic-matter content and fertility, and limiting crop losses during droughts.

Returning crop residue to the soil and growing a green manure crop help improve or maintain organic-matter content and fertility and improve this soil's capacity for retaining plant nutrients and moisture. Applying fertilizers frequently in small amounts helps prevent excessive leaching. Stripcropping uncultivated crops and planting winter cover crops and field windbreaks help control soil blowing.

This soil is poorly suited to cultivated crops because of low available water capacity and the hazard of soil blowing. It can be used to a limited extent for corn and soybeans. This soil is suited to small grain and to grasses and legumes grown for hay and pasture. It is especially suited to deep-rooted crops, such as alfalfa. This soil is also suited to woodland.

CAPABILITY UNIT Vw

This unit consists only of Beaucoup silty clay loam, wet. It is a deep, poorly drained, nearly level soil mainly on the Mississippi River flood plain. This soil has a surface layer and subsoil of silty clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is high. The main limitations to the use of this soil are frequent flooding, ponding, and a high water table for long periods of the year. The main concern of management is commonly to retain the present use of the soil if it is in pasture or woodland. Suitable grasses or trees should be established in cultivated areas.

This soil is too wet or too frequently subject to flooding to be used for cultivated crops. It is suited to reed canarygrass and alsike clover grown as pasture. It is well suited to habitats for wetland wildlife.

CAPABILITY UNIT VIe–1

This unit consists of deep, well drained and moderately well drained, moderately steep, severely eroded soils and steep, eroded or slightly eroded soils, on uplands. These soils have a surface layer and a subsoil of silt loam, cherty silt loam, loam, silty clay loam, clay loam, and sandy clay loam.

Permeability is mainly moderate, but it is moderately slow in places. Available water capacity is mainly high, but it is moderate in places. The organic-matter content is moderately low. The main concerns of management are controlling erosion, maintaining fertility, and assuring high yields in hay, pasture, and woodland.

Starting new seeding is more difficult on the severely eroded soils than on the eroded or slightly eroded soils. The unproductive pastures should be renovated. Mowing helps control weeds and brush in established pastures. Overgrazing should be avoided.

Steep slopes and a severe hazard of erosion limit the suitability of many areas of these soils to pasture or woodland. The moderately steep soils are suited to hay.

CAPABILITY UNIT VIe–2

This unit consists of moderately deep and some deep, well drained and moderately well drained, strongly sloping, severely eroded soils and moderately steep, eroded soils, on uplands. These soils have a surface layer of silt loam and silty clay loam and a subsoil of silty clay loam, silty clay, and cherty silty clay.

Permeability is moderate to very slow. The available water capacity is moderate in most areas and high in a few areas. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, moderate available water capacity, slope, and tilth. The main concerns of management are control-

ling erosion, maintaining fertility, and assuring high yields in hay, pasture, and woodland.

Starting new seedings is more difficult on the severely eroded soils than on the eroded soils. The unproductive pastures should be renovated. Mowing established pastures helps control weeds and brush. Overgrazing should be avoided, especially on the soils that have moderate available water capacity. In places deep gullies expose limestone or shale bedrock and large fragments of chert.

Steep slopes and a severe hazard of erosion limit the suitability of these soils to hay, pasture, and woodland. The moderate available water capacity of these soils is limiting in most seasons.

CAPABILITY UNIT VIe–6

This unit consists of deep, well drained and moderately well drained, moderately steep, severely eroded soils and steep, eroded soils, on uplands. These soils have a surface layer of sandy loam, loam, and sandy clay loam and a subsoil of sandy clay loam.

Permeability is moderate, and the available water capacity is moderate. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, slope, tilth, and low fertility. The main concerns of management are controlling water erosion and soil blowing, maintaining fertility and tilth, and assuring high yields in hay, pasture, and woodland.

Starting new seedings is more difficult on the severely eroded soils than on the eroded soils. Leaving residue on the surface during pasture renovations helps control water erosion and soil blowing. Mowing established pastures helps control weeds and brush. Overgrazing should be avoided, especially on the soils that have a lower available water capacity. Large gullies form rapidly on these soils unless protective measures are promptly used.

Steep slopes and a severe hazard of erosion limit the suitability of these soils to pasture and woodland and, on some moderately steep soils, to hay. The moderate available water capacity limits the use of these soils in most seasons.

CAPABILITY UNIT VIe–7

This unit consists of deep, moderately well drained and somewhat poorly drained, strongly sloping and moderately steep, severely eroded soils and moderately steep, eroded soils, on uplands. These soils have a surface layer of silt loam, silty clay loam, and clay and a subsoil of clay loam, heavy silty clay loam, or clay.

Permeability is moderately slow to very slow, and the available water capacity is moderate to high. The organic-matter content is moderately low. The main limitations to the use of these soils are erosion, slope, tilth, and seasonal wetness. The main concerns of management are controlling erosion, maintaining fertility and tilth, and assuring high yields in hay, pasture, and woodland.

The clayey subsoil, and in places, the clayey surface layer, increase the hazard of erosion and runoff. Starting new seedings is difficult on soils that have a clayey surface layer. As these clayey layers dry, wide cracks form that increase the rate of drying. Unproductive pastures should be renovated. Moving established pastures helps control weeds and brush. Overgrazing should be avoided. Plants that tolerate excess moisture should be planted in areas of soils that are seasonally wet. Steep slopes and a severe hazard of erosion limit the suitability of these soils to hay, pasture, and woodland.

CAPABILITY UNIT VIIe–1

This unit consists of deep, well drained and moderately well drained, very steep, eroded and slightly eroded soils on uplands. These soils have a surface layer of silt loam, loam, and some sandy loam and cherty silt loam and a subsoil of silt loam, clay loam, and some sandy clay loam and cherty silty clay.

Permeability is moderately rapid and moderate, and the available water capacity is moderate to high. The organic-matter content is moderately low. The main limitations to the use of these soils are slope, erosion, and droughtiness. The main concerns of management are controlling erosion and assuring high yields of woodland.

Some areas have soil slips underlain by stratified materials. Small to large chert fragments are on the soil surface in a few areas. Large gullies form rapidly on some of these soils. On most of these soils steep slopes prevent renovating the pasture efficiently by fertilizing, mowing weeds, and cutting brush. Wooded areas normally should not be cleared for pasture. Some cleared areas are suited to pasture if grazing is controlled and if weeds and brush are not a hazard. Woodlands should be protected from grazing and fire. Cutting down weed trees and treating stumps to prevent sprouting increase yields of woodland products. The moderate available water capacity of some of these soils limits woodland growth during most seasons.

Very steep slopes and a very severe hazard of erosion limit the suitability of these soils mainly to woodland.

CAPABILITY UNIT VIIe–2

This unit consists of moderately deep, well drained and moderately well drained, moderately steep, severely eroded soils and steep, eroded soils, on uplands. These soils have a surface layer of silt loam and silty clay loam and a subsoil of silty clay loam, silty clay, and cherty silty clay.

Permeability is moderate to very slow, and the available water capacity is moderate. The organic-matter content is moderately low. The main limitations to use of these soils are erosion, slope, and tilth. The main concerns of management are controlling erosion and assuring high yields in pasture and woodland.

There is a hazard of soil slippage on many areas of these soils. In places outcrops of sandstone bedrock must be avoided. Starting new seedings is more difficult on the severely eroded soils than on eroded soils. Unproductive pastures should be renovated if slopes are not too steep. Mowing established pastures helps control weeds and brush. Grazing should be controlled, especially on soils that have a lower available water capacity. Wooded areas normally should not be cleared for pasture. They should be protected from grazing and fire. Cutting down weed trees and treating stumps to prevent sprouting will increase the yields of woodland products.

Steep slopes and a severe hazard of erosion limit the

suitability of these soils to woodland and pasture. The moderate available water capacity of these soils is limiting in most seasons.

CAPABILITY UNIT VIIe–3

This unit consists of deep, somewhat poorly drained and moderately well drained, moderately steep, severely eroded soils and steep, eroded soils on uplands. These soils have a surface layer of silt loam, silty clay loam, and clay loam and a subsoil of heavy clay loam or clay.

Permeability is very slow to moderately slow, and the available water capacity is moderate to high. The organic-matter content is moderately low. The main limitations to the use of this soil are erosion, slope, tilth, and seasonal wetness. The main concerns of management are controlling erosion, minimizing effects of wetness, and assuring high yields in pasture and woodland.

The high clay content of the subsoil increases the hazard of erosion and runoff. Unproductive pastures should be renovated if slopes are not too steep. Mowing established pastures helps control weeds and brush. Grazing should be controlled, because overgrazing reduces pasture yields and increases erosion losses. Wooded areas normally should not be cleared for pasture. They should be protected from grazing and fire. Cutting down weed trees and treating stumps to prevent sprouting will increase the yields of woodland products.

Steep and moderately steep slopes and a severe hazard of erosion limit the suitability of these soils to pasture and woodland.

CAPABILITY UNIT VIIs–2

This unit consists of deep and very shallow, steep and very steep soils on uplands. These soils have variable drainage, but most are well drained. They have a surface layer of cherty silt loam and loam and a subsoil of cherty silty clay. Some areas of these soils have a very shallow layer of loam to silt loam material over weathered, mainly limestone bedrock.

Permeability is variable, but it is moderate in places. The available water capacity and the organic-matter content are low. The main limitations to the use of these soils are erosion, slope, droughtiness, and stones on the surface. The main concerns of management are controlling erosion and maintaining the present use of the soils.

Established pastures on these soils can be renovated in places if care is taken to avoid large stones, chert fragments, and bedrock outcrops. Wooded areas normally should not be cleared, because the rate of tree growth is fair to poor.

Steep slopes, a severe hazard of erosion, and stones and bedrock on the surface and below the surface limit the suitability of these soils to woodland. They also have some potential for wildlife habitat and recreation uses.

CAPABILITY UNIT VIIs–3

This unit consists only of Riverwash, sand and gravel. It is deep, excessively drained, nearly level soil material on flood plains. It has a sandy surface layer and sandy underlying material.

Permeability is variable, but it is commonly rapid. The available water capacity is very low. The organic-matter content is low. The main limitations to the use of this land are droughtiness, flooding, and low fertility. The main concerns of management are starting and maintaining woodland.

Starting woodland is difficult because of droughtiness. Once established, adapted trees root deeply to obtain moisture for growth. Woodland should be protected from fire and grazing. Removing weed trees helps desirable species grow more rapidly. Droughtiness and flooding limit the suitability of this land to woodland or wildlife habitat.

Predicted Yields[7]

Table 4 shows predicted yields of the principal crops grown in Adams County under a high level of management. These predictions are based on yields for the period 1954 to 1963, on soil tests, and on the experience and records of farmers, agronomists, conservationists, and extension advisers (*11*). The predictions are adjusted to reflect the trend toward higher yields during the period 1963 to 1972. Average yields are expected to increase. A few farmers obtain yields as high as 200 bushels of corn per acre in some years, but yields this high are still uncommon.

Management was determined on the basis of farming techniques, crop varieties, and fertilizers commonly used in 1972. Differences in weather from year to year may cause annual yields to range up to 20 percent above or below those in the table. Hay and pasture yields are predicted for varieties of grasses and legumes suited to the soil.

Under a high level of management an adequate drainage system and flood and erosion controls are provided. The proper number of plants are planted by using high-quality seed. Tillage is kept to a minimum, and it is used when soil moisture is favorable. The weeds, plant diseases, and harmful insects are controlled. A favorable soil reaction and nearly-optimum levels of nitrogen, phosphorus, and potassium are maintained. Barnyard manure and green-manure crops are used. The crops are harvested with the smallest possible loss, and all operations are timely.

Woodland[8]

About 395,000 acres in Adams County was once forested, but in 1969 only 67,900 acres in the county was in woodland (*5*). Soils that are poorly suited to crops remain in woodland. Scattered tracts of woodland are in most of the upland parts of the county, except in an area in the northeastern part (fig. 15).

The largest tracts of trees are near streams or drainageways, especially those that are steeply sloping. Oak and hickory are the main trees in this part of the county. Privately owned wooded areas of 200 to 300 acres are common.

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[7] J. F. STEINKAMP, soil scientist, and D. A. BENZ, district conservationist, Soil Conservation Service, helped prepare this section.

[8] By BILL CLARK, woodland conservationist, Soil Conservation Service.

TABLE 4.—*Predicted average yield per acre for principal crops*

[Yields are those to be expected under a high level of management. Absence of data indicates that the soil is not well suited to the crop or that the crop is not commonly grown. Only arable soils are included]

Soil	Corn	Soybeans	Wheat	Grass-legume hay[1]	Rotation pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUM*[2]
Atlas silt loam, 7 to 12 percent slopes	60	20	28	2.0	3.3
Atlas soils, 7 to 12 percent slopes, severly eroded	50		22	1.5	2.5
Atlas silt loam, 12 to 18 percent slopes, eroded				1.9	3.2
Atlas soils, 12 to 18 percent slopes, severely eroded				1.4	2.3
Atterberry silt loam, 0 to 2 percent slopes	130	45	55	4.5	7.5
Atterberry silt loam, 2 to 6 percent slopes	125	40	55	4.5	7.5
Baylis soils, 7 to 12 percent slopes, severely eroded	80	28	35	3.0	5.0
Baylis soils, 7 to 12 percent slopes, severely eroded				2.0	3.3
Baylis silt loam, 12 to 18 percent slopes, eroded				2.4	4.0
Baylis soils, 12 to 18 percent slopes, severely eroded				1.8	3.0
Beaucoup silty clay loam	115	40	50	4.2	7.0
Beaucoup silty clay loam, wet					
Beaucoup silt loam, overwash	120	42	53	4.4	7.4
Birds silt loam	115	35	45	4.3	6.6
Blackoar silt loam	120	42	55	4.5	7.5
Blair silt loam, 7 to 12 percent slopes, eroded	65	22	30	2.2	3.7
Blair soils, 7 to 12 percent slopes, severely eroded	50		25	1.6	2.7
Blair soils, 12 to 18 percent slopes, severely eroded				1.5	2.5
Camden silt loam, 0 to 2 percent slopes	110	38	48	4.3	7.2
Camden silt loam, 2 to 7 percent slopes	110	38	48	4.3	7.2
Camden silt loam, 7 to 12 percent slopes, eroded	95	32	40	3.6	6.0
Camden soils, 7 to 12 percent slopes, severely eroded	90		38	3.4	5.7
Camden silt loam, 12 to 18 percent slopes, eroded	90		38	3.4	5.7
Camden soils, 12 to 18 percent slopes, severely eroded				3.2	5.3
Camden silt loam, 18 to 30 percent slopes				3.2	5.3
Camden silt loam, 30 to 50 percent slopes					
Clarksdale silt loam, 2 to 4 percent slopes	120	42	52	4.5	7.5
Clarksdale silt loam, 2 to 4 percent slopes	120	42	52	4.5	7.5
Clarksdale silt loam, 4 to 7 percent slopes, eroded	108	38	47	4.0	6.7
Clinton silt loam, 2 to 7 percent slopes, eroded	100	35	42	4.0	6.7
Clinton soils, 4 to 7 percent slopes, severely eroded	95	32	40	3.6	6.0
Clinton silt loam, 7 to 12 percent slopes, eroded	95	32	40	3.6	6.0
Clinton soils, 7 to 12 percent slopes, severely eroded	90		38	3.3	5.5
Clinton-El Dara complex, 7 to 12 percent slopes, eroded	85	30	38	3.3	5.5
Clinton-El Dara complex, 7 to 12 percent slopes, severely eroded	80	28	36	3.0	5.0
Clinton-El Dara complex, 12 to 18 percent slopes, severely eroded				2.0	3.3
Coatsburg silt loam, 4 to 7 percent slopes, eroded	70	25	32	2.5	4.2
Coatsburg silt loam, 7 to 12 percent slopes, eroded	65	22	30	2.3	3.8
Cowden silt loam	110	38	48	4.0	6.7
Darwin silty clay	90	32	38	2.5	4.2
Dickinson sandy loam, 0 to 4 percent slopes	80	28	40	2.6	4.3
Downs silt loam, 0 to 2 percent slopes	125	45	55	4.4	7.3
Downs silt loam, 2 to 7 percent slopes	115	43	55	4.4	7.3
Downs silt loam, 7 to 12 percent slopes, eroded	105	38	48	3.8	6.3
Dupo silt loam	115	40	50	4.2	7.0
El Dara sandy loam, 7 to 12 percent slopes	88	28	35	2.9	4.8
El Dara soils, 7 to 12 percent slopes, severely eroded	65		32	2.5	4.2
El Dara sandy loam, 12 to 18 percent slopes	65			2.5	4.2
El Dara soils, 12 to 18 percent slopes, severely eroded				2.0	3.3
El Dara sandy loam, 18 to 30 percent slopes, eroded				2.0	3.3
El Dara soils, 30 to 50 percent slopes					
Fayette silt loam, 2 to 7 percent slopes	115	42	52	4.6	7.7
Fayette silt loam, 12 to 18 percent slopes, eroded	100	35	45	4.0	6.7
Fayette soils, 7 to 12 percent slopes, severely eroded	95	32	40	3.6	6.0
Fayette silt loam, 12 to 18 percent slopes, eroded	90	32	40	3.6	6.0
Fayette soils, 12 to 18 percent slopes, severely eroded	30		38	3.4	5.7
Fayette-Hickory complex, 12 to 18 percent slopes, eroded	89	30	38	3.4	5.7
Fayette-Hickory complex, 12 to 25 percent slopes, severely eroded	60	20	25	3.0	5.0
Fishhook silt loam, 4 to 7 percent slopes, eroded	65	22	26	2.6	4.3
Fishhook soils, 4 to 7 percent slopes, severely eroded			19	2.5	4.2
Fishhook silt loam, 7 to 12 percent slopes, eroded			24	2.5	4.2
Fishhook soils, 7 to 12 percent slopes, severely eroded			17	2.0	3.3
Fishhook silt loam, 12 to 18 percent slopes, eroded				2.2	3.7
Gorham silty clay loam	120	42	52	4.6	7.7

See footnotes at end of table.

TABLE 4.—*Predicted average yield per acre for principal crops*—Continued

Soil	Corn	Soybeans	Wheat	Grass-legume hay[1]	Rotation pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUM*[2]
Gosport silt loam, 12 to 18 percent slopes, eroded				2.5	4.2
Gosport soils, 12 to 18 percent slopes, severely eroded				2.0	3.3
Gosport silt loam, 18 to 50 percent slopes, eroded				2.0	3.3
Goss cherty silt loam, 15 to 50 percent slopes					
Hamburg silt loam, 30 to 50 percent slopes, eroded					
Haymond silt loam	122	44	50	4.2	7.0
Herrick silt loam, 0 to 2 percent slopes	125	45	55	4.6	7.7
Herrick silt loam, 2 to 4 percent slopes	125	45	55	4.6	7.7
Hickory loam, 7 to 12 percent slopes, eroded	85	30	38	3.2	5.3
Hickory soils, 7 to 12 percent slopes, severely eroded	80	25	34	3.0	5.0
Hickory loam, 12 to 18 percent slopes, eroded	80		34	3.0	5.0
Hickory soils, 12 to 18 percent slopes, severely eroded				2.5	4.2
Hickory loam, 18 to 30 percent slopes				2.5	4.2
Hickory loam, 30 to 50 percent slopes					
Huntsville silt loam	130	45	55	5.0	8.3
Ipava silt loam, 0 to 2 percent slopes	140	48	58	5.2	7.2
Ipava silt loam, 2 to 4 percent slopes	135	42	53	5.2	7.0
Joy silt loam	135	48	55	5.0	8.3
Keller silt loam, 4 to 7 percent slopes, eroded	80	28	35	3.5	5.2
Keller silt loam, 7 to 12 percent slopes, eroded	75	25	29	3.2	5.0
Keomah silt loam, 0 to 2 percent slopes	110	38	48	4.5	7.5
Keomah silt loam, 2 to 4 percent slopes	110	38	48	4.5	7.5
Keomah silt loam, 4 to 7 percent slopes, eroded	100	34	43	4.1	6.8
Keomah soils, 4 to 7 percent slopes, severely eroded	90	30	38	3.6	6.0
Lawson silt loam	130	45	55	5.0	8.3
Littleton silt loam	135	48	55	5.0	8.3
Mt. Carroll silt loam, 0 to 2 percent slopes	115	40	50	4.5	7.5
Mt. Carroll silt loam, 2 to 7 percent slopes	110	35	50	4.5	7.5
Mt. Carroll silt loam, 7 to 12 percent slopes, eroded	100	26	42	3.6	6.0
Muscatine silt loam, 0 to 2 percent slopes	131	48	58	5.2	11.7
Muscatine silt loam, 2 to 4 percent slopes	128	45	58	5.2	11.7
NewGlarus-Palsgrove silt loams, 7 to 12 percent slopes, eroded	73	24	32	2.5	4.2
NewGlarus-Palsgrove silt loams, 12 to 18 percent slopes, eroded	45			2.2	3.7
Orion silt loam	115	40	50	4.2	7.0
Port Byron silt loam, 0 to 2 percent slopes	120	42	50	4.6	7.7
Port Byron silt loam, 2 to 6 percent slopes	116	39	49	4.6	7.4
Racoon silt loam	90	32	42	3.2	5.3
Riley silty clay loam	105	38	48	4.2	7.0
Rozetta silt loam, 0 to 2 percent slopes	120	37	44	4.6	7.0
Rozetta silt loam, 2 to 7 percent slopes	109	32	42	4.1	6.6
Rozetta silt loam, 7 to 12 percent slopes, eroded	95	30	40	4.0	6.0
Rozetta soils, 7 to 12 percent slopes, severely eroded			36	3.6	6.0
Rushville silt loam	100	35	42	3.2	5.3
Sandy alluvial land	80	28	38	2.6	4.3
Seaton silt loam, 0 to 2 percent slopes	110	38	48	4.5	7.5
Seaton silt loam, 2 to 7 percent slopes	110	38	48	4.5	7.5
Seaton silt loam, 7 to 12 percent slopes, eroded	95	32	40	3.6	6.0
Seaton silt loam, 12 to 18 percent slopes, eroded	90		38	3.5	5.8
Seaton silt loam, 18 to 30 percent slopes				3.0	5.0
Seaton silt loam, 30 to 50 percent slopes					
Seaton-Goss complex, 18 to 30 percent slopes				1.8	3.0
Seaton-Goss complex, 30 to 50 percent slopes					
Seaton-Hickory complex, 18 to 30 percent slopes				2.8	4.7
Seaton-Hickory complex, 30 to 50 percent slopes					
Shiloh silty clay	80	28	38	2.6	4.3
Sparta loamy sand, 0 to 4 percent slopes	70	25	35	2.2	3.7
Starks silt loam, 0 to 3 percent slopes	115	40	50	4.5	7.5
Stronghurst silt loam, 0 to 2 percent slopes	120	42	52	4.6	7.7
Stronghurst silt loam, 2 to 6 percent slopes	117	35	45	4.6	7.2
Tama silt loam, 0 to 2 percent slopes	135	48	55	4.8	8.0
Tama silt loam, 2 to 6 percent slopes	130	44	51	4.8	8.0
Tice silty clay loam	130	45	55	4.5	7.5
Timula silt loam, 7 to 12 percent slopes, eroded	83	28	35	3.6	6.0
Timula silt loam, 12 to 18 percent slopes, eroded	65			3.0	5.1
Timula silt loam, 18 to 30 percent slopes, eroded				2.7	4.5
Timula silt loam, 30 to 50 percent slopes					
Titus silty clay	100	35	40	3.2	5.3
Ursa silt loam, 7 to 12 percent slopes, eroded	60	20	28	2.0	3.3

See footnotes at end of table.

TABLE 4.—*Predicted average yield per acre for principal crops*—Continued

Soil	Corn	Soybeans	Wheat	Grass-legume hay[1]	Rotation pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUM*[2]
Ursa soils, 7 to 12 percent slopes, severely eroded	50		22	1.5	2.5
Ursa silt loam, 12 to 18 percent slopes, eroded				1.9	3.2
Ursa soils, 12 to 18 percent slopes, severely eroded				1.9	3.2
Ursa silt loam, 18 to 30 percent slopes, eroded				1.9	3.2
Virden silt loam	125	45	52	4.5	7.5
Wakeland silt loam	115	40	50	4.2	7.0
Worthen silt loam, 0 to 2 percent slopes	130	45	55	4.8	8.0
Worthen silt loam, 2 to 6 percent slopes	130	45	55	4.8	8.0

[1] Yields for hay and pasture are estimated for mixed stands of grasses and legumes that are suited to the soil.

[2] AUM is animal-unit-month, a term used to express the carrying capacity of pasture. It is the number of months during a single grazing season that 1 acre will provide grazing for 1 animal unit without injury to the sod. One animal unit is defined as 1 cow, 2 yearling calves, 1 horse, 7 sheep, or 4 brood sows. For example, 2 cows can graze about 4 months in a pasture that has a capacity of 8 animal unit months.

Sizable areas of woodland are also on the flood plain of the Mississippi River, mainly near the river or on islands in the river. The main trees are silver maple, cottonwood, and ash. The Federal Government owns most of these areas.

About 50 percent of the woodland in the upland part of the county is grazed. Fire is a hazard to the woodland throughout the county.

Small sawmills in the county process wood products for commercial use. Some walnut, white oak, and red oak logs are sold for veneer. Some wood products, mainly white oak, are made into barrel staves. Some evergreen trees are grown to be sold as Christmas trees. Woodlands also provide wildlife cover, recreation use, and protection of the soil from erosion.

In table 5 the soils of Adams County are placed in 19 woodland suitability groups. Each group is made up of soils that are suited to the same kinds of trees, that need approximately the same kind of management when the vegetation on them is similar, and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol, such as 1r2, 2o1, or 3s2. The first element of the symbol indicates the ordination class. It expresses site quality by an Arabic numeral, from 1 to 5. These classes indicate the potential productivity of soils in the group: *1* is very high; *2*, high; *3*, moderately high; *4*, moderate; and *5*, low. The class is based on the average site index of an indicator plant or forest type. Site index is the height in feet that the dominant and co-dominant trees will reach in a natural unmanaged stand in a specified number of years. For the merchantable hardwoods and softwoods in this county, the site index is the height reached in 50 years, except for cottonwood trees, for which the index is the height reached in 30 years. The estimated site indexes listed in table 5 were determined by foresters and soil scientists from measurements made in Adams County and in several nearby counties.

Site indexes are grouped into site quality classes, which are used to determine approximate expected yields per acre in cords and board feet. For this survey conversions of average site index into volumetric growth and yield are based on research on cottonwoods (*3*) and oaks (*9*).

The second element of the symbol, a small letter, indicates the subclass. This letter indicates an important soil property that imposes a slight to severe hazard or limitation on woodland use and management. A letter *d* indicates that the soils have restricted rooting depths; *o* indicates that the soils have few limitations that restrict their use for trees; *r* indicates that the main limitation is steep slopes; *s* indicates that the soils are sandy and dry, have little or no difference in texture between surface layer and subsoil (or B horizon), have low available water capacity, and generally have a low supply of plant nutrients; *w* indicates that water in or on the soil, either seasonally or year round, is the chief limitation.

The third element of the symbol is the woodland suitability group. A woodland suitability group is made up of kinds of soils that are capable of producing similar kinds of wood crops, that need similar management to produce these crops when the vegetation is similar, and that have about the same potential productivity. Woodland suitability groups are designated by Arabic numerals from 1 to 6. The concerns of management considered in assigning these numerals are erosion hazard. equipment restrictions, seedling mortality, and windthrow hazard.

The numeral *1* indicates upland and terrace soils that have all management concerns rated *slight*. The numeral *2* indicates upland and terrace soils that have one or more management concerns rated *moderate*. The numeral *3* indicates upland and terrace soils that have one or more management concerns rated *severe*. The numeral *4* indicates bottom land soils that have all management concerns rated *slight*. The numeral *5* indicates bottom land soils that have one or more management concerns rated *moderate*. The numeral *6* indicates bottom land soils that have one or more management concerns rated *severe*.

Four limitations and hazards that affect the growth of trees are rated in table 5. The ratings are *slight*,

Figure 15.—**Typical woodlot in a very steep area of Hickory soils.**

moderate, or *severe* for the soils in each group.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site where openings are made in the canopy. *Slight* means that competition is not a concern. *Moderate* means that plant competition develops, but it does not prevent the establishment of desirable species, and it can be controlled easily. *Severe* means that stands of desired species are not restocked naturally and that planted trees can be choked out unless intensive management is applied to eliminate competing plants.

Equipment limitation refers to soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees. *Slight* means that there is little or no restriction on the type of equipment or the time of year that it can be used. *Moderate* means that use of equipment is restricted because of steep slopes or because the soils are wet for up to three months each year. *Severe* means that very steep slopes make special harvesting methods necessary, or that use of equipment is restricted because the soils are wet for more than three months each year.

Seedling mortality refers to the expected loss of natural or planted tree seedlings caused by soil characteristics and topographic features, excluding losses caused by plant competition. It is assumed that the natural supply of seed is adequate, that the stock is good, that seedlings are properly planted and cared for, and that climatic conditions are normal. *Slight* means that losses normally do not exceed 25 percent of the planted or natural stock; *moderate* means that losses are between 25 and 50 percent; *severe* means that more than 50 percent of the planted or natural stock is likely to die.

Erosion hazard refers to the degree of potential erosion following cutting operations where soil is exposed along roads, skid trails, and log decking areas. *Slight* means that erosion is not a major concern of management. *Moderate* means that management is needed to prevent erosion during harvesting operations and in cleared areas. *Severe* means that intensive management is required to control erosion.

Windthrow hazard is an evaluation of soil characteristics that control tree root development and therefore the likelihood that trees will be uprooted by wind. Windthrow hazard is not included in table 5, because it is rated *slight* for all of the soils.

Table 5 lists trees to favor in existing stands for each woodland suitability group. The ratings are based on suitability of the trees for the site and market value of the trees, but the trees are not listed in order of

TABLE 5.—*Woodland*

[Port Byron-Mt. Carroll-Urban land complex (858B) and

Woodland suitability group	Potential soil productivity			Management limitations and hazards			
	Species	Site index	Annual growth per acre [1]	Plant competition	Equipment limitation	Seedling mortality	Erosion hazard
			Board feet				
Group 1o1: Well drained and moderately well drained soils that have a slope of 0 to 12 percent; on uplands and terraces. They have a surface layer of silt loam or loam and a subsoil of silty clay loam to sandy clay loam. These soils are moderately permeable and generally have a high available water capacity. Camden (134A, 134B, 134C2, 134C3) Clinton (18B2, 18B3, 18C2, 18C3), Clinton-El Dara (932C2, 932C3), Hickory (8C2, 8C3), Mt. Carroll (268A, 268B, 268C2).	Upland oaks [3]	85+	350–450	Moderate	Slight	Slight	Slight
Group 1o4: Well drained and moderately well drained soils that have a slope of 0 to 2 percent; on bottom lands. They have a surface layer and underlying material of silt loam. These soils are moderately permeable and have a high available water capacity. Haymond (331), Huntsville (77).	Cottonwood	105+	550–650	Moderate	Slight	Slight	Slight
Group 1r2: Well drained and moderately well drained soils that have a slope of 12 to 30 percent; on uplands and terraces. They have a surface layer of silt loam or loam and a subsoil of silty clay loam to sandy clay loam. Most of these soils are moderately permeable and have a high to moderate available water capacity. Camden (134D2, 134D3, 134E), Clinton-El Dara (932D3), Hickory (8D2, 8D3, 8E).	Upland oaks [3]	85+	350–450	Moderate	Moderate	Slight	Moderate
Group 1r3: Well drained soils that have a slope of 30 to 50 percent; on uplands and terraces. They have a surface layer of loam or silt loam and a subsoil of silty clay loam or clay loam. These soils are moderately permeable and have a high available water capacity. Camden (134F), Hickory (8F).	Upland oaks [3]	85+	350–450	Moderate	Severe	Slight	Severe

See footnotes at end of table.

suitability of soils

Seaton-Urban land complex (U274C, U274D) are not included]

Trees to favor in existing stands	Trees and shrubs suitable for planting on [2]—					
	Cool sites that face north and east		Hot sites that face south and west		Windbreaks	
	Severely eroded soils	Other soils	Severely eroded soils	Other soils	Trees	Shrubs
Black walnut, white oak, red oak, and ash.	Red pine, Scotch pine, black locust, and white pine.	White oak, black walnut, red oak, green ash, cottonwood, sycamore, yellow-poplar, white pine, Scotch pine, and red pine.	Red pine, Scotch pine, and black locust.	Green ash, black walnut, yellow-poplar, red pine, and white pine.	Norway spruce, Douglas-fir, white spruce, white pine, and red pine.	Silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, autumn-olive, flowering dogwood, spirea, American cranberry bush, forsythia, and lilac.
Cottonwood, black walnut, ash, and sycamore.	----------	Cottonwood, black walnut, sycamore, red maple, ash, sweetgum, and yellow-poplar.	----------	----------	Douglas-fir, Norway spruce, white spruce, white pine, and red pine.	Silky dogwood, Amur maple, Amur honeysuckle, Russian-olive, gray dogwood, autumn-olive, flowering dogwood, spirea, American cranberry bush, lilac, and forsythia.
White oak, black walnut, ash, red oak, and black cherry.	Red pine, white pine, Scotch pine, and black locust.	Black walnut, sycamore, yellow-poplar, white oak, red oak, ash, white pine, red pine, and Scotch pine.	Red pine, Scotch pine, and black locust.	Black walnut, yellow-poplar, ash, white pine, and red pine.	Norway spruce, white pine, red pine, white spruce, and Douglas-fir.	Silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, flowering dogwood, spirea, American cranberry bush, lilac, and forsythia.
Red oak, white oak, black walnut, ash, and black cherry.	----------	Black walnut, yellow-poplar, white oak, red oak, ash, white pine, red pine, and Scotch pine.	----------	Black walnut, white pine, yellow poplar, red pine, and ash.	Norway spruce, white pine, red pine, white spruce, and Douglas-fir.	Silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, autumn-olive, flowering dogwood, spirea, American cranberry bush, lilac, and forsythia.

TABLE 5.—*Woodland*

Woodland suitability group	Potential soil productivity			Management limitations and hazards			
	Species	Site index	Annual growth per acre [1]	Plant competition	Equipment limitation	Seedling mortality	Erosion hazard
			Board feet				
Group 2o1: Well drained, moderately well drained, and somewhat poorly drained soils; on uplands and terraces. The well drained and moderately well drained soils have a slope of 0 to 12 percent, and the somewhat poorly drained soils have a slope of 0 to 7 percent. They have a surface layer of silt loam and a subsoil of silty clay loam to silty clay. These soils are moderately permeable to slowly permeable and have a high available water capacity. Clarksdale (257A, 257B, 257C2), Downs (386A, 386B, 386C2), Fayette (280B, 280C2, 280C3), Herrick (46A, 46B), Ipava (43A, 43B)[4], Joy (275)[4], Keomah (17A, 17B, 17C2, 17C3), Littleton (81)[4], Muscatine (41A, 41B)[4], Rozetta (279A, 279B, 279C2, 279C3), Seaton (274A, 274B, 274C2), Starks (132A), Tama (36A, 36B)[4], Worthen (37A, 37B)[4].	Upland oaks [3]	75–85	250–350	Moderate to severe.	Slight	Slight	Slight
Group 2o4: Somewhat poorly drained soils that have a slope of 0 to 2 percent; on bottom lands. They have a surface layer of silt loam or silty clay loam, and the underlying material is sandy loam to silty clay. Most of these soils are moderately permeable and have a moderate to high available water capacity. Dupo soils are moderately slowly permeable to slowly permeable. Dupo (180), Lawson (451), Orion (415), Riley (452), Tice (284), Wakeland (333).	Pin oak	85–95		Severe	Slight	Slight	Slight
Group 2r2: Well drained and moderately well drained soils that have a slope of 12 to 30 percent; on uplands. They have a surface layer of silt loam, loam, or cherty silt loam and a subsoil of silt loam to cherty silty clay. These soils are moderately permeable and have a high available water capacity. Goss soils have a low available water capacity. Fayette (280D2, 280D3), Fayette-Hickory (936D2, 936D3), Seaton (274D2, 274E), Seaton-Goss (931E), Seaton-Hickory (937E).	Upland oaks [3]	75–85	250–350	Moderate	Moderate	Slight	Moderate

See footnotes at end of table.

suitability of soils—Continued

Trees to favor in existing stands	Trees and shrubs suitable for planting on [2]—					
	Cool sites that face north and east		Hot sites that face south and west		Windbreaks	
	Severely eroded soils	Other soils	Severely eroded soils	Other soils	Trees	Shrubs
Ash, white oak, red oak, bur oak, and black walnut.	Red pine, white pine, and Scotch pine.	Black walnut, white oak, red oak, ash, yellow-poplar, white pine, red pine, and Scotch pine.	Red pine, Scotch pine, black locust, and redcedar.	White pine, black walnut, yellow-poplar, red pine, ash, and Scotch pine.	Norway spruce, white spruce, Douglas-fir, white pine, and red pine.	Silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, autumn-olive, flowering dogwood, spirea, American cranberry bush, forsythia, and lilac.
Pin oak, ash, cottonwood, sycamore, and red maple.	----------	Cottonwood, sycamore, ash, red maple, pin oak, and swamp white oak.	----------	----------	White pine, Norway spruce, and white spruce.	Silky dogwood, Amur maple, flowering dogwood, American cranberry bush, and forsythia.
Red oak, white oak, ash, and black walnut.	Red pine, white pine, and Scotch pine.	White oak, red oak, sycamore, ash, white pine, yellow-poplar, and Scotch pine.	Red pine, Scotch pine, black locust, and redcedar.	White pine, red pine, ash, yellow-poplar, and Scotch pine.	Norway spruce, white spruce, Douglas-fir, white pine, and red pine.	Silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, autumn-olive, flowering dogwood, spirea, American cranberry bush, forsythia, and lilac.

TABLE 5.—*Woodland*

Woodland suitability group	Potential soil productivity			Management limitations and hazards			
	Species	Site index	Annual growth per acre [1]	Plant competition	Equipment limitation	Seedling mortality	Erosion hazard
			Board feet				
Group 2r3: Well drained and moderately well drained soils that have a slope of 30 to 50 percent; on uplands and terraces. They have a surface layer and subsoil that are mainly silt loam. These soils are moderately permeable and have a high available water capacity. Goss soils have a low available water capacity. Seaton (274F), Seaton-Goss (931F), Seaton-Hickory (937F).	Upland oaks [3]	75–85	250–350	Moderate	Severe	Slight	Severe
Group 2w5: Poorly drained soils that have a slope of less than 2 percent; on bottom lands. They have a surface layer and underlying material of silt loam or silty clay. These soils are moderately permeable to slowly permeable and have a high available water capacity. Beaucoup (70, W70, 70+), Birds (334), Gorham (162), Shiloh (138), Titus (404).	Cottonwood	95–105	450–550	Slight	Moderate	Moderate	Slight
Group 3o1: Somewhat poorly drained to well drained soils that have a slope of 0 to 12 percent; on uplands. Coatsburg soils are poorly drained. They have a surface layer of silt loam to sandy loam and a subsoil of sandy clay loam to clay. These soils are very slowly permeable to moderately permeable and have a moderate to high water capacity. Atlas (7D, 7D3), Atterberry (61A, 61B), Baylis (472C2, 472C3), Blair (5D2, 5D3), Coatsburg (660C2, 660D2)[4], El Dara (264C, 264C3), Fishhook (6C2, 6C3, 6D2, 6D3), Keller (470C2, 470D2)[4], NewGlarus-Palsgrove (928C2), Port Byron (277A, 277B)[4], Stronghurst (278A, 278B), Timula (271C2), Ursa (605D2, 605D3).	Upland oaks [3]	65–75	150–250	Slight	Slight	Slight	Slight
Group 3r2: Somewhat poorly drained to well drained soils that have a slope of 12 to 30 percent; on uplands and terraces. They have a surface layer of silt loam or sandy loam and a subsoil of sandy clay loam to clay. These soils are slowly permeable to moderately permeable and have a moderate to high available water capacity. Atlas (7E2, 7E3), Baylis (472D2, 472D3), Blair (5E3), El Dara (264D, 264D3, 264E2), Fishhook (6E2), Gosport (551E2, 551E3, 551F2), NewGlarus-Palsgrove (928D2), Timula (271D2, 271E2), Ursa (605E2, 605E3, 605F2).	Upland oaks [3]	65–75	150–250	Slight	Moderate	Slight	Moderate

See footnotes at end of table.

suitability of soils—Continued

Trees to favor in existing stands	Trees and shrubs suitable for planting on [2]—					
	Cool sites that face north and east		Hot sites that face south and west		Windbreaks	
	Severely eroded soils	Other soils	Severely eroded soils	Other soils	Trees	Shrubs
Red oak, white oak, ash, and black walnut.	----------	Scotch pine, white oak, red oak, ash, sycamore, white pine, red pine, and yellow-poplar.	----------	White pine, red pine, ash, Scotch pine, and yellow-poplar.	Norway spruce, white spruce, Douglas-fir, white pine, and red pine.	American cranberry bush, forsythia, lilac, silky dogwood, Amur maple, Amur honeysuckle, gray dogwood, Russian-olive, autumn-olive, flowering dogwood, and spirea.
Cottonwood, ash, pin oak, hackberry, and red maple.	----------	Cottonwood, sycamore, ash, and pin oak.	----------	----------	Arborvitae ------	American cranberry bush, Amur maple, and forsythia.
White oak, red oak, and black oak (black walnut on Timula and Port Byron soils).	Red pine, white pine, and Scotch pine.	Scotch pine, red pine, and white pine (Timula and Port Byron soils—black walnut).	Red pine, Scotch pine, and redcedar.	White pine, red pine, and Scotch pine.	White pine, red pine, Norway spruce, Douglas-fir, and arborvitae.	Gray dogwood, autumn-olive, spirea, and Russian-olive.
White oak, red oak, and black oak.	Red pine, white pine, and Scotch pine.	White pine, red pine, and Scotch pine.	Red pine, redcedar, and Scotch pine.	White pine, red pine, and Scotch pine.	White pine, red pine, Norway spruce, Douglas-fir, and arborvitae.	Gray dogwood, autumn-olive, spirea, and Russian-olive.

TABLE 5.—*Woodland*

Woodland suitability group	Potential soil productivity			Management limitations and hazards			
	Species	Site index	Annual growth per acre [1]	Plant competition	Equipment limitation	Seedling mortality	Erosion hazard
			Board feet				
Group 3r3: Well drained and moderately well drained soils that have a slope of 30 to 60 percent; on uplands. They have a surface layer of sandy loam or silt loam and a subsoil of sandy clay loam to silty clay. Most of these soils are moderately permeable to moderately slowly permeable and have a moderate to high available water capacity. El Dara (624F), Timula (271F).	Upland oaks [3]	65–75	150–250	Moderate	Severe	Slight	Severe
Group 3s2: Well drained and somewhat excessively drained sandy soils that have a slope of 0 to 4 percent; on terraces. They have a surface layer of sandy loam and underlying material of sand and sandy loam. These soils are moderately rapidly permeable to rapidly permeable and have a low available water capacity. (Sandy loam alluvial land is included in this group.) Dickinson (87B) [4], Sandy alluvial land (604).	Upland oaks [3]	65–75	150–250	Slight	Moderate	Moderate	Slight
Group 3w2: Poorly drained soils that have a slope of less than 2 percent; on terraces and uplands. They have a surface layer of silt loam and silty clay loam and a subsoil of silty clay loam to silty clay. These soils are moderately slowly permeable to very slowly permeable and have a high available water capacity. Cowden (112) [4], Racoon (109), Rushville (16), Virden (50) [4].	Pin oak	75–85	200–300	Severe	Moderate	Moderate	Slight
Group 3w6: Poorly drained soils that have a slope of less than 2 percent; on bottom lands. They have a surface layer and underlying material of silty clay or clay, except that the surface layer of Darwin overwash and Blackoar soils is silt loam. The soils are moderately permeable or very slowly permeable and have a high available water capacity. Darwin (71), Blackoar (603).	Pin oak	76–85	200–350	Severe	Moderate	Slight	Slight
Group 4f3: Well drained soils that have a slope of 15 to 50 percent; on uplands. They have a surface layer of cherty silt loam and have a subsoil of cherty silty clay. These soils have a low available water capacity. Goss (606F).	Upland oaks [3]	55–65	100–150	Slight	Severe	Moderate	Slight

See footnotes at end of table.

suitability of soils—Continued

Trees to favor in existing stands	Trees and shrubs suitable for planting on [2]—					
	Cool sites that face north and east		Hot sites that face south and west		Windbreaks	
	Severely eroded soils	Other soils	Severely eroded soils	Other soils	Trees	Shrubs
Red oak, white oak, ash, and black oak.	----------	Ash, white pine, red pine, white oak, and red oak.	----------	Scotch pine, red pine, redcedar, and white pine.	White pine, red pine, Norway spruce, Douglas-fir, and arborvitae.	Gray dogwood, autumn-olive, Russian-olive, and spirea.
Black oak, white oak, and red oak.	----------	White pine, red pine, and Scotch pine.	----------	----------	White pine, red pine, Norway spruce, and Douglas-fir.	Gray dogwood, spirea, autumn-olive, and Russian-olive.
Pin oak, ash, white oak, and red maple.	----------	Pin oak, and red maple.	----------	----------	Arborvitae ------	Gray dogwood, forsythia, Amur maple, and American cranberry bush.
Pin oak, sycamore, ash, cottonwood, swamp white oak, red maple, and hackberry.	----------	----------	----------	----------	Arborvitae ------	American cranberry bush, Amur maple, and forsythia.
White oak and green ash.	----------	Sweet gum and yellow-poplar.	----------	----------	White pine and red pine.	Autumn-olive and Amur honeysuckle.

TABLE 5.—*Woodland*

Woodland suitability group	Potential soil productivity			Management limitations and hazards			
	Species	Site index	Annual growth per acre [1]	Plant competition	Equipment limitation	Seedling mortality	Erosion hazard
Group 4s2: Excessively drained soils that have a slope of 0 to 12 percent; on uplands and terraces. They have a surface layer of loamy sand or sand with some gravel and underlying material of sand or sand and gravel. These soils are very rapidly permeable and have a low available water capacity. (Riverwash sand and gravel is an inclusion in this group.) Riverwash, sand and gravel (123), Sparta (88B)[4].	Upland oaks [3]	55–65	100–150	Slight	Moderate	Moderate	Slight
Group 5d3: Miscellaneous land types such as Limestone rock land that have a slope of 15 to 60 percent. These areas have variable permeability and a low available water capacity. Limestone rock land (94).	Upland oaks [3]	45–55	50–100	Slight	Moderate to severe.	Severe	Moderate to severe.
Group 5r3: Somewhat excessively drained soils that have a slope of 30 to 50 percent; on uplands. They are moderately rapidly permeable and have a moderate available water capacity. Hamburg (30F2).	Upland oaks [3]	45–55	50–100	Slight	Moderate	Severe	Severe

[1] Doyle rule (*9*).
[2] Absence of data indicates that no species is suited to that particular use. For those groups that are nearly level or for which the slope aspect is not a factor, the trees and shrubs that are suitable for planting are listed in the second column under "Species".

preference. The table lists trees to plant on soils that are severely eroded and on other soils according to cool and hot sites. It also lists desirable trees and shrubs to plant as windbreaks.

Pine trees generally are better suited to severely eroded areas than hardwoods. Pine trees planted on these sites can be harvested for pulpwood after a period of about 25 years. During this period, hardwoods can regenerate naturally and then will take over the site as the pine trees are cleared. Scotch pine is planted mainly for use as Christmas trees. Black locust is suitable for planting in gullied areas. The locust borer is a severe hazard, however, and few trees will attain maturity in sound condition. Locust trees are planted mainly as a soil builder and as nurse trees for other hardwoods interplanted with them (*8*).

Wildlife[9]

Wildlife is dependent on the land for food, water, and cover. The management of wildlife cannot be considered apart from its interaction with plants and soil. Each kind of wildlife has different habitat requirements, some of which can be controlled or modified by man. The greatest changes that man can make are in the amount, quality, and distribution of food, cover, and water.

Most managed wildlife habitats are developed, improved, or maintained by (1) planting suitable vegetation; (2) manipulating existing vegetation; (3) inducing natural establishment of desired plants; (4) adding a water supply; or (5) by a combination of such measures. Soil properties that limit plant growth or water management include (1) available water capacity; (2) natural soil drainage; (3) hazard of flooding; and (4) steepness of slope. These soil factors were used to group the soil mapping units of Adams County into eight soil groups, which are rated for wildlife habitat in table 6.

In table 6 the soil groups are described and mapping unit symbols are listed for each soil group. Seven elements of wildlife habitat and three kinds of wildlife habitat are rated as good, fair, poor, and very poor, and the limiting factors are given.

A *good* rating indicates that no problems or limitations exist or that they can be overcome by ordinary

[9] By REX HAMILTON, biologist, and KERMIT LARSON, assistant State soil scientist, Soil Conservation Service.

suitability of soils—Continued

Trees to favor in existing stands	Trees and shrubs suitable for planting on [3]—					
	Cool sites that face north and east		Hot sites that face south and west		Windbreaks	
	Severely eroded soils	Other soils	Severely eroded soils	Other soils	Trees	Shrubs
Black oak and white oak.	----------	White pine, red pine, Scotch pine, and jack pine.	----------	White pine, red pine, and Scotch pine.	White pine, red pine, Norway spruce, Douglas-fir, and arborvitae.	Autumn-olive, gray dogwood, Russian-olive, and spirea.
White oak and black oak.	Maintain any existing vegetation to protect against erosion.	Redcedar, white pine, red pine, and jack pine.	Maintain any existing vegetation to protect against erosion.	Maintain any existing vegetation to protect against erosion.	White pine, red pine, and redcedar.	Autumn-olive, Russian-olive, and spirea.
White oak, red oak, and black oak.	Maintain any existing vegetation to protect against erosion.	Redcedar, white pine, red pine, and jack pine.	Maintain any existing vegetation to protect against erosion.	Maintain any existing vegetation to protect against erosion.	White pine, red pine, and redcedar.	Autumn-olive, Russian-olive, and spirea.

[3] Upland oaks include white oak, red oak, black oak, and bur oak.
[4] These soils have no natural woodland, but they are suited to the trees that are listed as suitable for planting.

management. A *fair* rating indicates that problems limit use to some degree or that special management methods are needed. A *poor* rating indicates that extreme care or unusual management methods are necessary. A *very poor* rating means that problems are so extreme that the site is not suitable for use.

The seven wildlife habitat elements are detailed in the following paragraphs.

Grain and seed crops are planted to produce food for wildlife. The crops considered are corn, soybeans, wheat, oats, millet, buckwheat, cowpeas, sorghums, and sunflowers.

Grasses and legumes are planted to provide cover as well as food for wildlife. Examples are fescue, bluegrass, brome, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoil, crownvetch, alfalfa, and sericea lespedeza.

Wild herbaceous plants are native or naturally established dryland herbaceous grasses and forbs (including weeds) that provide food and cover for wildlife. Examples are beggarweed, goldenrod, dandelion, lespedeza, partridge pea, ragweed, bluestem, pokeweed, and fescue.

Hardwood trees include nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs, or foliage used extensively as food by wildlife; they are commonly established through natural processes but are sometimes planted. They include oak, hickory, sassafras, dogwood, cherry, maple, birch, poplar, grape, honeysuckle, bramble, autumn-olive, and hawthorn.

Coniferous plants are cone-bearing trees and shrubs important to wildlife mainly as cover, but which may also furnish food in the form of browse, seeds, or fruitlike cones. They commonly are planted but can be established naturally after once bearing seeds. Examples of these plants are pine, spruce, fir, yew, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants, exclusive of floating or submerged aquatic plants, that grow on moist or wet sites. They produce food or cover used mainly by wetland forms of wildlife. Examples of these plants are smartweed, wild millet, rushes, sedges, reeds, and cattails.

Shallow water areas are areas of surface water, averaging less than 5 feet deep, useful to wildlife. They can be natural wet areas or those created by dams or levees or by water-control devices in marshes or

TABLE 6.—*Suitability*

[Port Byron-Mt. Carroll-Urban land complex (858B) and

Wildlife groups	Elements of wildlife habitat		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants
Group 1. Somewhat excessively drained to moderately well drained, nearly level to strongly sloping soils; on uplands, terraces, and bottom lands. Baylis (472C2, 472C3), Camden (134A, 134B, 134C2, 134C3), Clinton (18B2, 18B3, 18C2, 18C3), Clinton-El Dara (932C2, 932C3), Dickinson (87B), Downs (386A, 386B, 386C2), El Dara (264C, 264C3), Fayette (280B, 280C2, 280C3), Haymond (331), Hickory (8C2, 8C3), Huntsville (77), Mt. Carroll (268A, 268B, 268C2), NewGlarus-Palsgrove (928C2), Port Byron (277A, 277B), Rozetta (279A, 279B, 279C2, 279C3), Seaton (274A, 274B, 274C2), Tama (36A, 36B), Timula (271C2), Ursa (605D2, 605D3), Worthen (37A, 37B).	Good where slope is 0 to 7 percent. Fair where slope is 7 to 12 percent.	Good	Good
Group 2. Well drained, moderately well drained, and somewhat poorly drained, moderately steep soils; on uplands. Atlas (7E2, 7E3), Baylis (472D2, 472D3), Blair (5E3), Camden (134D2, 134D3), Clinton-El Dara (932D3), El Dara (264D, 264D3), Fayette (280D2, 280D3), Fayette-Hickory (936D2, 936D3), Fishhook (6E2), Gosport (551E2, 551E3), Hickory (8D2, 8D3), NewGlarus-Palsgrove (928D2), Seaton (274D2), Timula (271D2), Ursa (605E2, 605E3).	Poor	Fair	Good
Group 3. Well drained and moderately well drained, steep and very steep soils; on uplands. Camden (134E, 134F), El Dara (264E2, 264F), Gosport (551F2), Hamburg (30F2), Hickory (8E, 8F), Seaton (274E, 274F), Seaton-Goss (931E, 931F), Seaton-Hickory (937E, 937F), Timula (271E2, 271F), Ursa (605F2).	Very poor	Fair	Good
Group 4. Somewhat poorly drained, nearly level soils; on uplands and terraces. Atterberry (61A), Clarksdale (257A), Herrick (46A), Ipava (43A), Joy (275), Keomah (17A), Littleton (81), Muscatine (41A), Starks (132A), Stronghurst (278A).	Fair	Good	Good
Group 5. Somewhat poorly drained, gently sloping to strongly sloping soils; on uplands. Atlas (7D, 7D3), Atterberry (61B), Blair (5D2, 5D3), Clarksdale (257B, 257C2), Coatsburg (660C2, 660D2)[1], Fishhook (6C2, 6C3, 6D2, 6D3), Herrick (46B), Ipava (43B), Keller (470C2, 470D2), Keomah (17B, 17C2, 17C3), Muscatine (41B), Stronghurst (278B).	Fair	Good	Good
Group 6. Somewhat poorly drained, nearly level soils; on bottom lands. Dupo (180), Lawson (451), Orion (415), Riley (452), Tice (284), Wakeland (333).	Fair	Good	Good
Group 7. Poorly drained, nearly level soils; on uplands, terraces, and bottom lands. Beaucoup (70, W70, 70+), Birds (334), Blackoar (603), Cowden (112), Darwin (71), Gorham (162), Racoon (109), Rushville (16), Shiloh (138), Titus (404), Virden (50).	Poor	Fair	Fair
Group 8. Well drained to excessively drained, level to very steep soils; on uplands, terraces, and bottom lands. Goss (606F), Limestone rock land (94), Riverwash, sand and gravel (123), Sandy alluvial land (604), Sparta (88B).	Very poor	Poor	Fair

[1] Coatsburg soils are poorly drained.

streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, wildlife ponds, and beaver ponds.

The three kinds of wildlife rated are openland, woodland, and wetland. The ratings are based on weighting factors that are assigned to a selection of habitat elements appropriate to each of the three kinds of wildlife. For example, grain and seed crops, domestic grasses and legumes, and wild herbaceous plants are given greater weight than hardwood trees as habitat elements for openland wildlife.

Openland wildlife refers to birds and mammals that normally frequent cropland, pastures, lawns, and areas overgrown with grasses, herbs, and shrubby

of soils for wildlife

Seaton-Urban land complex (U274C, U274D) are not included]

Elements of wildlife habitat—Continued				Kinds of wildlife		
Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Good	Good	Poor where slope is 0 to 7 percent. Very poor where slope is 7 to 12 percent.	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Fair	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor where slope is 0 to 7 percent. Very poor where slope is 7 to 12 percent.	Poor where slope is 2 to 4 percent. Very poor where slope is 4 to 12 percent.	Good	Good	Poor where slope is 2 to 4 percent. Very poor where slope is 4 to 12 percent.
Good	Good	Good	Good	Good	Good	Good.
Fair	Fair	Good	Good	Fair	Fair	Good.
Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor.

growth. Examples of this kind of wildlife are quail, meadowlark, field sparrow, killdeer, red-winged blackbird, cottontail rabbit, red fox, and woodchuck.

Woodland wildlife refers to birds and mammals that normally frequent wooded areas of hardwood trees, coniferous trees, or mixtures of such trees. Examples of this kind of wildlife are thrush, vireo, scarlet tanager, woodpecker, dove, squirrel, gray fox, deer, wild turkey, and raccoon.

Wetland wildlife refers to birds and mammals that normally frequent wet areas such as ponds, marshes, and swamps. Examples of this kind of wildlife are ducks, geese, heron, kingfisher, mink, muskrat, and beaver.

TABLE 7.—*Recreational*

[Port Byron-Mt. Carroll-Urban land complex (858B) and

Recreational group, soil series, and map symbols	Degree of limitation and soil features affecting use for—	
	Cottages and utility buildings	Camp areas
Group 1. Moderately well drained and well drained, nearly level to moderately sloping soils; on uplands and terraces. Camden (134A, 134B), Clinton (18B2, 18B3), Dickinson (87B), Downs (386A, 386B), Fayette (280B), Mt. Carroll (268A, 268B), Port Byron (277A, 277B), Rozetta (279A, 279B), Seaton (274A, 274B), Tama (36A, 36B), Worthen (37A, 37B).	Moderate: shrink-swell potential. Slight for Dickinson soils.	Slight
Group 2. Well drained to excessively drained, nearly level to strongly sloping soils; on uplands and terraces. Baylis (472C2, 472C3), Camden (134C2, 134C3), Clinton (18C2, 18C3), Clinton-El Dara (932C2, 932C3), Downs (386C2, El Dara (264C, 264C3), Fayette (280C2, 280C3), Hickory (8C2, 8C3), Mt. Carroll (268C2), NewGlarus-Palsgrove (928C2), Rozetta (279C2, 279C3), Seaton (274C2), Sparta (88B), Timula (271C2), Ursa (605D2, 605D3).	Moderate: shrink-swell potential; slope limits use.	Moderate: slope limits use
Group 3. Somewhat poorly drained to somewhat excessively drained, moderately steep to very steep soils; on uplands. (Limestone rock land is an inclusion in this group.) Atlas (7E2, 7E3), Baylis (472D2, 472D3), Blair (5E3), Camden (134D2, 134D3, 134E, 134F), Clinton-El Dara (932D3), El Dara (264D, 264D3, 264E2, 264F), Fayette (280D2, 280D3), Fayette-Hickory (936D2, 936D3), Fishhook (6E2), Gosport (551E2, 551E3, 551F2), Goss (606F), Hamburg (30F2), Hickory (8D2, 8D3, 8E, 8F), Limestone rock land (94), NewGlarus-Palsgrove (928D2), Seaton (274D2, 274E, 274F), Seaton-Goss (931E, 931F), Seaton-Hickory (937E, 937F), Timula (271D2, 271E2, 271F), Ursa (605E2, 605E3, 605F2).	Moderate where slope is 12 to 18 percent: shrink-swell potential; slope limits use. Severe where slope is more than 18 percent: slope limits use.	Moderate where slope is 12 to 18 percent: slope limits use. Severe where slope is more than 18 percent: slope limits use.
Group 4. Somewhat poorly drained, nearly level to strongly sloping soils; on uplands and terraces. (Coatsburg soils are poorly drained.) Atlas (7D, 7D3), Atterberry (61A, 61B), Blair (5D2, 5D3), Clarksdale (257A, 257B, 257C2), Coatsburg (660C2, 660D2), Fishhook (6C2, 6C3, 6D2, 6D3), Herrick (46A, 46B), Ipava (43A, 43B), Joy (275), Keller (470C2, 470D2), Keomah (17A, 17B, 17C2, 17C3), Littleton (81), Muscatine (41A, 41B), Starks (132A), Stronghurst (278A, 278B).	Moderate: shrink-swell potential; occasionally high water table; subject to frost action.	Moderate: slope limits use; occasionally high water table.
Group 5. Poorly drained, nearly level soils; on uplands. (Riverwash, sand and gravel and sandy loam alluvial land are included in this group.) Beaucoup (70, W70, 70+), Birds (334), Blackoar (603), Cowden (112), Darwin (71), Gorham (162), Racoon (109), Riverwash, sand and gravel (123), Rushville (16), Sandy alluvial land (604), Shiloh (138), Titus (404), Virden (50).	Severe: shrink-swell potential; normally high water table; subject to frost action; hazard of flooding or ponding.	Severe: normally high water table; hazard of flooding or ponding.
Group 6. Somewhat poorly drained to well drained, nearly level soils; on bottom lands. Dupo (180), Haymond (331), Huntsville (77), Lawson (451), Orion (415), Riley (452), Tice (284), Wakeland (333).	Severe: occasionally high water table; subject to frost action; subject to flooding or ponding.	Severe: occasionally high water table; hazard of flooding or ponding.

Soil for Recreational Development[10]

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 7 the soils of Adams County are rated according to limitations that affect their suitability for small buildings, camp areas, picnic areas, playgrounds, paths and trails, and golf fairways.

In table 7 the soils are rated as having *slight, moderate,* or *severe* limitations for the specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limitation of *slight* means that soil properties are generally favorable and limitations are so minor that they easily can be overcome. A *moderate* limitation can be overcome or modified by planning, by design, or by special maintenance. A *severe* limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these is required. The recreational uses covered by the table are discussed in the following paragraphs.

Cottages and utility buildings include washrooms

[10] By REX HAMILTON, biologist and KERMIT LARSON, assistant State soil scientist, Soil Conservation Service.

uses of the soils

Seaton-Urban land complex (U274C, U274D) are not included]

Degree of limitation and soil features affecting use for—Continued			
Picnic areas	Playgrounds	Paths and trails	Golf fairways
Slight	Slight where slope is 0 to 2 percent. Moderate where slope is 2 to 7 percent: slope limits use.	Slight	Slight.
Moderate: slope limits use	Severe: slope limits use	Slight	Moderate where slope is 7 to 12 percent: slope limits use. Severe where slope is more than 12 percent: slope limits use.
Moderate where slope is 12 to 18 percent: slope limits use.	Severe: slope limits use	Moderate where slope is 12 to 30 percent: slope limits use. Severe where slope is more than 30 percent: slope limits use.	Severe: slope limits use.
Moderate: occasionally high water table.	Moderate: slope limits use; occasionally high water table.	Moderate: slope limits use	Moderate: slope limits use; hazard of flooding or ponding.
Severe: normally high water table; hazard of flooding or ponding.	Severe: normally high water table; hazard of flooding or ponding.	Severe: normally high water table; hazard of flooding or ponding.	Severe: normally high water table; hazard of flooding or ponding.
Moderate: occasionally high water table; hazard of flooding or ponding.	Moderate: occasionally high water table; hazard of flooding or ponding.	Moderate: occasionally high water table; hazard of flooding or ponding.	Moderate: occasionally high water table; hazard of flooding or ponding.

and bathrooms, picnic shelters, and service buildings that are used seasonally or all year. The ratings are based mainly on soil features that enable soils to support these buildings. Information about soil limitations for septic tank filter fields is given in the section "Engineering Uses of the Soils."

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

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The most suitable soils are firm when wet but not dusty when dry; are free of flooding during the season of use; and are not sloping or stony enough to greatly increase the cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball,

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

Paths and trails are used for local and cross-country travel on foot or horseback. Design and layout should require little or no cutting and filling. The most suitable soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Golf fairways include areas, such as greens, traps, and hazards, that generally are made from transported soil material. Soils used for fairways should support intensive traffic of people on foot or driving golf carts. In addition, turf and various kinds of trees and shrubs should grow well on these soils.

Engineering Uses of the Soils[11]

This section is useful to those who need information about soils used as structural material or as foundation material upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

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

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

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

[11] CLAUDE R. MCCORMICK, engineer, Soil Conservation Service, helped prepare this section.

Most of the information in this section is presented in tables 8, 9, 10, and 11, which show the results of engineering laboratory tests on soil samples, several estimated soil properties significant to engineering, and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 9 and 10, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 5 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. The Glossary defines many of the terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*2*) used by SCS engineers, the Department of Defense, and others, and the AASHTO system (*1*) adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH and OH; and one class of highly organic soils identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL–ML.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, 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 AASHTO classification for tested soils, with group index numbers in parentheses, is shown in table 8; the estimated classification, without group index numbers, is given in table 9 for all soils mapped in the survey area.

Soil test data

Table 8 contains engineering test data for some of the major soil series in Adams County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Compaction (or moisture-density) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

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. As 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 data in table 8 are based on tests of soil samples, but they are estimated in table 9.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 9. 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 9.

Depth to bedrock is not estimated in table 9 because most soils in Adams County are deep. However, Baylis soils are 20 to 40 inches deep to cherty silty clay; Gosport soils are 20 to 40 inches deep to shale; Limestone rock land is generally less than 10 inches deep to limestone bedrock; NewGlarus soils are 24 to 40 inches deep to limestone bedrock; and Palsgrove soils are generally 40 to about 70 inches deep to limestone bedrock.

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. It may be a perched water table or the upper limit of the true water table. It generally rises early in the spring.

Soil *texture* is described in table 9 in the standard terms used by the Department of Agriculture (*10*). 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.

Permeability is the quality of a soil that enables it to transmit water or air. It is estimated on basis of soil characteristics observed in the field, particularly structure and texture. The estimates in table 9 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.

Shrink-swell potential is the change in volume to be expected of soil material when its moisture content changes, that is, the extent to which the soil shrinks as it dries out or swells when it gets 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 of material having this rating.

Corrosivity, as used in table 9, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Engineering interpretations of soils

The estimated interpretations in tables 10 and 11 are based on the engineering properties of soils shown in table 9, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Adams County. In these tables, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for drainage of cultivated fields and pasture, irrigation, ponds and reservoirs, embankments, and terraces and diversions. For these particular uses, the tables list those soil features not to be overlooked in planning, installation, and maintenance.

TABLE 8.—*Engineering*

[Tests made by the Illinois Division

Soil name and location	Parent material	Illinois report number	Depth from surface	Moisture-density data [1]	
				Maximum dry density	Optimum moisture
			Inches	*Pounds per cubic foot*	*Percent*
Atlas silt loam: 1,295 feet east and 215 feet north of the southwest corner of SE¼ sec. 6, T. 1 N., R. 6 W. (Modal).	Loess and clayey buried soil in Illinoian glacial till.	68–IL–001–1–1 68–IL–001–1–2 68–IL–001–1–3	0–5 20–28 54–72	106 98 112	18 24 17
Blair silt loam: 470 feet west and 345 feet north of the southeast corner of NE¼ sec. 24, T. 1 N., R. 7 W. (Modal).	Roxanna silts and wash from glacial till.	70–IL–001–1–1 70–IL–001–1–2 70–IL–001–1–3	5–13 19–30 40–50	104 106 108	20 18 17
Clarksdale silt loam: 960 feet west and 183 feet north of the southeast corner of sec. 18, T. 2 N., R. 7 W. (Modal).	Loess.	70–IL–001–2–1 70–IL–001–2–2 70–IL–001–2–3	0–7 24–35 58–72	107 114 111	16 17 17
Clinton silt loam: 1,045 feet north and 460 feet east of the southwest corner of SE¼ sec. 13, T. 1 S., R. 6 W. (Modal).	Loess.	68–IL–001–2–1 68–IL–001–2–2 68–IL–001–2–3	0–6 19–30 49–65	106 100 113	17 27 16
Coatsburg silt loam: 205 feet south and 150 feet east of the northwest corner of SE¼ sec. 20, T. 2 N., R. 5 W. (Modal).	Thin loess and buried clayey soils in glacial till.	70–IL–001–3–1 70–IL–001–3–2 70–IL–001–3–3	0–7 22–31 44–60	105 99 105	17 22 18
Cowden silt loam: 885 feet west and 70 feet north of the southeast corner of NW¼ sec. 17, T. 2 N., R. 5 W. (Modal).	Loess.	70–IL–001–4–1 70–IL–001–4–2 70–IL–001–4–3	0–7 24–33 54–67	104 92 104	18 23 20
El Dara sandy loam: 625 feet north and 165 feet east of the southwest corner of sec. 6, T. 3 S., R. 6 W. (Modal).	Sandy deposits of Cretaceous age.	70–IL–001–5–1 70–IL–001–5–2 70–IL–001–5–3	0–6 14–27 40–55	121 114 119	9 13 12
El Dara sandy loam: 490 feet north and 250 feet east of the southwest corner of sec. 6, T. 3 S., R. 6 W. (Nonmodal—more sandy and thin solum).	Sandy deposits of Cretaceous age.	70–IL–001–6–1 70–IL–001–6–2 70–IL–001–6–3	5–10 17–27 36–81	121 123 116	11 10 13
El Dara loam: 1,055 feet south and 290 feet east of the northwest corner of SE¼ sec. 32, T. 2 S., R. 6 W. (Nonmodal—not as well drained and less sandy).	Sandy deposits of Cretaceous age.	70–IL–001–7–1 70–IL–001–7–2 70–IL–001–7–3	9–13 22–30 50–62	123 116 119	11 13 13
Haymond silt loam: 1,320 feet west and 600 feet north of the southeast corner of NW¼ sec. 14, T. 2 N., R. 8 W. (Modal).	Silty alluvium.	70–IL–001–8–1 70–IL–001–8–2	7–16 34–53	100 111	20 15
Hickory loam: 785 feet west and 170 feet south of the northeast corner of SW¼ sec. 21, T. 1 N., R. 7 W. (Modal).	Glacial till.	70–IL–001–9–1 70–IL–001–9–2 70–IL–001–9–3	4–8 16–23 58–72	118 106 121	12 17 12
Keomah silt loam: 515 feet east and 295 feet north of the southwest corner of sec. 18, T. 2 N., R. 7 W. (Modal).	Loess.	70–IL–001–10–1 70–IL–001–10–2 70–IL–001–10–3	0–7 21–31 59–72	106 97 109	17 23 17
Port Byron silt loam: 965 feet west and 275 feet north of the southeast corner of SW¼ sec. 31, T. 1 N., R. 8 W. (Modal).	Loess.	70–IL–001–11–1 70–IL–001–11–2 70–IL–001–11–3	5–11 21–30 48–63	105 107 109	16 18 17
Rushville silt loam: 1,110 feet west and 490 feet north of the southeast corner of SW¼ sec. 13, T. 1 S., R. 6 W. (Modal).	Loess.	68–IL–001–3–1 68–IL–001–3–2 68–IL–001–3–3	7–15 15–28 56–66	108 93 110	17 27 17
Seaton silt loam: 720 feet east and 245 feet south of the northwest corner of NE¼ sec. 23, T. 1. S., R. 9 W. (Modal).	Loess.	70–IL–001–12–1 70–IL–001–12–2 70–IL–001–12–3	0–8 16–25 56–72	103 107 111	16 17 16

See footnotes at end of table.

test data

of Highways, Bureau of Materials]

Mechanical analysis [2]								Liquid limit	Plasticity index	Classification	
Percentage less than 3 inches passing sieve—				Percentage smaller than—							
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO [3]	Unified [4]
								Percent			
----	100	98	86	80	54	22	16	32	11	A-6(8)	CL
----	100	99	91	87	73	52	47	69	46	A-7-6(20)	CH
100	99	98	94	88	68	46	38	53	39	A-7-6(19)	CH
----	100	99	92	81	57	26	18	51	28	A-7-6(18)	CH
----	100	98	82	73	53	30	23	45	30	A-7-6(17)	CL
100	99	95	76	70	56	34	25	40	28	A-6(15)	CL
100	99	98	94	91	58	31	24	41	20	A-7-6(12)	CL
96	95	93	85	82	70	48	35	33	20	A-6(12)	CL
99	99	99	97	93	56	30	24	39	17	A-6(11)	CL
----	100	98	95	87	55	20	14	28	8	A-4(8)	CL
----	----	----	99	94	76	39	36	54	35	A-7-6(19)	CH
----	100	99	94	88	64	30	25	35	17	A-6(11)	CL
----	100	99	96	88	46	8	4	28	6	A-4(8)	CL-ML
----	100	98	86	83	70	45	38	68	49	A-7-6(20)	CH
100	99	96	82	77	65	43	38	58	43	A-7-6(20)	CH
----	100	99	98	92	61	28	20	31	8	A-4(8)	CL
----	----	100	99	93	65	41	34	70	52	A-7-6(20)	CH
----	----	----	100	95	75	36	28	51	34	A-7-6(17)	CH
100	99	97	53	49	23	13	6	16	3	A-4(4)	CL
100	99	97	46	43	36	25	22	31	20	A-6(5)	SC
100	99	97	31	28	23	20	19	25	13	A-2-6(0)	SC
----	100	97	56	48	32	13	9	18	7	A-4(4)	CL-ML
98	98	93	33	28	23	19	17	22	14	A-2-6(1)	SC
----	100	96	17	16	15	14	13	----	NP [5]	A-2-4(0)	SM
----	100	96	49	40	31	25	23	22	13	A-6(3)	SC
----	100	96	47	44	37	31	27	23	11	A-6(2)	SC
----	100	95	28	23	17	14	12	16	6	A-2-4(0)	SC-SM
----	----	100	96	89	62	25	20	31	11	A-6(8)	CL
----	100	99	83	75	52	21	17	28	10	A-4(9)	CL
----	----	----	99	93	40	13	10	20	7	A-4(8)	CL-ML
99	98	91	59	55	39	18	13	43	24	A-7-6(11)	CL
98	93	86	58	53	37	21	12	28	15	A-6(7)	CL
----	100	96	94	79	45	14	11	28	7	A-4(8)	CL-ML
----	----	100	98	93	67	41	35	62	43	A-7-6(20)	CH
----	100	99	97	92	45	32	26	38	23	A-6(13)	CL
----	----	----	99	90	47	21	16	36	17	A-6(11)	CL
----	----	----	99	90	39	13	7	29	8	A-4(8)	CL
----	----	----	99	93	56	28	23	35	14	A-6(10)	CL
----	100	97	95	86	59	24	18	28	6	A-4(8)	ML
----	----	100	99	94	77	52	46	78	56	A-7-6(20)	CH
----	----	----	99	93	74	32	25	43	25	A-7-6(14)	CL
----	----	100	99	93	48	18	13	29	6	A-4(8)	ML
----	----	100	93	90	49	26	22	37	19	A-6(11)	CL
----	----	----	99	93	40	13	10	30	9	A-4(8)	CL

TABLE 8.—*Engineering*

Soil name and location	Parent material	Illinois report number	Depth from surface	Moisture-density data [1]	
				Maximum dry density	Optimum moisture
			Inches	*Pounds per cubic foot*	*Percent*
Ursa silt loam: 1,790 feet west and 580 feet south of the northeast corner of SE¼ sec. 5, T. 2 S., R. 7 W. (Modal).	Thin loess and buried clayey soils in glacial till.	70–IL–001–13–1 70–IL–001–13–2	17–26 45–63	98 112	24 15
Virden silty clay loam: 140 feet west and 54 feet north of the southeast corner of sec. 3, T. 2 N., R. 6 W. (Modal).	Loess.	68–IL–001–4–1 68–IL–001–4–2 68–IL–001–4–3	0–8 26–34 49–60	99 101 106	23 22 19

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

[2] Mechanical analysis according to AASHTO Designation T 88–57 (*1*). Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed

Soil limitations are rated *slight, moderate,* or *severe. Slight* means that soil properties generally are favorable for the rated use, or in other words, limitations are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* means that soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation and special designs.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms *slight, moderate,* and *severe.*

Following are explanations of the columns in table 10.

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

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

Shallow excavations, such as excavations for pipelines, sewer lines, phone and power transmission lines, basements, open ditches, and cemeteries, require digging or trenching to a depth of less than 6 feet. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or large stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 10, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings relate to capacity to support load and resist settlement under load, and to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Properties that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The most suitable soils have moderately slow permeability, are able to withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated the ratings in table 10 apply only to a depth of about 6 feet, and therefore limitation ratings of *slight or moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth

test data—Continued

Mechanical analysis [2]								Liquid limit	Plasticity index	Classification	
Percentage less than 3 inches passing sieve—				Percentage smaller than—							
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO [3]	Unified [4]
								Percent			
99	97	95	77	73	63	46	42	67	51	A–7–6(20)	CH
99	98	92	61	54	41	32	30	37	25	A–6(11)	CL
		100	98	93	70	42	33	46	23	A–7–6(15)	CL
		100	99	95	78	52	45	67	48	A–7–6(20)	CH
		100	99	94	75	40	24	52	34	A–7–6(18)	CH

by the pipette method and the material coarser than 2 millimeters is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soils.

[3] Based on AASHTO Designation M 145–49 (*1*).

[4] Based on the Unified Soil Classification System, Technical Memorandum No. 3—357, volume 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[5] NP means nonplastic.

of 10 or 15 feet, but regardless of that, every site should be investigated before selections are made.

Roads and streets, as rated in table 10, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic-supporting capacity.

Following are explanations of the columns in table 11.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage, and (2) the relative ease of excavating the material at borrow areas. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Sand is used in great quantities in many kinds of construction. Because there is so little gravel in the soils of Adams County, it has not been rated with sand in table 11. The land type, Riverwash, sand and gravel, contains some gravel in places. Goss soils contain cherty gravel along with a considerable amount of silty clay and coarse cherty and stony material. Baylis soils have this same type of material below a depth of about 3 feet. The ratings in table 11 provide guidance on probable sources of sand. A soil rated as a *good* or *fair* source of sand generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. (The ratings do not take into account the thickness of overburden or other factors that affect mining of the materials; neither do they indicate quality of the deposit.)

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response to the growth of plants when fertilizer is applied; and absence of substances toxic to plants. Other characteristics that affect suitability are the texture of the soil material and its content of stone fragments. Also considered in the ratings is the damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage. This characteristic is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require a soil material that is resistant to seepage and piping and favorable in stability, shrink-swell potential, shear strength, and compactibility. Among unfavorable factors is the presence of stones or organic material in a soil.

Drainage of cropland and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream

TABLE 9.—*Estimated soil properties*

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

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Percent passing sieve—
				Unified	AASHTO	No. 4 (4.7 mm)
	Feet	*Inches*				
Atlas: 7D, 7D3, 7E2, 7E3	1–3	0–9	Silt loam	CL	A–6 or A–4	100
		9–43	Clay	CH	A–7 or A–6	100
		43–70	Clay loam	CH or CL	A–6 or A–7	100
Atterberry: 61A, 61B	1–3	0–15	Silt loam	ML or CL	A–4 or A–6	100
		15–51	Silty clay loam	CL	A–7 or A–6	100
		51–65	Silt loam	CL or ML	A–6 or A–4	100
Baylis: 472C2, 472C3, 472D2, 472D3.	>5	0–7	Silty clay loam	ML or CL	A–4 or A–6	100
		7–34	Silty clay loam	CL	A–7 or A–6	100
		34–75	Silty clay loam and cherty silty clay.	GC	A–7 or A–6	45–70
Beaucoup: 70, W70, 70+	<1	0–15	Light silty clay loam.	CL	A–6 or A–7	100
		15–48	Silty clay loam	CL	A–7	100
		48–60	Light silty clay loam.	CL	A–7	100
Birds: 334	<1	0–7	Silt loam	ML or CL	A–4 or A–6	100
		7–50	Silt loam	ML or CL	A–4 or A–6	100
Blackoar: 603	<1	0–20	Silt loam	ML or CL	A–6 or A–4	100
		20–44	Silt loam	ML or CL	A–6 or A–4	100
		44–62	Heavy silt loam and silty clay loam.	ML or CL	A–6 or A–4	100
Blair: 5D2, 5D3, 5E3	1–3	0–5	Silt loam	CL or ML	A–4 or A–6	100
		5–58	Clay loam	CL, CH	A–6 or A–7	100
Borrow pits: B.P. No estimates made; onsite determination necessary.						
Camden: 134A, 134B, 134C2, 134C3, 134D2, 134D3, 134E, 134F.	3–5	0–9	Silt loam	ML or CL	A–4	100
		9–51	Silty clay loam	CL	A–6	95–100
		51–59	Loam, sandy loam	SM, SC, or CL	A–2, A–4, or A–6	90–100
Clarksdale: 257A, 257B, 257C2.	1–3	0–14	Silt loam	CL	A–6 or A–7	100
		14–58	Heavy silty clay loam.	CL or CH	A–6 or A–7	100
		58–70	Heavy silt loam	CL or ML	A–6 or A–4	100
*Clinton: 18B2, 18B3, 18C2, 18C3, 932C2, 932C3, 932D3. For El Dara parts of 932C2, 932C3, and 932D3, see El Dara series.	3–4	0–12	Silt loam	ML or CL	A–4 or A–6	100
		12–49	Heavy silty clay loam.	CL or CH	A–7 or A–6	100
		49–65	Heavy silt loam	CL	A–6 or A–4 (16)	100
Coatsburg: 660C2, 660D2	1–3	0–12	Silt loam	CL or ML	A–4 or A–6	100
		12–44	Clay	CH	A–7 or A–6	100
		44–60	Heavy clay loam	CH or CL	A–6 or A–7	100
Cowden: 112	<1	0–15	Silt loam	CL	A–4 or A–6	100
		15–54	Silty clay, silty clay loam.	CH	A–7	100
		54–65	Heavy silt loam	CL or CH	A–6 or A–7	100

See footnote at end of table.

significant to engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
soil is too variable to be rated or that no estimate was made. The symbol > means more than; the symbol < means less than]

Percent passing sieve—Continued		Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits [1]
No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
95–100	70–90	0.0–2.0	0.22–0.24	5.1–6.5	Low	
95–100	80–95	<0.06	0.09–0.11	4.5–6.0	High	High
95–100	70–95	0.2–0.6	0.14–0.16	6.6–7.8	High	Moderate.
100	95–100	0.6–2.0	0.20–0.25	5.6–6.5	Low	
100	95–100	0.2–2.0	0.19–0.21	5.1–6.5	Moderate	Moderate.
100	95–100	0.6–2.0	0.18–0.22	5.6–7.3	Low	Slight.
100	95–100	0.6–2.0	0.20–0.22	4.5–7.3	Moderate	
100	95–100	0.6–2.0	0.18–0.20	4.5–6.0	Moderate to high.	High.
40–65	35–45	0.6–2.0	0.04–0.08	5.1–7.3	Moderate	Moderate.
100	65–95	0.6–2.0	0.19–0.23	6.1–7.8	Moderate	
95–100	65–95	0.6–2.0	0.19–0.21	6.1–7.8	Moderate	Low.
85–100	65–95	0.6–2.0	0.19–0.21	6.6–8.4	Moderate	Low.
95–100	80–100	0.2–0.6	0.20–0.24	5.6–7.8	Low	
100	80–100	0.2–0.6	0.18–0.22	6.1–7.8	Low	Low.
100	84–99	0.6–2.0	0.22–0.24	5.6–7.3	Low	
100	84–99	0.6–2.0	0.22–0.24	5.6–7.3	Low	Low.
100	84–99	0.6–2.0	0.22–0.24	6.1–7.8	Low	Low.
100	90–100	0.6–2.0	0.16–0.20	5.1–7.3	Low	
95–100	70–90	0.2–0.6	0.14–0.18	4.5–7.8	Low	High.
95–100	80–95	0.6–2.0	0.20–0.25	5.1–7.3	Low	
90–100	60–95	0.6–2.0	0.16–0.20	5.1–6.5	Moderate	Moderate.
89–100	40–90	0.6–6.0	0.12–0.16	6.1–7.8	Low	Low.
100	95–100	0.6–2.0	0.20–0.25	5.1–7.3	Low	
100	85–100	0.2–0.6	0.19–0.21	5.1–6.5	Moderate to high.	Moderate.
100	85–100	0.2–0.6	0.18–0.23	5.6–7.3	Low to moderate.	Low.
100	95–100	0.6–2.0	0.17–0.19	5.6–6.5	Moderate	
100	95–100	0.2–0.6	0.19–0.21	5.1–6.0	Moderate to high.	Moderate.
100	95–100	0.6–2.0	0.17–0.19	5.6–6.5	Moderate	Moderate.
95–100	85–95	0.6–2.0	0.22–0.24	5.1–6.5	Low	
95–100	80–90	<0.06–0.2	0.09–0.11	5.1–6.5	High	Moderate.
95–100	70–85	0.06–0.2	0.14–0.16	6.1–7.8	High	Low.
100	95–100	0.2–0.6	0.20–0.24	5.1–6.5	Low	
100	95–100	0.06–0.2	0.11–0.13	5.1–7.3	High	Moderate.
100	95–100	0.2–0.6	0.18–0.20	5.6–8.4	Low to moderate.	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Percent passing sieve—
				Unified	AASHTO	No. 4 (4.7 mm)
	Feet	*Inches*				
Cut and fill land: C.F. No estimates made; onsite determination necessary.						
Darwin: 71	<1	0–17	Silty clay	CH	A–7	100
		17–60	Silty clay	CH	A–7	100
Dickinson: 87B	<5	0–19	Sandy loam	SM or SC	A–4 or A–2	100
		19–39	Sandy loam	SM or SP	A–2	100
		39–56	Sand, loamy sand	SP or SM	A–3 or A–2	95–100
Downs: 386A, 386B, 386C2	3–5	0–11	Silt loam	ML or ML–CL	A–4 or A–6	100
		11–63	Silty clay loam, silt loam.	CL	A–7 or A–6	100
		63–68	Silt loam	CL	A–6	100
Dupo: 180	1–3	0–31	Silt loam	ML	A–4	100
		31–72	Silty clay loam, light silty clay.	CH or CL	A–7 or A–6	100
El Dara: 264C, 264C3, 264D, 264D3, 264E2, 264F.	3–5	0–10	Sandy loam	CL or SC	A–4	100
		10–50	Sandy clay loam	SC	A–6	100
		50–60	Sandy loam	SC or SM	A–2 or A–4	100
*Fayette: 280B, 280C2, 280C3, 280D2, 280D3, 936D2, 936D3. For Hickory parts of 936D2 and 936D3, see Hickory series.	>5	0–13	Silt loam	ML or ML–CL	A–4 or A–6	100
		13–48	Silty clay loam	CL	A–7 or A–6	100
		48–70	Silt loam	CL	A–6	100
Fishhook: 6C2, 6C3, 6D2, 6D3, 6E2.	1–3	0–5	Silt loam	ML or CL	A–4 or A–6	100
		5–31	Heavy silty clay loam.	CL	A–7 or A–6	100
		31–60	Heavy clay loam, light clay.	CH	A–7 or A–6	90–100
Gorham: 162	>1	0–18	Silty clay loam	CL	A–6	100
		18–40	Light silty clay loam.	CL	A–6	100
		40–60	Sand	SM or SP	A–2 or A–3	100
Gosport: 551E2, 551E3, 551F2	3–5	0–10	Silt loam	ML or CL	A–4 or A–6	95–100
		10–33	Silty clay, silty clay loam.	CH	A–7 or A–6	95–100
		33–50	Clayey shale.			
Goss: 606F	>5	0–11	Cherty silt loam	ML	A–4	75–90
		11–100	Cherty silty clay, cherty clay.	GC	A–7 or A–6	45–70
Hamburg: 30F2	>10	0–4	Silt loam	ML	A–4	100
		4–50	Silt loam	ML	A–4	100
Haymond: 331	3–5	0–7	Silt loam	ML or CL	A–4, A–6	100
		7–60	Silt loam	CH or MH	A–4, A–6	100
Herrick: 46A, 46B	1–3	0–16	Silt loam	ML or CL	A–4, A–6	100
		16–59	Heavy silty clay loam.	CH or MH	A–7	100
		59–70	Silt loam	CL	A–6	100
Hickory: 8C2, 8C3, 8D2, 8D3, 8E, 8F.	3–5	0–11	Loam	ML, CL	A–4, A–6	95–100
		11–48	Clay loam	CL	A–6, A–7	95–100
		48–58	Heavy loam	CL, ML	A–4, A–6	95–100

See footnote at end of table.

significant to engineering—Continued

Percent passing sieve—Continued		Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits [1]
No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
100	95–100	0.06–0.2	0.12–0.14	6.1–7.8	High	
100	95–100	<0.06	0.11–0.13	6.1–7.8	High	Low.
100	35–50	2.0–6.0	0.12–0.15	5.6–6.5	Low	
100	3–20	2.0–6.0	0.12–0.15	5.1–6.5	Very low	High.
95–100	3–20	6.0–20.0	0.02–0.04	5.6–7.3	Low	Moderate.
100	95–100	0.6–2.0	0.21–0.23	5.1–7.3	Low	
100	95–100	0.6–2.0	0.18–0.20	4.5–6.5	Moderate to high.	High.
100	95–100	0.6–2.0	0.18–0.20	5.6–6.5	Moderate	Moderate.
100	80–90	0.6–2.0	0.22–0.24	5.6–7.8	Low	Moderate.
100	95–100	0.06–0.6	0.17–0.19	6.1–7.8	High	Low.
95–100	50–60	2.0–6.0	0.12–0.15	<4.5–6.5	Low	
95–100	30–49	0.6–2.0	0.14–0.18	<4.5–5.0	Low	High.
95–100	20–40	2.0–6.0	0.10–0.12	4.5–6.0	Low	High.
100	95–100	0.6–2.0	0.20–0.22	4.5–7.3	Moderate	
100	95–100	0.6–2.0	0.18–0.20	4.5–6.0	Moderate to high.	High.
100	95–100	0.6–2.0	0.18–0.20	5.1–6.5	Moderate	Moderate.
100	95–100	0.6–2.0	0.17–0.19	5.1–7.3	Moderate	
100	95–100	0.06–0.2	0.16–0.18	5.1–6.0	Moderate to high.	Moderate.
90–100	70–90	0.06–0.2	0.15–0.17	5.6–7.8	High	Moderate.
100	65–95	0.2–0.6	0.20–0.23	6.1–7.8	Moderate	
100	55–85	0.2–0.6	0.18–0.20	6.1–7.8	Moderate	Low.
80–90	5–20	6.0–20.0	0.04–0.08	6.1–7.8	Low	Low.
90–100	60–90	0.6–2.0	0.22–0.24	<4.5–6.5	Low	
90–100	60–90	<0.06	0.11–0.13	<4.5–5.5	Moderate	High.
75–90	70–85	2.0–6.0	0.13–0.17	5.1–6.5	Low	
40–65	35–45	0.6–2.0	0.04–0.08	5.1–6.5	Moderate	Moderate.
100	95–100	0.6–2.0	0.20–0.22	7.4–8.4	Low	
100	95–100	0.6–2.0	0.17–0.22	7.4–8.4	Low	Low.
100	80–96	0.6–2.0	0.22–0.24	5.6–7.3	Low	
100	80–90	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low.
100	95–100	0.6–2.0	0.20–0.25	5.1–7.3	Low	
100	95–100	0.2–0.6	0.18–0.20	5.1–6.5	High	Moderate.
100	95–100	0.2–0.6	0.18–0.22	5.6–7.8	Low	Moderate.
90–100	85–100	0.6–2.0	0.20–0.22	4.5–6.5	Low	
90–100	65–85	0.6–2.0	0.16–0.19	4.5–6.5	Moderate	High.
85–95	60–80	0.2–2.0	0.14–0.18	5.6–7.8	Low	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Percent passing sieve—
				Unified	AASHTO	No. 4 (4.7 mm)
	Feet	*Inches*				
Huntsville: 77	3–5	0–27	Silt loam	CL, ML	A–6, A–4	100
		27–70	Silt loam	CL, ML	A–6, A–4	100
Ipava: 43A, 43B	1–3	0–15	Silt loam	ML, CL	A–6	100
		15–48	Heavy silty clay loam.	CL or CH	A–7	100
		48–60	Silt loam	CL	A–6	100
Joy: 275	1–3	0–18	Silt loam	ML, CL	A–4, or A–6	100
		18–52	Heavy silt loam	CL, ML	A–6 or A–4	100
		52–70	Silt loam	ML, CL	A–4 or A–6	100
Keller: 470C2, 470D2	1–3	0–8	Silt loam	ML, CL	A–6	100
		8–25	Heavy silty clay loam.	CL	A–7, A–6	100
		25–60	Heavy clay loam, clay.	CH	A–7, A–6	95–100
Keomah: 17A, 17B, 17C2, 17C3.	1–3	0–11	Silt loam	ML, CL	A–4, A–6	100
		11–59	Heavy silty clay loam.	CL or CH	A–7 or A–6	100
		59–72	Heavy silt loam	CL or ML	A–6 or A–4	100
Lawson: 451	1–3	0–42	Silt loam	CL or CL–ML	A–4	100
		42–60	Silt loam	CL or CL–ML	A–4 or A–6	100
Limestone rock land: 94. No estimates made; onsite determination necessary.						
Littleton: 81	1–3	0–19	Silt loam	ML or CL	A–6, A–4	100
		19–53	Silt loam	CL	A–6, A–4	100
		53–65	Silt loam	ML or CL	A–4 or A–6	100
Mt. Carroll: 268A, 268B, 268C2.	>5	0–9	Silt loam	ML	A–4	100
		9–49	Heavy silt loam	CL or ML	A–6, A–4	100
		49–63	Silt loam	ML or CL	A–4, A–6	100
Muscatine: 41A, 41B	1–3	0–18	Silt loam	CL, ML, or OL	A–7	100
		18–60	Silty clay loam	CL or CH	A–7	100
		60–67	Silt loam	CL	A–7 or A–6	100
*NewGlarus: 928C2, 928D2 - For Palsgrove part, see Palsgrove series.	>5	0–18	Silty clay loam	CL	A–7 or A–6	100
		18–35	Silty clay	CH	A–7	95–100
		35	Limestone.			
Orion: 415	1–3	0–29	Silt loam	ML	A–4	100
		29–70	Light silty clay loam, silt loam.	ML	A–4	100
Palsgrove Mapped only in a complex with NewGlarus soils.	>5	0–9	Silt loam	ML or CL	A–4, A–6	100
		9–40	Silty clay loam	CL	A–7, A–6	100
		40–60	Silty clay	CH	A–7	95–100
*Port Byron: 277A, 277B, 858B. For Mt. Carroll part of 858B, see Mt. Carroll series. Estimates were not made for Urban land part of 858B.	3–5	0–16	Silt loam	ML or CL	A–4 or A–6	100
		16–63	Silt loam	CL or ML	A–6, A–4	100
		63–91	Silt loam	ML or CL	A–4 or A–6	100

See footnote at end of table.

significant to engineering—Continued

Percent passing sieve—Continued		Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits [1]
No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
95–100	85–100	0.6–2.0	0.22–0.24	6.1–7.8	Moderate	Low.
85–95	55–95	0.6–2.0	0.18–0.20	6.1–7.8	Low	Low.
100	95–100	0.6–2.0	0.22–0.24	5.6–7.3	Moderate	
100	95–100	0.2–2.0	0.18–0.20	5.6–6.5	High	Moderate.
100	95–100	0.2–2.0	0.18–0.22	6.6–7.8	Moderate	Low.
100	95–100	0.6–2.0	0.22–0.24	5.6–7.3	Low	
100	95–100	0.6–2.0	0.20–0.22	5.6–6.5	Low	Moderate.
100	95–100	0.6–2.0	0.20–0.22	6.1–8.4	Low	Low.
100	95–100	0.6–2.0	0.20–0.25	5.1–6.5	Low	
100	90–100	0.06–0.2	0.18–0.20	5.1–6.0	Moderate to high.	Moderate.
90–100	70–90	0.06–0.2	0.14–0.16	5.6–7.3	High	Moderate.
100	95–100	0.6–2.0	0.20–0.25	5.1–7.3	Low	
100	95–100	0.2–0.6	0.18–0.20	5.1–6.5	Moderate to high.	Moderate.
100	95–100	0.6–2.0	0.18–0.22	6.1–7.3	Low to moderate.	Low.
100	85–95	0.6–2.0	0.22–0.24	6.1–7.8	Low	Low.
100	85–95	0.6–2.0	0.20–0.22	6.1–7.8	Low	Low.
100	95–100	0.6–2.0	0.20–0.25	6.1–7.3	Low	
100	95–100	0.6–2.0	0.18–0.23	6.1–7.3	Low	Low.
100	95–100	0.6–2.0	0.18–0.23	6.1–7.8	Low	Low.
100	95–100	0.6–2.0	0.20–0.25	5.6–6.5	Low	
100	95–100	0.6–2.0	0.18–0.23	5.6–6.5	Low	Moderate.
100	95–100	0.6–2.0	0.18–0.23	5.6–8.4	Low	Low.
100	95–100	0.6–2.0	0.21–0.23	5.1–6.5	Moderate	
100	95–100	0.6–2.0	0.18–0.20	5.1–7.3	Moderate to high.	Moderate.
100	95–100	0.6–2.0	0.20–0.22	5.6–7.3	Moderate	Moderate.
100	95–100	0.6–2.0	0.19–0.21	5.6–6.5	Moderate	
90–100	70–90	0.2–0.6	0.13–0.15	5.6–6.5	High	Low.
100	90–100	0.6–2.0	0.20–0.22	6.6–7.8	Low	Low.
100	90–100	0.6–2.0	0.20–0.22	6.6–7.8	Low	Low.
100	95–100	0.6–2.0	0.20–0.22	5.1–7.3	Moderate	
100	95–100	0.6–2.0	0.18–0.20	5.1–6.5	Moderate	Moderate.
90–100	70–90	<0.06	0.13–0.15	5.1–6.5	High	Moderate.
100	95–100	0.6–2.0	0.20–0.25	5.6–7.3	Low	
100	95–100	0.6–2.0	0.18–0.23	5.6–6.5	Low	Moderate.
100	95–100	0.6–2.0	0.18–0.23	6.1–7.8	Low	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Percent passing sieve—
				Unified	AASHTO	No. 4 (4.7 mm)
	Feet	*Inches*				
Quarry: Q.U. No estimates made; onsite determination necessary.						
Racoon: 109	<1	0–25	Silt loam	ML or CL	A–4 or A–6	100
		25–53	Silty clay loam	CL	A–6	100
		53–66	Silt loam	ML or CL	A–4 or A–6	100
Riley: 452	1–3	0–13	Silty clay loam	CL	A–6	100
		13–27	Loam and silty clay loam.	CL or ML	A–4 or A–6	100
		27–76	Sand, loamy sand	SM, SM–SC	A–2	100
Riverwash, sand and gravel: 123.	3–5	0–50	Sand	SM, GM	A–1	40–100
Rozetta: 279A, 279B, 279C2, 279C3.	3–4	0–10	Silt loam	ML or CL	A–4 or A–6	100
		10–60	Silty clay loam, silt loam.	CL	A–6	100
		60–70	Silt loam	ML or CL	A–4 or A–6	100
Rushville: 16	<1	0–15	Silt loam	CL or ML	A–4 or A–6	100
		15–56	Silty clay, silty clay loam	CL or CH	A–7	100
		56–66	Silt loam	CL	A–6, A–7	100
Sandy alluvial land: 604	3–5	0–30	Light sandy loam	SM or SC	A–2, A–4	100
*Seaton: 274A, 274B, 274C2, 274D2, 274E, 274F, 931E, 931F, 937E, 937F, U274C, U274D. For Goss parts of 931E and 931F, see Goss series, and for Hickory parts of 937E and 937F, see Hickory series. Estimates were not made for Urban land parts of U274C and U274D.	>5	0–14	Silt loam	ML or CL	A–4, A–6	100
		14–43	Heavy silt loam	CL or ML	A–6, A–4	100
		43–60	Silt loam	CL or ML	A–6, A–4	100
Shiloh: 138	<1	0–19	Light silty clay	CH	A–7	100
		19–62	Light silty clay	CH or CL	A–7	100
		62–70	Light silty clay loam.	CL	A–6 or A–7	100
Sparta: 88B	<5	0–23	Loamy sand	SM	A–2	100
		23–60	Sand	SP	A–3	100
Starks: 132A	1–3	0–16	Silt loam	CL or ML	A–6 or A–4	100
		16–53	Silty clay loam	CL	A–6 or A–7	95–100
		53–70	Silt loam	SM, SC, ML, or CL	A–2 or A–4	90–100
Strip mine: S.M. No estimates made; onsite determination necessary.						
Stronghurst: 278A, 278B	1–3	0–19	Silt loam	ML or CL	A–4 or A–6	100
		19–62	Silty clay loam	CL	A–7 or A–6	100
		62–72	Heavy silt loam	CL or ML	A–6 or A–4	100
Tama: 36A, 36B	3–5	0–16	Silt loam	ML or CL	A–7 or A–6	100
		16–62	Silty clay loam	CL	A–7	100
		62–70	Silt loam	CL	A–7 or A–6	100

See footnote at end of table.

significant to engineering—Continued

Percent passing sieve—Continued		Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits[1]
No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
100	95–100	0.2–0.6	0.20–0.24	4.5–6.5	Moderate	
100	90–100	0.06–0.2	0.18–0.20	4.5–6.0	High	High.
100	80–90	0.2–0.6	0.18–0.20	6.1–6.5	Moderate	Low.
100	80–100	0.6–2.0	0.20–0.23	6.1–7.8	Moderate	
90–100	65–85	0.6–2.0	0.18–0.20	5.6–7.8	Moderate	Low.
90–100	5–20	6.0–20.0	0.04–0.08	6.1–7.8	Low	Low.
40–80	10–20	6.0–20.0	0.05–0.07	5.6–7.8	Low	Low.
100	95–100	0.6–2.0	0.22–0.24	5.1–7.3	Low	
100	95–100	0.6–2.0	0.18–0.20	5.1–6.5	Moderate	Moderate.
100	95–100	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low to moderate.
100	95–100	0.2–0.6	0.20–0.25	4.5–6.5	Moderate	
100	95–100	<0.06	0.13–0.15	4.5–6.0	High	High.
100	95–100	0.06–0.2	0.18–0.23	5.6–7.3	Moderate	Moderate.
95–100	25–50	2.0–20.0	0.10–0.12	5.6–7.8	Low	Low.
100	95–100	0.6–2.0	0.22–0.24	5.6–7.3	Low	
100	95–100	0.6–2.0	0.20–0.22	5.6–6.5	Low	Low to moderate.
100	90–100	0.6–2.0	0.17–0.19	5.6–8.4	Low	Low to moderate.
100	95–100	0.2–0.6	0.15–0.17	6.6–7.8	High	
100	95–100	0.06–0.6	0.14–0.16	6.6–7.8	High	Low.
100	95–100	0.2–0.6	0.18–0.20	6.6–8.4	Moderate	Low.
100	10–20	6.0–20.0	0.10–0.12	5.6–7.3	Low	
100	1–4	6.0–20.0	0.05–0.07	5.6–6.0	Low	Low.
95–100	80–95	0.6–2.0	0.20–0.25	5.6–6.5	Low	
90–100	60–90	0.2–2.0	0.18–0.20	5.1–6.0	Moderate	Moderate.
80–95	30–60	0.6–2.0	0.17–0.19	5.6–7.8	Low	Low.
100	95–100	0.6–2.0	0.18–0.23	5.1–7.3	Low	
100	95–100	0.2–2.0	0.19–0.21	5.1–6.5	Moderate	Moderate.
100	95–100	0.6–2.0	0.18–0.20	6.1–7.3	Low	Low.
100	95–100	0.6–2.0	0.22–0.24	5.1–7.3	Moderate	
100	95–100	0.6–2.0	0.18–0.20	5.1–6.0	Moderate to high.	Moderate.
100	95–100	0.6–2.0	0.18–0.20	6.1–7.3	Moderate	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification		Percent passing sieve—
				Unified	AASHTO	No. 4 (4.7 mm)
	Feet	*Inches*				
Tice: 284	1–3	0–13	Light silty clay loam.	CL	A–6	100
		13–60	Light silty clay loam, loam.	CL	A–6	100
		60–70	Silty clay loam and loam.	CL or ML	A–6 or A–4	100
Timula: 271C2, 271D2, 271E2, 271F.	>5	0–5	Silt loam	ML	A–4	100
		5–21	Silt loam	ML	A–4	100
		21–60	Silt loam	ML	A–4	100
Titus: 404	<1	0–18	Light silty clay	CH or CL	A–7	100
		18–53	Light silty clay, silty clay loam.	CH or CL	A–7	100
		53–68	Silty clay loam	CL	A–6	100
Ursa: 605D2, 605D3, 605E2, 605E3, 605F2.	3–5	0–8	Silt loam	CL	A–6 or A–4	95–100
		8–63	Heavy clay loam, light clay.	CH or CL	A–7 or A–6	95–100
		63–70	Light clay loam	CL	A–6	95–100
Virden: 50	<1	0–12	Heavy silty loam	CL	A–6 or A–7	100
		12–53	Heavy silty clay loam.	CH or CL	A–7	100
		53–64	Silt loam	CL or CH	A–6, A–7	100
Wakeland: 333	1–3	0–10	Silt loam	ML	A–4	100
		10–68	Silt loam	ML	A–4	100
Worthen: 37A, 37B	3–5	0–19	Silt loam	ML or CL	A–4 or A–6	100
		19–56	Silt loam	ML or CL	A–4 or A–6	100
		56–70	Silt loam	ML or CL	A–4 or A–6	100

[1] Corrosivity is estimated only for the horizons in which conduits are likely to be buried.

overflow; salinity or alkalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion or soil blowing; soil texture; content of stones; accumulations of salts and alkali; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; available water capacity; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments or ridges constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other impermeable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Formation and Classification of Soils

The factors that affect the formation of Adams County soils are discussed in this section. The system of soil classification is explained, and the classification of the soil series by higher categories is given.

Factors of Soil Formation

Soil is produced by soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life, especially plants, are active factors in soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that is formed, and in extreme cases, determines it almost entirely. Finally, time is needed for changing

significant to engineering—Continued

Percent passing sieve—Continued		Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity potential for concrete conduits [1]
No. 10 (2.0 mm)	No. 200 (0.074 mm)	*Inches per hour*	*Inches per inch of soil*	*pH*		
100	90–100	0.6–2.0	0.20–0.23	6.1–7.8	Moderate	
100	90–100	0.6–2.0	0.18–0.20	6.1–7.8	Moderate	Low.
100	85–100	0.6–2.0	0.18–0.20	6.6–7.8	Moderate	Low.
100	90–100	0.6–2.0	0.22–0.24	6.1–7.8	Low	
100	90–100	0.6–2.0	0.20–0.22	6.1–7.8	Low	Low.
100	90–100	0.6–2.0	0.20–0.22	7.9–8.4	Low	Low.
100	95–100	0.06–0.2	0.14–0.16	6.1–7.8	High	
100	95–100	0.06–0.2	0.14–0.16	6.1–7.8	High	Low.
100	85–100	0.06–0.2	0.18–0.20	6.1–7.8	High to moderate.	Low.
95–100	80–90	0.6–2.0	0.20–0.24	5.1–7.3	Moderate	
95–100	75–95	0.2–0.6	0.15–0.18	5.1–8.4	High	Moderate.
95–100	60–80	0.2–0.6	0.14–0.16	7.9–8.4	Moderate	Low.
100	95–100	0.6–2.0	0.20–0.25	5.6–7.3	High	
100	95–100	0.2–0.6	0.16–0.18	5.6–6.5	High	Moderate.
100	95–100	0.2–0.6	0.18–0.23	5.6–7.8	High	Low.
100	80–90	0.6–2.0	0.22–0.24	5.6–7.3	Low	
100	80–90	0.6–2.0	0.20–0.22	5.6–7.3	Low	Low.
100	80–100	0.6–2.0	0.20–0.25	5.6–7.8	Low	
100	80–100	0.6–2.0	0.20–0.25	5.6–7.8	Low	Low.
100	80–100	0.6–2.0	0.20–0.25	6.1–7.8	Low	Low.

the parent material into a soil profile. It may be much or little, but some time is always required for differentiation of soil horizons. Generally, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent materials

The less sloping soils in the upland part of the county formed mainly in loess. The loess in nearly level areas ranges from 20 to 25 feet in thickness near the bluff bordering the flood plain of the Mississippi River to about 6 feet in thickness in the eastern part of the county (fig. 16). The loess is coarser textured near the bluff, and the soils formed mainly in that part of the loess deposited most recently. Most of the loess in the eastern part of the county has been exposed to weathering since it was deposited. Soils formed in this loess, such as the Clinton soils, have finer textured subsoils than those formed near the bluff, such as the Seaton soils.

The parent materials are mainly glacial till in the more strongly sloping and steep parts of the county. Loess was also deposited in these areas, but it was subsequently removed by water erosion in all except the areas of thickest loess deposits. Deposits of glacial till of Kansan age glaciers cover most of Adams County. The Illinoian, a later glaciation, is in the northern and eastern parts of the county. A clayey soil formed in the upper part of the drift deposited by both of these glaciers (fig. 17). In the northern and eastern parts of the county, clayey soils that formed in both of these glacial materials are exposed on a valley side (*4*). Among the soils mapped in these clayey materials are Atlas and Coatsburg. Soils that formed in the loam and clay loam glacial till below these clayey soils are mainly of the Hickory series.

In the western part of the county, some strongly sloping and steep soils formed in clayey material and cherty clayey material weathered from limestone. Material weathered from shale and some sandstone is in some of these kinds of areas in the eastern part of Adams County. Water-deposited silt loam and some loam, sandy loam, and silty clay loam parent materials are in an area generally 1 to 3 miles east of McKee

Figure 16.—**Loess overlying glacial drift and limestone bedrock.**

Creek (fig. 18). The Camden soils formed in these materials.

The parent materials of the El Dara soils in soil association 5 probably were deposited in the Cretaceous period (*6*). These materials are mainly sand and loamy sand, but they are also sandy loam that has some sandy clay loam. They are in drainage divides and on the higher parts of the landscape. Glacial till is on all sides of these parent materials and in places overlies them.

The flood plains in soil association 6 in the upland part of the county are generally silty. On the flood plain of the Mississippi River the materials in soil association 7 range from sandy to clayey. Most of the finer textured soils on the flood plain of the Mississippi River are in areas north of the city of Quincy, especially in an area a few miles east of Meyer that was formerly covered by Lima Lake. There are a few terraces in the form of benches of sandy material rising 10 to 15 feet above the flood plain.

Climate

Climate influences soil formation through its effect on parent materials, weathering, and vegetation. The humid-temperate climate of Adams County is favorable for vigorous plant growth. It also has an acid-forming effect on the soil. It promotes breakdown of soil material to clay-size particles and a net transfer of this clay from the surface horizon to the subsoil horizon.

Plants and animals

Plants have had more effect on the formation of soils in Adams County than have animals, but both are important. Animals that live and die in the soils help condition them for a more favorable exchange of air and help add organic materials. Man has a strong influence on soils by draining wet soils, applying fertilizers, and both causing and preventing erosion.

The native vegetation in Adams County was hardwood forest and prairie grasses. The soils in associations 1 and 2 formed mainly under prairie grasses, and those in associations 3, 4, and 5 formed mainly under hardwood forest. Soils in associations 6 and 7 formed under both forest and prairie, but mainly under forest.

Soils formed under prairie grasses in Adams County are generally higher in organic-matter content. They are less acid, and they have a lower clay content in the subsoil than similar soils formed under hardwood forest.

Relief

Relief influences the amount of erosion, the amount of runoff, and the parent material that will be exposed at the surface. Most sloping soils, unless seepy, have a lower seasonal water table than nearly level soils formed in similar parent materials. Large areas of steep and very steep soils are in Adams County. The

Figure 17.—**Buried soil in a borrow area for a farm pond. The soil is about 6 feet thick and underlies about 7 feet of loess.**

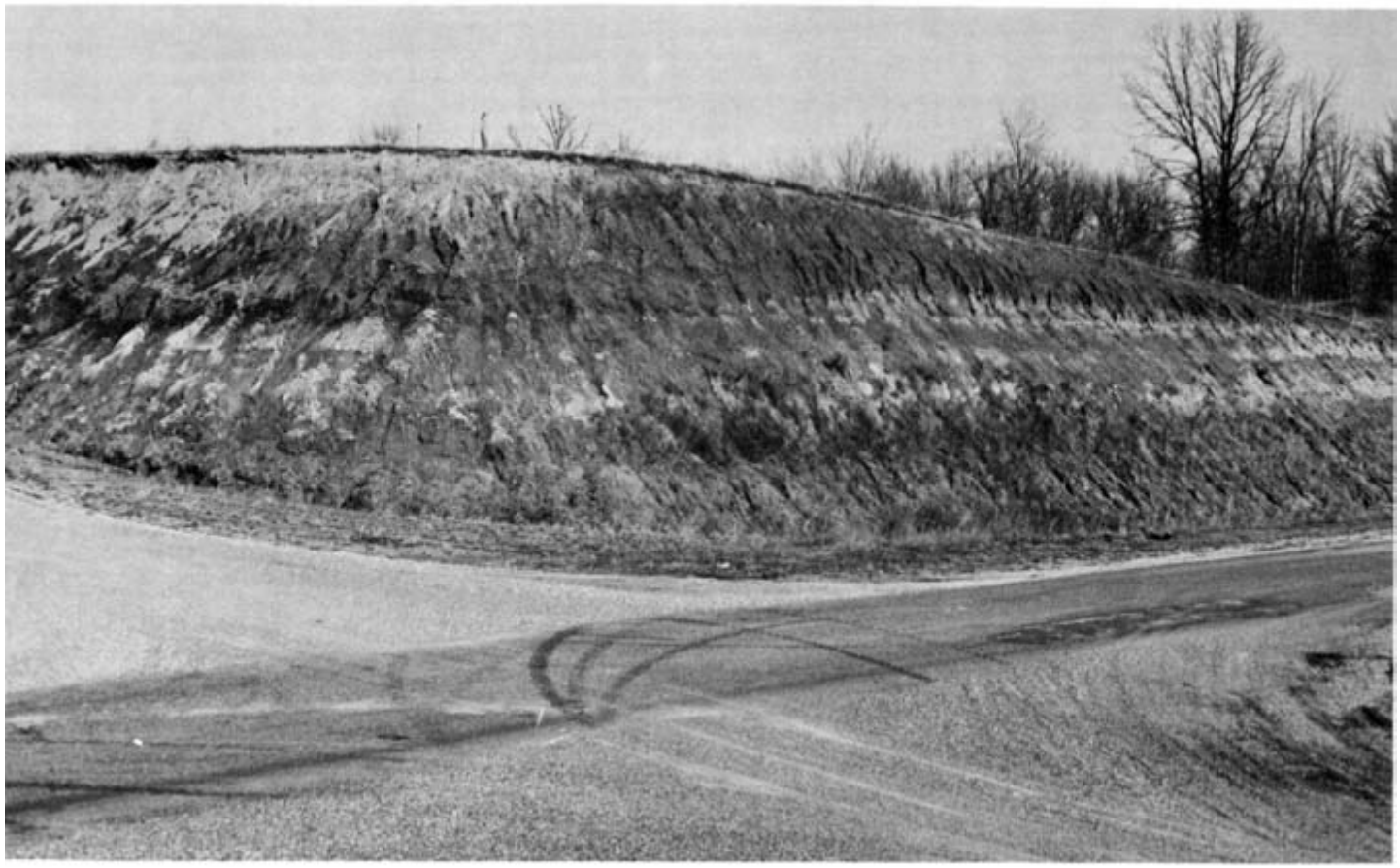

Figure 18.—**Stratified silt loams and sandy loams deposited by water. They are exposed in a road cut in an area of Camden silt loam.**

soils in these areas have a wider range of parent materials exposed at the surface, are thinner and less strongly weathered, are more droughty, and are more susceptible to erosion than similar, less sloping soils.

Time

Generally, the greater the length of time that soil formation factors have acted on a soil, the more pronounced is the soil formation. Other factors of soil formation, however, strongly influence the apparent age of a soil. Soils form faster under forest than under prairie grass vegetation. Very steep soils remain young because of rapid erosion. Some old soils that were originally strongly leached can be resaturated by overburden materials rich in bases.

The soils on the flood plains in the county are young. Soils on the uplands are much older, especially in the eastern part of the county. Most of the buried and formerly buried soils are older yet.

Classification of Soils

Soils are classified so that their significant characteristics can be more easily remembered. Classification makes it possible to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help in understanding their behavior and their response to manipulation. First through classification, and then through use of soil maps, knowledge of soils can be applied to specific fields and other tracts of land.

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

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the current system should search the latest literature available.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 12, the soil series of Adams County are placed in four categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The properties

TABLE 10.—*Engineering interpretations*

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

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Atlas: 7D, 7D3, 7E2, 7E3	Severe: slow to very slow permeability; seasonal high water table; slope is more than 12 percent.	Severe: slope is more than 7 percent.
Atterberry: 61A, 61B	Severe: seasonal high water table; moderate to moderately slow permeability.	Severe: seasonal high water table.
Baylis: 472C2, 472C3, 472D2, 472D3	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Severe if slope is more than 7 percent: more than 50 percent of material below depth of 2 to 3 feet has coarse fragments in places.
Beaucoup: 70, W70, 70+	Severe: seasonal high water table; subject to flooding.	Severe: seasonal high water table; subject to flooding.
Birds: 334	Severe: seasonal high water table; subject to flooding; moderately slow to slow permeability.	Severe: seasonal high water table; subject to flooding.
Blackoar: 603	Severe: seasonal high water table; subject to flooding.	Severe: seasonal high water table; subject to flooding.
Blair: 5D2, 5D3, 5E3	Severe: seasonal high water table; moderately slow permeability.	Severe: slope is more than 7 percent; seasonal high water table.
Borrow pit: B.P. No interpretations made; onsite determination necessary.		
Camden: 134A, 134B, 134C2, 134C3, 134D2, 134D3, 134E, 134F	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Severe: moderate or moderately rapid permeability; subject to moderate seepage.
Clarksdale: 257A, 257B, 257C2	Severe: seasonal high water table; moderately slow permeability.	Slight if slope is 0 to 2 percent. Moderate if slope is 2 to 7 percent.
*Clinton: 18B2, 18B3, 18C2, 18C3, 932C2, 932C3, 932D3 For El Dara parts of 932C2, 932C3, and 932D3, see El Dara series.	Severe: moderately slow permeability; slope is more than 12 percent.	Moderate if slope is 2 to 7 percent. Severe if slope is 7 to 12 percent: slight seepage hazard below depth of about 4 feet.

See footnotes at end of table.

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

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Severe: somewhat poorly drained; slope is more than 12 percent; clayey.	Severe: high shrink-swell potential; material classified CH; seasonal high water table at depth of 1 to 3 feet; slope is more than 12 percent in places.	Severe: clayey	Severe: high shrink-swell potential; subgrade classified CH or CL; slope is more than 12 percent in places.
Severe: somewhat poorly drained.	Severe: seasonal high water table at depth of 1 to 3 feet; subject to frost action.	Severe: somewhat poorly drained; high seasonal water table.	Severe: subject to frost action; plasticity index of subgrade is more than 15 percent.
Moderate if slope is less than 12 percent. Severe if slope is more than 12 percent: coarse fragments below depth of 2 to 3 feet.	Moderate if slope is less than 12 percent. Severe if slope is more than 12 percent.	Moderate: silty clay loam; 12 to 18 percent slopes in places; chert fragments at depth of about 3 feet.	Moderate if slope is 7 to 12 percent: moderate shrink-swell potential. Severe if slope is more than 12 percent.
Severe: poorly drained; subject to flooding.	Severe: seasonal high water table at depth of less than 1 foot; subject to flooding and frost action.	Severe: poorly drained; subject to flooding.	Severe: poorly drained; subject to flooding and frost heave; plasticity index of subgrade is more than 15 percent.
Severe: poorly drained; subject to flooding.	Severe: seasonal high water table at depth of less than 1 foot; subject to flooding and frost action.	Severe: poorly drained; subject to flooding.	Severe: subject to flooding and frost action; poorly drained.
Severe: poorly drained; subject to flooding.	Severe: seasonal high water table at depth of less than 1 foot; subject to flooding and frost action.	Severe: poorly drained; subject to flooding.	Severe: subject to flooding and frost action; poorly drained.
Severe: somewhat poorly drained; slope is more than 12 percent.	Severe: seasonal high water table at depth of 1 to 3 feet; subject to frost action; slope is more than 12 percent in places.	Severe: somewhat poorly drained; 12 to 18 percent slopes in places; clay loam.	Severe: somewhat poorly drained; plasticity index of subgrade is more than 15 percent; subject to frost action; slope is more than 12 percent in places.
Severe: subject to flooding; slope is more than 12 percent in places.	Severe: subject to flooding; slope is more than 12 percent in places.	Severe: moderately rapid permeability in lower part of soil.	Moderate: subject to frost action and flooding.
Severe: somewhat poorly drained.	Severe: seasonal high water table between depth of 1 to 3 feet; subject to frost action.	Severe: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; subject to frost action; plasticity index of subgrade is more than 15 percent.
Moderate if slope is 2 to 12 percent. Severe if slope is more than 12 percent: moderately well drained.	Moderate if slope is 2 to 12 percent: seasonal high water table at depth of 3 to 4 feet; moderate shrink-swell potential. Severe if slope is more than 12 percent.	Moderate: silty clay loam; moderately well drained; 12 to 18 percent slopes in places.	Severe: moderate shrink-swell potential; slope is more than 12 percent in places; plasticity index of subgrade is more than 15 percent.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Coatsburg: 660C2, 660D2	Severe: slow to very slow permeability; seasonal high water table.	Severe: slope is more than 7 percent.
Cowden: 112	Severe: slow permeability; seasonal high water table; subject to flooding.	Slight
Cut and Fill land: C.F. No interpretations made; onsite determination necessary.		
Darwin: 71	Severe: very slow permeability; seasonal high water table; subject to flooding and ponding.	Severe: subject to flooding.
Dickinson: 87B	Slight [2]	Severe: moderately rapid permeability; hazard of excessive seepage.
Downs: 386A, 386B, 386C2	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent.	Moderate: seasonal high water table at depth of 3 to 5 feet; moderate permeability; hazard of seepage. Severe if slope is 7 to 12 percent.
Dupo: 180	Severe: seasonal high water table; moderately slow to slow permeability; subject to flooding.	Severe: subject to flooding; seasonal high water table.
El Dara: 264C, 264C3, 264D, 264D3, 264E2, 264F	Moderate [2] if slope is 7 to 12 percent. Severe if slope is more than 12 percent: moderate permeability.	Severe: slope is more than 12 percent; hazard of excessive seepage in places.
*Fayette: 280B, 280C2, 280C3, 280D2, 280D3, 936D2, 936D3 For Hickory parts of 936D2 and 936D3, see Hickory series.	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Moderate if slope is 2 to 7 percent. Severe if slope is more than 7 percent: moderate hazard of seepage.
Fishhook: 6C2, 6C3, 6D2, 6D3, 6E2	Severe: slow to very slow permeability; seasonal high water table; slope is more than 12 percent.	Moderate if slope is 4 to 7 percent. Severe if slope is more than 7 percent.
Gorham: 162	Severe: seasonal high water table; subject to flooding.	Severe: seasonal high water table; hazard of seepage in underlying material.

See footnotes at end of table.

for town and country planning—Continued

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Severe: poorly drained; clayey.	Severe: seasonal high water table at depth of 1 to 3 feet; high shrink-swell potential; material classified CH.	Severe: poorly drained; clayey.	Severe: poorly drained; high shrink-swell potential; subgrade classified CH.
Severe: poorly drained; clayey subsoil.	Severe: seasonal high water table at depth of less than 1 foot; material classified CH and CL.	Severe: poorly drained; clayey.	Severe: poorly drained; subgrade classified CH; moderate to high shrink-swell potential.
Severe: poorly drained; clayey; subject to flooding.	Severe: material classified CH; subject to flooding, seasonal high water table at depth of less than 1 foot; high shrink-swell potential.	Severe. subject to flooding; poorly drained; clayey.	Severe: poorly drained; subject to flooding; subgrade classified CH; high shrink-swell potential.
Severe: sidewall instability in sandy material below depth of about 3 feet.	Slight	Severe: moderately rapid permeability.	Slight.
Moderate: moderately well drained to well drained; 7 to 12 percent slopes in places.	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent.	Slight	Moderate: moderate shrink-swell potential; 7 to 12 percent slopes in places.
Severe: somewhat poorly drained; subject to flooding; clayey soil at depth of 2 to 5 feet in places.	Severe: Seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Severe: subject to flooding; clayey in places.	Severe: somewhat poorly drained; plasticity index of subgrade is more than 15 percent; subject to flooding.
Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent: well drained and moderately well drained; sandy soil below depth of 3 to 5 feet in places.	Moderate if slope is 7 to 12 percent: seasonal high water table at depth of 3 to 5 feet. Severe if slope is more than 12 percent.	Moderate if slope is 7 to 18 percent: moderately well drained. Severe if slope is more than 18 percent: hazard of ground water pollution in places.	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.
Slight if slope is 2 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Slight if slope is less than 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Slight	Moderate if slope is 2 to 12 percent: subgrade classified CL; moderate shrink-swell potential. Severe if slope is more than 12 percent.
Severe: somewhat poorly drained; slope is more than 12 percent in places; clayey below depth of 1 to 2 feet in many places.	Severe: seasonal high water table at depth of 1 to 3 feet; moderate to high shrink-swell potential; slope is more than 12 percent in places.	Severe: mostly clayey	Severe: somewhat poorly drained; plasticity index of subgrade is more than 15 percent; high to moderate shrink-swell potential.
Severe: poorly drained; sandy soil at depth of 3 to 4 feet; subject to flooding.	Severe: moderate shrink-swell potential; seasonal high water table at depth of less than 1 foot; subject to flooding.	Severe: poorly drained; subject to flooding; possible pollution of ground water through underlying sands.	Severe: poorly drained; subject to flooding and frost action; plasticity index of subgrade is more than 15 percent.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Gosport: 551E2, 551E3, 551F2	Severe: very slow permeability; bedrock within depth of about 3 feet; slope is more than 12 percent.	Severe: slope is more than 7 percent; shallow to shale bedrock.
Goss: 606F	Severe: slope is more than 12 percent; soil material is cherty; possible pollution of ground water where cherty material lacks fines.	Severe: slope is more than 7 percent; more than 50 percent coarse fragments in many places; possible pollution of ground water where cherty material lacks fines.
Hamburg: 30F2	Severe: slope is more than 12 percent.	Severe: slope is very steep; moderately rapid permeability.
Haymond: 331	Slight if protected from flooding. Severe if subject to flooding.	Severe: subject to flooding; hazard of seepage can be great in underlying material.
Herrick: 46A, 46B	Severe: moderately slow permeability; seasonal high water table.	Slight
Hickory: 8C2, 8C3, 8D2, 8D3, 8E, 8F	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Severe: slope is more than 7 percent.
Huntsville: 77	Slight if protected from flooding. Severe if subject to flooding.	Severe: subject to flooding; moderate seepage losses.
Ipava: 43A, 43B	Severe: seasonal high water table.	Severe: seasonal high water table; moderate permeability below depth of 4 feet.
Joy: 275	Severe: seasonal high water table.	Severe: seasonal high water table; moderate permeability in subsoil and underlying material.
Keller: 470C2, 470D2	Severe: slow permeability; seasonal high water table.	Moderate if slope is 4 to 7 percent. Severe if slope is more than 7 percent.
Keomah: 17A, 17B, 17C2, 17C3	Severe: moderately slow permeability; seasonal high water table.	Moderate: moderate permeability below depth of 4 feet.

See footnotes at end of table.

for town and country planning—Continued

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Severe: slope is more than 12 percent; clayey; shale bedrock within depth of about 3 feet that can be dug with difficulty in most places.	Severe: slope is more than 12 percent; moderate shrink-swell potential, shale bedrock within depth of about 3 feet; soil slips in some places.	Severe: clayey; slope is steep; shale bedrock within depth of about 3 feet that can be dug with difficulty in most places.	Severe: slope is steep; subgrade classified CH.
Severe: coarse cherty fragments; slope is more than 12 percent.	Severe: slope is more than 12 percent; some coarse fragments.	Moderate if slope is 12 to 18 percent. Severe if slope is more than 18 percent: possible pollution of ground water where cherty material lacks fines.	Severe: slope is steep; moderate shrink-swell potential.
Severe: slope is steep ------	Severe: slope is more than 12 percent.	Severe: slope is steep; permeability greater than 2 inches per hour.	Severe: slope is steep; subgrade classified ML.
Severe: subject to flooding; well drained and moderately well drained.	Severe: subject to flooding --	Severe: subject to flooding.	Severe: subject to flooding; subgrade classified ML.
Severe: somewhat poorly drained; somewhat clayey subsoil.	Severe: seasonal high water table at depth of 1 to 3 feet; subject to frost action.	Severe: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; subject to frost action; subgrade classified CH and CL.
Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent: well drained and moderately well drained.	Moderate if slope is 7 to 12 percent: plasticity index more than 15 percent. Severe if slope is more than 12 percent.	Slight if slope is 7 to 12 percent. Moderate if slope is 12 to 18 percent. Severe if slope is more than 18 percent: clay loam.	Severe: plasticity index of subgrade is more than 15 percent; moderate shrink-swell potential; slope is more than 12 percent in places.
Severe: subject to flooding; well drained and moderately well drained.	Severe: subject to flooding --	Severe: subject to flooding.	Severe: subject to flooding.
Severe: somewhat poorly drained.	Severe: seasonal high water table at depth of 1 to 3 feet; subject to frost action.	Severe: somewhat poorly drained; silty clay loam.	Severe: plasticity index of subgrade is more than 15 percent; somewhat poorly drained; moderate shrink-swell potential; subject to frost action.
Severe: somewhat poorly drained.	Severe: seasonal high water table at depth of 1 to 3 feet; subject to frost action.	Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action; subgrade classified CL.
Severe: somewhat poorly drained; clayey.	Severe: high shrink-swell potential; seasonal high water table at depth of 1 to 3 feet; material classified CH or CL.	Severe: clayey; somewhat poorly drained.	Severe: high shrink-swell potential; subgrade classified CH or CL.
Severe: somewhat poorly drained; clayey subsoil in places.	Severe: somewhat poorly drained; subject to frost action.	Moderate: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; subject to frost action; moderate shrink-swell potential; plasticity index of subgrade is more than 15 percent.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Lawson: 451	Severe: seasonal high water table; subject to flooding.	Severe: subject to flooding; high organic-matter content.
Limestone rock land: 94. No interpretations made; onsite determination necessary.		
Littleton: 81	Severe: seasonal high water table.	Severe: hazard of seepage losses; upper 2 feet poor for embankment material and floor of lagoon; seasonal high water table.
Mt. Carroll: 268A, 268B, 268C2	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent.	Moderate if slope is 0 to 7 percent. Severe if slope is more than 7 percent: moderate hazard of seepage.
Muscatine: 41A, 41B	Severe: seasonal high water table.	Severe: seasonal high water table; moderate hazard of seepage.
*NewGlarus: 928C2, 928D2 For Palsgrove part, see Palsgrove series.	Severe[2]: bedrock within depth of about 3 feet; slope is more than 12 percent.	Severe: slope is more than 7 percent; bedrock within depth of about 3 feet.
Orion: 415	Severe: seasonal high water table; subject to flooding.	Severe: seasonal high water table; subject to flooding.
Palsgrove Mapped only in a complex with NewGlarus soils.	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Severe: slope is more than 7 percent.
Port Byron: 277A, 277B	Slight	Moderate: moderate hazard of seepage; moderate organic-matter content in surface layer.
Port Byron-Mt. Carroll-Urban land: 858B. No interpretations made; onsite determination necessary.		
Quarry: Q.U. No interpretations made; onsite determination necessary.		
Racoon: 109	Severe: slow permeability; seasonal high water table; subject to local flooding and ponding.	Slight
Riley: 452	Severe[2]; seasonal high water table; subject to flooding.	Severe: seasonal high water table; severe hazard of seepage in underlying material.

See footnotes at end of table.

for town and country planning—Continued

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Severe: subject to flooding; somewhat poorly drained.	Severe: somewhat poorly drained; subject to flooding and frost action.	Severe: subject to flooding; somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action and flooding.
Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action.	Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action; subgrade classified ML.
Slight if slope is 0 to 7 percent. Moderate if slope is more than 7 percent.	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent.	Slight	Moderate: subgrade classified ML; 7 to 12 percent slopes in places.
Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action; moderate to high shrink-swell potential.	Moderate: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; moderate to high shrink-swell potential; subject to frost action; plasticity index of subgrade is more than 15 percent.
Severe: bedrock within depth of about 3 feet.	Severe: bedrock at depth of about 3 feet.	Severe: bedrock at depth of about 3 feet.	Moderate: plasticity index of subgrade is more than 15 percent; bedrock at depth of about 3 feet; moderate to high shrink-swell potential; slope is more than 12 percent in places.
Severe: somewhat poorly drained; subject to flooding.	Severe: subject to flooding; somewhat poorly drained.	Severe: subject to flooding; somewhat poorly drained.	Severe: subject to frost action and flooding.
Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent: bedrock within depth of 40 to 60 inches.	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent: plasticity index more than 15 percent; moderate to high shrink-swell potential.	Severe: bedrock commonly between depths of 40 and 60 inches.	Severe: plasticity index of subgrade is more than 15 percent; slope is more than 12 percent in places; moderate to high shrink-swell potential; bedrock at depth of 5 feet or more.
Moderate: moderately well drained in places.	Slight	Slight	Moderate: subgrade classified CL.
Severe: somewhat poorly drained; subject to local flooding and ponding.	Severe: poorly drained; subject to flooding in places; subject to frost action.	Severe: poorly drained; subject to local flooding.	Severe: plasticity index more than 15 percent in most places; subject to frost action; poorly drained; subject to flooding in places.
Severe: somewhat poorly drained; sand generally at depth of 2 to 3 feet; subject to flooding.	Severe: somewhat poorly drained; subject to flooding and frost action.	Severe: subject to flooding; somewhat poorly drained; possible contamination of ground water through underlying sands.	Severe: somewhat poorly drained; subject to frost action and flooding.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Riverwash, sand and gravel: 123	Severe[2]: subject to flooding.	Severe: sand and gravel; excessive hazard of seepage; subject to flooding.
Rozetta: 279A, 279B, 279C2, 279C3	Moderate: seasonal high water table; slope is 0 to 12 percent.	Moderate if slope is 0 to 7 percent: seasonal high water table at depth of 3 to 4 feet; moderate hazard of seepage. Severe if slope is 7 to 12 percent.
Rushville: 16	Severe: slow to very slow permeability; seasonal high water table; subject to ponding in places.	Slight
Sandy alluvial land: 604	Severe[2]: subject to flooding.	Severe: excessive seepage through porous underlying material; subject to flooding.
*Seaton: 274A, 274B, 274C2, 274D2, 274E, 274F, 931E, 931F, 937E, 937F. For Goss parts of 931E and 931F, see Goss series, and for Hickory parts of 937E and 937F, see Hickory series.	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Moderate if slope is 0 to 7 percent: moderate seepage hazard. Severe if slope is more than 7 percent.
Seaton-Urban land complex: U274C. No interpretations made; onsite determination necessary.		
Seaton-Urban land complex: U274D. No interpretations made; onsite determination necessary.		
Shiloh: 138	Severe: slow to moderately slow permeability; seasonal high water table; subject to flooding and ponding.	Severe: seasonal high water table; subject to flooding.
Sparta: 88B	Slight[3]	Severe: severe hazard of seepage.
Starks: 132A	Severe: seasonal high water table; moderate to moderately slow permeability; low areas subject to flooding in places.	Severe: seasonal high water table.
Strip mine: S.M. No interpretations made; onsite determination necessary.		
Stronghurst: 278A, 278B	Severe: seasonal high water table; moderate to moderately slow permeability.	Severe: seasonal high water table.
Tama: 36A, 36B	Slight	Moderate if slope is 0 to 7 percent: moderate hazard of seepage.
Tice: 284	Severe: seasonal high water table; subject to flooding.	Severe: seasonal high water table; subject to flooding.

See footnotes at end of table.

for town and country planning—Continued

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Severe: sand with some gravel; subject to flooding.	Severe: subject to flooding	Severe: subject to flooding; permeability greater than 2 inches per hour.	Severe: subject to frequent flooding in most places.
Moderate: moderately well drained; slope is 0 to 12 percent.	Moderate: moderately well drained; slope is 7 to 12 percent in places.	Moderate: moderately well drained; silty clay loam.	Moderate: slope is 0 to 12 percent; moderate to low shrink-swell potential.
Severe: poorly drained; clayey subsoil.	Severe: poorly drained; moderate to high shrink-swell potential.	Severe: poorly drained; silty clay.	Severe: poorly drained; moderate to high shrink-swell potential; subgrade classified CL and CH.
Severe: subject to flooding; sand in places.	Severe: subject to flooding	Severe: subject to flooding; moderately rapid to very rapid permeability.	Severe: subject to frequent flooding in most places.
Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Slight if slope is 0 to 7 percent. Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Slight if slope is 0 to 12 percent. Moderate if slope is 12 to 18 percent. Severe if slope is more than 18 percent.	Moderate if slope is 0 to 12 percent: soil classified ML or CL. Severe if slope is more than 12 percent.
Severe: poorly drained; subject to flooding; clayey.	Severe: poorly drained; subject to flooding; clayey; high shrink-swell potential.	Severe: poorly drained; clayey.	Severe: poorly drained; subgrade classified mostly CH; high shrink-swell potential.
Severe: sandy	Slight	Severe: permeability greater than 2 inches per hour; sandy.	Slight.
Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action; low areas subject to flooding in places.	Severe: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; subgrade classified CL and ML; subject to to frost action.
Severe: somewhat poorly drained.	Severe: somewhat poorly drained; subject to frost action.	Severe: somewhat poorly drained; silty clay loam.	Severe: somewhat poorly drained; plasticity index of subgrade is more than 15 percent; subject to frost action.
Slight	Moderate: moderately well drained and well drained; material classified ML.	Slight	Moderate: moderate to high shrink-swell potential; subgrade classified CL and ML.
Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding and frost action.	Severe: subject to flooding; somewhat poorly drained.	Severe: subject to flooding and frost action; plasticity index of subgrade is more than 15 percent.

TABLE 10.—*Engineering interpretations*

Soil series and map symbols	Degree and kind of limitation for—	
	Septic tank absorption fields	Sewage lagoons
Timula: 271C2, 271D2, 271E2, 271F	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Severe: slope is more than 7 percent.
Titus: 404	Severe: slow permeability; seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.
Ursa: 605D2, 605D3, 605E2, 605E3, 605F2	Severe: slow to moderately slow permeability; slope is more than 12 percent.	Severe: slope is more than 7 percent.
Virden: 50	Severe: seasonal high water table; moderately slow permeability; subject to ponding.	Severe: seasonal high water table; subject to ponding; surface layer high in organic-matter content.
Wakeland: 333	Severe: seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.
Worthen: 37A, 37B	Slight	Moderate: moderate hazard of seepage; slope is 2 to 7 percent; moderate organic-matter content.

[1] Onsite deep studies of the underlying strata, water table, and hazards of aquifer pollution and drainage into ground water need to be made for landfills deeper than 5 or 6 feet.

used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and the Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol).

SUBORDER. Each order is divided into suborders that are based mainly on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is Aquoll (*Aqu,* meaning water or wet, and *oll,* from Mollisols).

GREAT GROUP. Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated, those that have pans that interfere with the growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used include the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and dark-red and dark-brown colors associated with basic rocks. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Hapludoll (*Hapl* meaning simple horizons, *ud* for moist or humid, and *oll,* from Mollisols).

SUBGROUP. Great groups are divided into subgroups, one representing the central (typic) segment of the group, and others called intergrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups can also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Hapludoll (a typical Hapludoll).

FAMILY. Soil families are separated within a subgroup mainly on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered

for town and country planning—Continued

Degree and kind of limitation for—Continued			
Shallow excavations	Dwellings with basements	Sanitary landfill (trench type) [1]	Local roads and streets
Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent.	Moderate if slope is 7 to 12 percent: material classified ML or CL. Severe if slope is more than 12 percent.	Slight if slope is 7 to 12 percent. Moderate if slope is 12 to 18 percent. Severe if slope is more than 18 percent.	Moderate if slope is 7 to 12 percent. Severe if slope is more than 12 percent: subgrade classified ML.
Severe: poorly drained; subject to flooding; clayey.	Severe: poorly drained; subject to flooding; high shrink-swell potential; material classified CH.	Severe: poorly drained; subject to flooding; clayey.	Severe: poorly drained; subject to flooding; high shrink-swell potential; subgrade classified CH.
Severe: clayey	Severe: material classified CH or CL; moderate to high shrink-swell potential; slope is steep in places.	Severe: clayey; slope is steep in places.	Severe: subgrade classified CH and CL; high shrink-swell potential; slope is steep in places.
Severe: poorly drained	Severe: poorly drained; moderate to high shrink-swell potential; material classified CH or CL.	Severe: poorly drained; clayey.	Severe: poorly drained; subgrade classified CL and CH; moderate to high shrink-swell potential.
Severe: somewhat poorly drained; subject to flooding.	Severe: somewhat poorly drained; subject to flooding and frost action.	Severe: subject to flooding; somewhat poorly drained.	Severe: subject to flooding and frost action; plasticity index of subgrade is more than 15 percent in most places.
Slight	Slight	Slight	Moderate: subgrade classified ML.

[1] Pollution is a hazard in places because of permeability of underlying material.

are texture, mineralogy, reactions, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for such features as texture and mineralogy, that are used as family differentiae. An example is the coarse-loamy, mixed, mesic family of Typic Hapludolls.

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

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Glossary

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.

TABLE 11.—*Interpretations of*

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

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Atlas: 7D, 7D3, 7E2, 7E3	Poor: high shrink-swell potential; material classified CH or CL.	Not suitable	Poor: favorable surface layers are thin or absent; clayey subsoils.
Atterberry: 61A, 61B	Poor: plasticity index more than 15 percent; somewhat poorly drained.	Not suitable	Good
Baylis: 472C2, 472C3, 472D2, 472D3	Fair: moderate shrink-swell potential; subject to frost action; coarse fragments in places; slope is moderately steep in places.	Not suitable	Fair: favorable surface layers are thin.
Beaucoup: 70, W70, 70+	Poor: poorly drained; plasticity index more than 15 percent; subject to frost action.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Birds: 334	Poor: poorly drained; subject to frost action.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Blackoar: 603	Poor: poorly drained; subject to frost action.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Blair: 5D2, 5D3, 5E3	Poor: plasticity index more than 15 percent.	Not suitable	Fair: favorable surface layers are thin.

engineering properties of the soils

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

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Seasonal high water table at depth of 1 to 3 feet; steeper slopes limit storage in places.	Fair to poor compaction characteristics; medium to low shear strength; high compressibility; high shrink-swell potential.	Additional drainage needed in seepy areas; very slow permeability; strongly sloping to moderately steep.	Slow intake rate; seasonal high water table at depth of 1 to 3 feet; very slow permeability in subsoil; strongly sloping and moderately steep.	Not applicable on steeper slopes; exposed subsoil is difficult to work and vegetate.
Seasonal high water table at depth of 1 to 3 feet; nearly level slopes in places; seepage in underlying material in places; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; medium compressibility.	Drainage generally needed; moderate to moderately slow permeability; suited to tile drains or open ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet; nearly level to moderately steep.	Nearly level slopes in places; seepy areas in places; other features favorable.
Steeper slopes limit storage in places; moderate seepage potential; underlain by pervious material in places.	Subsoil (upper part): medium to low shear strength; medium compressibility; moderate to high shrink-swell potential; low to medium resistance to piping. Subsoil (lower part): medium shear strength; high permeability of compacted soil in places.	Natural drainage is adequate.	Moderate intake rate; moderate available water capacity; strongly sloping and moderately steep.	Not applicable on steeper slopes; outcrops of limestone bedrock and cherty material in places.
Moderate seepage potetial; seasonal high water table at depth of less than 1 foot; nearly level slopes; high organic-matter content in upper 2 feet; subject to flooding; potential for dugout ponds.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility.	Subject to flooding and ponding; suited to tile drains or open ditches.	Moderate intake rate; seasonal high water table at depth of less than 1 foot; subject to flooding and ponding.	Not needed.
Subject to flooding; nearly level slopes; seasonal high water table at depth of less than 1 foot; potential for dugout ponds.	Fair to poor compaction characteristics; low to medium permeability of compacted soil; medium compressibility; medium susceptibility to piping.	Drainage is needed; moderately slow to slow permeability; subject to flooding and ponding; suited to open ditches.	Slow intake rate; seasonal high water table at depth of less than 1 foot; subject to ponding and flooding.	Not needed.
Moderate seepage potential; subject to flooding; seasonal high water table at depth of less than 1 foot; nearly level slopes; potential for dugout ponds.	Fair to poor compaction characteristics; low to medium permeability of compacted soil; medium compressibility; medium susceptibility to piping.	Drainage generally needed; suited to tile drains or open ditches.	Moderate intake rate; seasonal high water table at depth of less than 1 foot; subject to flooding.	Not needed.
Seasonal high water table; steeper slopes limit storage in places.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility.	Strongly sloping and moderately steep; drainage is needed in seepy areas in places.	Moderately slow intake rate; seasonal high water table at depth of 1 to 3 feet; strongly sloping and moderately steep.	Short, irregular slopes in most places; not applicable if slopes are steeper.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Borrow pit: B.P. No interpretations made; onsite determination necessary.			
Camden: 134A, 134B, 134C2, 134C3, 134D2, 134D3, 134E, 134F.	Fair: plasticity index more than 15 percent; subject to frost action; slope is very steep in places.	Generally not suitable: sandy material below depth of about 4 feet in places.	Fair if slope is 0 to 18 percent. Poor if slope is more than 18 percent: favorable surface layers are thin.
Clarksdale: 257A, 257B, 257C2	Poor: plasticity index more than 15 percent; subject to frost action.	Not suitable	Fair: favorable surface layers are thin.
*Clinton: 18B2, 18B3, 18C2, 18C3, 932C2, 932C3, 932D3. For El Dara parts of 932C2, 932C3, and 932D3, see El Dara series.	Poor: plasticity index more than 15 percent; subject to frost action.	Not suitable	Fair: favorable surface layers are thin.
Coatsburg: 660C2, 660D2	Poor: high shrink swell potential; poorly drained; plasticity index more than 15 percent.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot; favorable surface layers are thin; clayey subsoils.
Cowden: 112	Poor: moderate to high shrink-swell potential; plasticity index more than 15 percent; poorly drained.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Cut and Fill land: C.F. No interpretation made; onsite determination necessary.			
Darwin: 71	Poor: poorly drained; high shrink-swell potential; plasticity index more than 15 percent.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot; clayey.
Dickinson: 87B	Good	Fair: material below depth of about 39 inches is classified SP or SM.	Good: slightly droughty.

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Underlain by pervious material in places; moderate seepage potential; nearly level slopes in places; steep slopes limit storage in places.	Fair to good compaction characteristics; low permeability of compacted soil; low to medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; nearly level to very steep.	Irregular slopes in places; not applicable on steeper slopes.
Nearly level in places; seasonal high water table at depth of 1 to 3 feet; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; low permeability of compacted soil; low susceptibility to piping.	Drainage generally needed; suited to tile drains.	Moderate intake rate; moderately slow permeability; seasonal high water table at depth of 1 to 3 feet; nearly level to moderately sloping.	Not needed if nearly level; soil wetness is a concern in terrace channels in places.
Steeper slopes limit storage in places; other features generally favorable.	Fair compaction characteristics; medium to low shear strength; low permeability of compacted soil; low susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; gently sloping to moderately steep.	Not applicable if steeper slopes; exposed subsoil material difficult to work and vegetate; irregular slopes in most places.
Seasonal high water table at depth of less than 1 foot; other features generally favorable.	Fair to poor compaction characteristics; medium to low shear strength; high compressibility; high shrink-swell potential.	Slow to very slow permeability; drainage is needed in seepy areas; moderately sloping to strongly sloping.	Moderate intake rate; slow to very slow permeability in subsoil; seasonal high water table at depth of less than 1 foot; moderately sloping to strongly sloping.	Seedbed preparation difficult because of clayey material; seepy areas in places; in places soil wetness is a concern in terrace channels.
Seasonal high water table at depth of less than 1 foot; nearly level; potential for dugout ponds.	Medium to high compressibility; medium to low shear strength; low permeability of compacted soil.	Drainage is needed; slow permeability; subject to ponding; suited to open ditches.	Moderately slow intake rate; slow permeability seasonal high water table at depth of less than 1 foot.	Not needed.
Subject to flooding; nearly level; seasonal high water table at depth of less than 1 foot; potential for dugout ponds.	Fair to poor compaction characteristics; low permeability of compacted soil; high compressibility; high shrink-swell potential; low susceptibility to piping.	Drainage is needed; very slow permeability; subject to flooding and ponding; suited to open ditches.	Intake rate varies with amount of vertical cracking upon drying; seasonal high water table at depth of less than 1 foot; subject to flooding; very slow permeability; moderate available water capacity.	Not needed.
Highly permeable material; high seepage potential; nearly level in most places.	Medium shear strength; medium permeability of compacted soil; low compressibility; medium to high susceptibility to piping.	Natural drainage is adequate.	Low available water capacity; moderately rapid permeability; susceptible to soil blowing.	Not needed; sandy loam layer that has little runoff.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Downs: 386A, 386B, 386C2	Fair: plasticity index less than 15 percent; moderate shrink-swell potential; subject to frost action.	Not suitable	Fair: favorable surface layers are thin.
Dupo: 180	Poor: subject to frost action.	Not suitable	Fair: favorable surface layers are thin.
El Dara: 264C, 264C3, 264D, 264D3, 264E2, 264F	Good: more than 30 percent fines in places.	Not suitable: commonly contains fines; fair or good in places.	Fair if slope is 7 to 12 percent. Poor if slope is more than 12 percent: favorable surface layers are thin.
*Fayette: 280B, 280C2, 280C3, 280D2, 280D3, 936D2, 936D3. For Hickory parts of 936D2 and 936D3, see Hickory series.	Fair: moderate shrink-swell potential; plasticity index less than 15 percent; slope is steep in places; subject to frost action.	Not suitable	Fair if slope is 0 to 18 percent. Poor if slope is more than 18 percent: favorable surface layers are thin.
Fishhook: 62, 6C3, 6D2, 6D3, 6E2	Poor: high shrink-swell potential; plasticity index more than 15 percent; subject to frost action.	Not suitable	Fair: favorable surface layers are thin. Poor where severely eroded.
Gorham: 162	Poor: poorly drained; subject to frost action; plasticity index more than 15 percent; sandy below depth of 3 to 4 feet.	Fair to good: source of sand below depth of 3 to 4 feet; usually poorly graded; contains fines in places.	Poor: seasonal high water table at depth of less than 1 foot.
Gosport: 551E2, 551E3, 551F2	Poor: plasticity index more than 15 percent; slope is steep in places; shale bedrock within depth of about 3 feet that can be dug with difficulty in most places.	Not suitable	Fair if slope is 12 to 18 percent: favorable surface layers are thin. Poor if slope is more than 18 percent and where severely eroded.
Goss: 606F	Fair if slope is 12 to 30 percent: moderate shrink-swell potential; coarse fragments in places. Severe if slope is more than 30 percent.	Not suitable	Poor: more than 15 percent chert fragments; steep slopes.

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Moderate seepage potential; nearly level in places.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility; medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; nearly level to strongly sloping.	Most features favorable.
Seasonal high water table at depth of 1 to 3 feet; nearly level; subject to flooding; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; low permeability of compacted soil.	Drainage generally needed; suited to tile drains in places that have a thick surface layer.	Moderate intake rate; moderately slow to slow permeability in lower part of soil; subject to flooding; seasonal high water table at depth of 1 to 3 feet.	Not needed.
Moderate seepage potential; underlying material is excessively permeable in most places; steeper slopes limit storage potential in places.	Fair to good compaction characteristics; medium to low permeability of compacted soil; medium susceptibility to piping.	Natural drainage is adequate.	Moderate available water capacity; strongly sloping to steep; susceptible to soil blowing in places.	Not applicable if slopes are steeper; cuts expose highly erodible sandy material in places that is difficult to vegetate.
Moderate seepage potential; steeper slopes limit storage potential in places.	Fair to good compaction characteristics; medium to low shear strength; medium susceptibility to piping.	Natural drainage is adequate.	Nearly level to steep---	Not applicable on steeper slopes; irregular slopes in places.
Seasonal high water table at depth of 1 to 3 feet; steeper slopes limit storage potential in places.	Fair to poor compaction characteristics; medium to low shear strength; high to medium compressibility; high shrink-swell potential.	Additional drainage needed in seepy areas; slow to very slow permeability; moderately sloping to moderately steep.	Moderately slow intake rate; slow to very slow permeability in subsoil; moderately sloping to moderately steep; seasonal high water table at depth of 1 to 3 feet.	Short, irregular slopes in most places; not applicable on steeper slopes; cuts expose clayey material in places.
Moderate seepage potential; very permeable underlying material; seasonal high water table at depth of less than 1 foot; nearly level; potential for dugout ponds.	Fair to good compaction characteristics; medium to low shear strength; medium permeability of compacted soil; medium compressibility; medium to high susceptibility to piping in underlying material.	Drainage is needed; subject to flooding; suited to tile drains.	Moderate intake rate; seasonal high water table at depth of less than 1 foot; subject to flooding.	Not needed.
Steep slopes limit storage potential in places; shale bedrock at depth of 2 to 3 feet.	Fair to poor compaction characteristics; medium to low shear strength; high compressibility; low susceptibility to piping; shallow to shale bedrock.	Natural drainage is adequate.	Moderately slow intake rate; very slow permeability in subsoil; moderate available water capacity; moderately steep to very steep.	Steep slopes.
Moderate seepage potential; slopes limit storage potential in places; underlain by pervious material in places.	Medium shear strength; high permeability of compacted soil in places; low to medium compressibility; large chert fragments in places.	Natural drainage is adequate.	Low available water capacity; steep and very steep; stones and rock outcrops on the surface.	Cherty surface and steep slopes; not recommended.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Hamburg: 30F2	Poor: slope is more than 30 percent; subject to frost action.	Not suitable	Poor: steep slopes.
Haymond: 331	Poor: material classified ML; subject to frost action.	Not suitable	Good
Herrick: 46A, 46B	Poor: plasticity index more than 15 percent; subject to frost action.	Not suitable	Good if slope is 0 to 2 percent. Fair if slope is 2 to 4 percent: favorable surface layers are thin.
Hickory: 8C2, 8C3, 8D2, 8D3, 8E, 8F	Poor: plasticity index more than 15 percent; subject to frost action; slope is more than 30 percent in places.	Not suitable	Fair if slope is 0 to 18 percent. Poor if slope is more than 18 percent.
Huntsville: 77	Poor: subject to frost action.	Not suitable	Good
Ipava: 43A, 43B	Poor: plasticity index more than 15 percent; subject to frost action.	Not suitable	Good if slope is 0 to 2 percent. Fair if slope is 2 to 4 percent: favorable surface layers are thin.
Joy: 275	Poor: most material classified ML; somewhat poorly drained; subject to frost action.	Not suitable	Good
Keller: 470C2, 470D2	Poor: high shrink-swell potential; most material classified CH or CL.	Not suitable	Fair: favorable surface layers are thin.
Keomah: 17A, 17B, 17C2, 17C3	Poor: plasticity index more than 15 percent; moderate to high shrink-swell potential; somewhat poorly drained; subject to frost action.	Not suitable	Fair: favorable surface layers are thin.

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Slopes too steep for suitable sites; moderate to high seepage potential.	Poor compaction characteristics; medium permeability of compacted soil; high susceptibility to piping.	Natural drainage is adequate.	Not recommended on very steep slopes.	Steep slopes; no outlets.
Subject to flooding; moderate seepage potential; underlain by pervious material in places; nearly level.	Fair to poor compaction characteristics; medium to low shear strength; moderate to low permeability of compacted soil.	Natural drainage is adequate, but subject to flooding.	Moderate intake rate; subject to flooding.	Terraces not needed; diversions are needed in places to intercept runoff from higher ground.
Seasonal high water table at depth of 1 to 3 feet; nearly level; potential for dugout ponds.	Fair compaction characteristics; low permeability of compacted soil; medium to high compressibility.	Drainage generally needed on nearly level soils and in seepy spots on gently sloping soils; suited to tile drains or surface ditches.	Slow intake rate; moderately slow permeability; seasonal high water table at depth of 1 to 3 feet.	Nearly level in most places; wetness is a concern in places in terrace channels.
Steeper slopes limit storage potential in places; moderate seepage potential.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility; medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; strongly sloping to very steep.	Steep slopes in most places; the rest are generally short and irregular.
Subject to flooding; excessive seepage potential; nearly level slopes.	Fair compaction characteristics; medium to low shear strength; medium to low permeability of compacted soil; medium compressibility.	Natural drainage is adequate.	Moderate intake rate; subject to flooding.	Not needed.
Underlying material has moderate seepage potential; seasonal high water table at depth of 1 to 3 feet; potential for dugout ponds.	Fair compaction characteristics; low permeability of compacted soil; low to medium susceptibility to piping; high shrink-swell potential in subsoil.	Drainage generally needed on nearly level soils and in seepy spots on gently sloping soils; suited to tile drains or surface ditches.	Moderate intake rate; moderate to moderately slow permeability; seasonal high water table at depth of 1 to 3 feet.	Nearly level in most places; wetness is a concern in places in terrace channels.
Moderate seepage potential; seasonal high water table at depth of 1 to 3 feet; nearly level slopes.	Fair to poor compaction characteristics; medium to low shear strength; high to medium susceptibility to piping.	Drainage generally needed; suited to tile drains or surface ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet.	Not needed.
Seasonal high water table at depth of 1 to 3 feet; other features generally favorable.	Fair to good compaction characteristics; medium to low shear strength; medium to high compressibility; moderate to high shrink-swell potential.	Additional drainage needed in seepy areas; slow permeability.	Moderately slow intake rate; slow permeability; seasonal high water table at depth of 1 to 3 feet; moderately sloping to strongly sloping.	Cuts expose clayey material in places that is difficult to work and vegetate; wetness is a concern in places in terrace channels.
Seasonal high water table at depth of 1 to 3 feet; nearly level in places; potential for dugout ponds.	Fair to good compaction characteristics; medium to low shear strength; medium to high compressibility.	Drainage generally needed; suited to tile drains or open ditches.	Moderately slow intake rate; seasonal high water table at depth of 1 to 3 feet; nearly level to moderately sloping.	Nearly level in places; short, irregular slopes in many places; wetness is a concern in places in terrace channels.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Lawson: 451	Fair: somewhat poorly drained; subject to frost action; plasticity index less than 15 percent in most places.	Not suitable	Good
Limestone rock land: 94. No interpretation made; onsite determination necessary.			
Littleton: 81	Poor: somewhat poorly drained; subject to frost action; plasticity index less than 15 percent in most places.	Not suitable	Good
Mt. Carroll: 268A, 268B, 268C2	Fair: plasticity index less than 15 percent in most places; subject to frost action.	Not suitable	Good if slope is 0 to 7 percent. Fair if slope is more than 7 percent.
Muscatine: 41A, 41B	Poor: moderate to high shrink-swell potential; plasticity index more than 15 percent; subject to frost action.	Not suitable	Good
*NewGlarus: 928C2, 928D2 For Palsgrove part, see Palsgrove series.	Poor: moderate to high shrink-swell potential; limestone bedrock within depth of about 3 feet.	Not suitable	Fair: favorable surface layers are thin; lower subsoil is clayey.
Orion: 415	Fair: somewhat poorly drained; material classified ML; subject to frost action.	Not suitable	Good
Palsgrove Mapped only in a complex with NewGlarus soils.	Poor: plasticity index more than 15 percent; moderate to high shrink-swell potential; underlying material is limestone bedrock at depth of 5 feet or more in some areas.	Not suitable	Fair: favorable surface layers are thin; subsoil is firm silty clay loam.
Port Byron: 277A, 277B	Fair: most material classified ML; subject to frost action.	Not suitable	Good

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Subject to flooding; moderate seepage potential; nearly level slopes; seasonal high water table at depth of 1 to 3 feet; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; medium susceptibility to piping.	Drainage generally needed; subject to flooding; suited to tile drains or open ditches.	Moderate intake rate; subject to flooding; seasonal high water table at depth of 1 to 3 feet.	Not needed.
Moderate seepage potential; seasonal high water table at depth of 1 to 3 feet; potential for dugout ponds.	Fair to poor compaction characteristics; high to medium susceptibility to piping.	Drainage generally needed; subject to flooding in places; suited to tile drains or open ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet.	Terraces generally not needed; diversions needed to intercept runoff from higher ground.
Moderate seepage potential.	Fair compaction characteristics; low to medium permeability of compacted soil; medium compressibility.	Natural drainage is adequate.	Moderate intake rate; nearly level to strongly sloping.	Nearly level slopes in places; soil erodes easily in areas where water concentrates; level terraces can be used.
Moderate seepage potential; nearly level seasonal high water table at depth of 1 to 3 feet; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; medium compressibility.	Drainage generally needed on nearly level soils and in seepy spots on gently sloping soils; suited to tile drains or surface ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet.	Nearly level in most places; others are long and relatively uniform.
Limestone bedrock within depth of 3 feet.	Medium to low shear strength; medium to high compressibility; limestone bedrock close to surface.	Natural drainage is adequate.	Moderate intake rate; moderate available water capacity; strongly sloping and moderately steep.	Not recommended; excavation exposes limestone bedrock in places.
Moderate seepage potential; seasonal high water table at depth of 1 to 3 feet; nearly level; subject to flooding; potential for dugout ponds.	Fair to poor compaction characteristics; medium to low shear strength; medium to low permeability of compacted soil; medium compressibility; high susceptibility to piping.	Drainage generally needed; subject to flooding; suited to tile drains and open ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Not needed.
Moderate seepage potential; limestone bedrock at depth of 3 to 5 feet.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility.	Natural drainage is adequate.	Moderate intake rate; strongly sloping and moderately steep.	Cuts expose clayey material or limestone bedrock in a few places; not applicable slopes are steeper.
Moderate seepage potential; nearly level in places.	Fair compaction characteristics; low to medium permeability of compacted soil; medium compressibility.	Natural drainage is adequate.	Moderate intake rate; nearly level to moderately sloping.	Nearly level areas in places; soil erodes easily in areas where water concentrates; level terraces can be used.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Port Byron-Mt. Carroll-Urban land: 858B. No interpretations made; onsite determination necessary.			
Quarry: Q.U. No interpretations made; onsite determination necessary.			
Racoon: 109	Poor: poorly drained; plasticity index more than 15 percent in most places; subject to frost action.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Riley: 452	Poor: somewhat poorly drained; subject to frost action.	Poor: source of sand below depth of 2 feet; fair in places.	Fair: silty clay loam surface layer; sandy below depth of 2 feet.
Riverwash, sand and gravel: 123	Good: sand with some gravel; flooding hinders excavation in places.	Good: source of well-graded sand; some gravel in places.	Poor: sand and gravel.
Rozetta: 279A, 279B, 279C2, 279C3	Poor: moderate to low shrink-swell potential; material classified ML and CL; subject to frost action.	Not suitable	Fair: favorable surface layers are thin.
Rushville: 16	Poor: moderate to high shrink-swell potential in subsoil; plasticity index more than 15 percent.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Sandy alluvial land: 604	Good: low shrink-swell potential; material classified SM or SC; flooding hinders excavation in places.	Poor: fine and medium sand and some silt.	Good: slightly droughty; loose sand in places.
*Seaton: 274A, 274B, 274C2, 274D2, 274E, 274F, 931E, 931F, 937E, 937F. For Goss parts of 931E and 931F, see Goss series, and for Hickory parts of 937E and 937F, see Hickory series.	Fair if slope is 0 to 30 percent: plasticity index less than 15 percent; low shrink-swell potential; subject to frost action. Poor if slope is more than 30 percent.	Not suitable: contains a few small areas of fine sand that generally are shown by spot symbols.	Good if slope is 0 to 7 percent. Fair if slope is 7 to 18 percent. Poor if slope is more than 18 percent.
Seaton-Urban land complex: U274C. No interpretations made; onsite determination necessary.			

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Nearly level slopes; seasonal high water table at depth of less than 1 foot; potential for dugout ponds.	Fair to poor compaction characteristics; medium compressibility; medium susceptibility to piping.	Drainage is needed; slow permeability; subject to flooding in places; suited to open ditches.	Slow intake rate; seasonal high water table at depth of less than 1 foot.	Diversions are needed in places to intercept runoff from higher ground.
Very permeable underlying material; high seepage potential; seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility; medium to high permeability of compacted soil in underlying material; medium to high susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; moderate available water capacity; seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Not needed.
Sand and gravel; high seepage rate.	Sand and gravel; high permeability of compacted soil; medium to high susceptibility to piping.	Natural drainage is adequate.	Rapid intake rate; low available water capacity; subject to flooding and soil blowing.	Not needed.
Moderate seepage potential.	Fair compaction characteristics; medium to low shear strength; medium compressibility; medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; strongly sloping.	Short, irregular slopes in places.
Nearly level; seasonal high water table at depth of less than 1 foot; potential for dugout ponds.	Fair to good compaction characteristics; medium to high compressibility; moderate to high shrink-swell potential in subsoil.	Drainage is needed; slow to very slow permeability; subject to ponding; suited to open ditches.	Slow intake rate; slow to very slow permeability; seasonal high water table at depth of 1 to 3 feet; subject to ponding.	Not needed.
High seepage potential.	Fair to good compaction characteristics; medium to low shear strength; medium permeability of compacted soil.	Natural drainage is generally adequate.	Moderately rapid to rapid intake rate; moderate to low available water capacity; subject to flooding and soil blowing.	Not needed.
Moderate seepage potential; steeper slopes limit storage potential in places.	Medium to low shear strength; medium to low permeability of compacted soil; medium compressibility; medium to high susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; nearly level to very steep.	Short, irregular slopes in places; soil erodes easily in areas where water concentrates; outlets are unavailable in places; level terraces can be used.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Seaton-Urban land complex: U274D. No interpretations made; onsite determination necessary.			
Shiloh: 138	Poor: poorly drained; high shrink-swell potential; plasticity index more than 15 percent.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot; clayey.
Sparta: 88B	Good	Good: fines in places in upper 2 feet.	Poor: sand; droughty.
Starks: 132A	Poor: plasticity index usually less than 15 percent; somewhat poorly drained; subject to frost action.	Generally not suitable: sandy layers below depth of 2 feet in places.	Good
Strip mine: S.M. No interpretations made; onsite determination necessary.			
Stronghurst: 278A, 278B	Poor: plasticity index usually more than 15 percent; subject to frost action; somewhat poorly drained.	Not suitable	Good if slope is 0 to 2 percent. Fair if slope is more than 2 percent: favorable surface layers are thin.
Tama: 36A, 36B	Fair: moderate shrink-swell potential; plasticity index less than 15 percent in most places; subject to frost action.	Not suitable	Good
Tice: 284	Poor: plasticity index more than 15 percent; subject to frost action.	Not suitable	Fair: surface layer and subsoil of silty clay loam.
Timula: 271C2, 271D2, 271E2, 271F	Fair if slope is 7 to 30 percent: plasticity index less than 15 percent; subject to frost action. Poor if slope is more than 30 percent.	Not suitable	Fair if slope is 7 to 18 percent. Poor if slope is more than 18 percent.
Titus: 404	Poor: poorly drained; material classified CH; high shrink-swell potential.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot; clayey.

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Nearly level slopes; seasonal high water table at depth of less than 1 foot; subject to flooding; potential for dugout ponds.	Fair to poor compaction characteristics; high compressibility; high shrink-swell potential; low susceptibility to piping.	Drainage is needed; slow to moderately slow permeability; subject to flooding; suited to tile drains or open ditches.	Slow to moderate intake rate; seasonal high water table at depth of less than 1 foot; subject to flooding.	Not needed.
Very high seepage potential.	Good compaction characteristics; medium to high permeability of compacted soil; medium to high susceptibility to piping.	Natural drainage is adequate.	Moderately rapid intake rate; low available water capacity; subject to soil blowing.	Not needed; sandy; moderately rapid permeability.
Seepage potential through underlying material; nearly level; water table at depth of 1 to 3 feet.	Fair compaction characteristics; medium to low shear strength; medium compressibility; medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; moderate to moderately slow permeability; seasonal high water table at depth of 1 to 3 feet.	Generally not needed; diversions are needed in places to intercept runoff from higher ground.
Seepage potential through underlying material; seasonal high water table at depth of 1 to 3 feet.	Fair compaction characteristics; medium to low shear strength; medium compressibility; medium susceptibility to piping.	Drainage generally needed on nearly level soils and in seepy spots on gently sloping soils; suited to tile drains or surface ditches.	Moderate intake rate; moderate to moderately slow permeability; seasonal high water table at depth of 1 to 3 feet.	Nearly level slopes in places; irregular slopes in places; seepy areas in places.
Moderate seepage potential; nearly level in places.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility.	Natural drainage is adequate.	Moderate intake rate; nearly level to moderately sloping.	All features generally favorable.
Moderate seepage potential; subject to flooding; nearly level; seasonal high water table at depth of 1 to 3 feet.	Fair to good compaction characteristics; medium to low shear strength; medium compressibility; low to medium susceptibility to piping.	Drainage generally needed; subject to flooding; suited to tile drains and open ditches.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Not needed.
Moderate to high seepage potential; steep slopes limit storage potential in places.	Fair to poor compaction characteristics; medium to low shear strength; medium to low permeability of compacted soil; high susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate; strongly sloping to very steep.	Not applicable; slopes are steeper; soil erodes easily in areas where water concentrates; outlets are unavailable in places; level terraces can be used.
Nearly level; seasonal high water table at depth of less than 1 foot; subject to flooding; potential for dugout ponds.	Fair compaction characteristics; medium to low shear strength; high to medium compressibility.	Drainage is needed; slow permeability; subject to flooding; suited to open ditches; suited to tile drains if under good management.	Slow intake rate; seasonal high water table at depth of less than 1 foot; subject to flooding.	Not needed.

TABLE 11.—*Interpretations of engineering*

Soil series and map symbols	Suitability as a source of—		
	Road fill	Sand	Topsoil
Ursa: 605D2, 605D3, 605E2, 605E3, 605F2	Poor: moderate to high shrink-swell potential; material classified CH and CL.	Not suitable	Fair if slope is 7 to 18 percent: favorable surface layers are thin. Poor if slope is more than 18 percent: severely eroded soils; clayey subsoils.
Virden: 50	Poor: poorly drained; plasticity index more than 15 percent.	Not suitable	Poor: seasonal high water table at depth of less than 1 foot.
Wakeland: 333	Poor: plasticity index more than 15 percent in most places; subject to frost action; somewhat poorly drained.	Not suitable	Good
Worthen: 37A, 37B	Fair: most material classified ML; subject to frost action.	Not suitable	Good

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

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

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

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

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

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

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

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

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

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

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

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

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

Cemented.—Hard and brittle; little affected by moistening.

Depth, soil. The thickness of soil over a specified layer, generally one that restricts the growth of roots. Classes used in this survey are as follows: *deep*—36 inches or more; *moderately deep*—20 to 36 inches; *shallow*—10 to 20 inches; and *very shallow*—less than 10 inches.

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

Excessively drained soils are commonly very porous and rapidly permeable and have a low available water capacity.

Somewhat excessively drained soils are also very permeable

properties of the soils—Continued

Soil features affecting—				
Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Steeper slopes limit storage potential in places; all other features favorable.	Fair compaction characteristics; medium to low shear strength; medium to high compressibility.	Natural drainage generally adequate; hillside seeps in places.	Moderately slow intake rate; strongly sloping to steep.	Exposed subsoil somewhat clayey and difficult to vegetate; not applicable on steeper slopes.
Nearly level; seasonal high water table at depth of less than 1 foot; potential for dugout ponds.	Poor compaction characteristics; low permeability of compacted soil; medium to high compressibility; moderate to high shrink-swell potential in subsoil.	Drainage is needed; moderately slow permeability; suited to open ditches; suited to tile drains if under good management.	Moderately slow intake rate; seasonal high water table at depth of less than 1 foot; subject to ponding.	Not needed.
Moderate seepage potential; seasonal high water table at depth of 1 to 3 feet; subject to flooding; nearly level; potential for dugout ponds.	Fair to poor compaction characteristics; medium to low shear strength; medium compressibility; medium to low permeability of compacted soil; high susceptibility to piping.	Drainage generally needed; subject to flooding; suited to open ditches and tile drains.	Moderate intake rate; seasonal high water table at depth of 1 to 3 feet; subject to flooding.	Not needed.
Hazard of excessive seepage; nearly level in most places.	Fair compaction characteristics; medium to low shear strength; medium compressibility; high to medium susceptibility to piping.	Natural drainage is adequate.	Moderate intake rate	Nearly level areas in most places; other features generally favorable; level terraces can be used.

and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time.

Erosion. The wearing away of the land surface by wind (sandblast), 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 light, moisture, temperature, and the physical condition of the soil are favorable.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

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

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

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

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

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

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

Mottling, soil. Irregularly marked with spots of different colors

TABLE 12.—*Classification of soil series*

Soil series	Family	Subgroup	Order
Atlas	Fine, montmorillonitic, mesic	Aeric Ochraqualfs	Alfisols.
Atterberry	Fine-silty, mixed, mesic	Udollic Ochraqualfs	Alfisols.
Baylis	Fine-silty, mixed, mesic	Typic Paleudalfs	Alfisols.
Beaucoup	Fine-silty, mixed, mesic	Fluvaquentic (Typic) Haplaquolls.	Mollisols.
Birds	Fine-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Blackoar	Fine-silty, mixed, mesic	Fluvaquentic Haplaquolls	Mollisols.
Blair	Fine-loamy, mixed, mesic	Aquic Hapludalfs	Alfisols.
Camden[1]	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Clarksdale	Fine, montmorillonitic, mesic	Udollic Ochraqualfs	Alfisols.
Clinton	Fine, montmorillonitic, mesic	Typic Hapludalfs	Alfisols.
Coatsburg	Fine, montmorillonitic, mesic, sloping	Typic Argiaquolls	Mollisols.
Cowden	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Darwin	Fine, montmorillonitic, mesic	Vertic Haplaquolls	Mollisols.
Dickinson	Coarse-loamy, mixed, mesic	Typic Hapludolls	Mollisols.
Downs	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Dupo	Coarse-silty over clayey, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.
El Dara	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Fayette	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Fishhook	Fine, montmorillonitic, mesic	Aquic Hapludalfs	Alfisols.
Gorham	Fine-silty, mixed, mesic	Fluvaquentic Haplaquolls	Mollisols.
Gosport	Fine, illitic, mesic	Typic Dystrochrepts	Inceptisols.
Goss	Clayey-skeletal, mixed, mesic	Typic Paleudalfs	Alfisols.
Hamburg	Coarse-silty, mixed (calcareous), mesic	Typic Udorthents	Entisols.
Haymond	Coarse-silty, mixed, nonacid, mesic	Typic Udifluvents	Entisols.
Herrick	Fine, montmorillonitic, mesic	Aquic Argiudolls	Mollisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Huntsville	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Ipava	Fine, montmorillonitic, mesic	Aquic Argiudolls	Mollisols.
Joy	Fine-silty, mixed, mesic	Aquic Hapludolls	Mollisols.
Keller	Fine, montmorillonitic, mesic	Aquic Argiudolls	Mollisols.
Keomah	Fine, montmorillonitic, mesic	Aeric Ochraqualfs	Alfisols.
Lawson	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Littleton	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Mt. Carroll	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Muscatine	Fine-silty, mixed, mesic	Aquic Argiudolls	Mollisols.
NewGlarus	Fine-silty over clayey, mixed, mesic	Typic Hapludalfs	Alfisols.
Orion	Coarse-silty, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.
Palsgrove	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Port Byron	Fine-silty, mixed, mesic	Typic Hapludolls	Mollisols.
Racoon	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Riley	Fine-loamy over sandy or sandy-skeletal, mixed, mesic.	Fluvaquentic Hapludolls	Mollisols.
Rozetta	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Rushville	Fine-montmorillonitic, mesic	Typic Albaqualfs	Alfisols.
Seaton	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Shiloh	Fine, montmorillonitic, mesic	Cumulic Haplaquolls	Mollisols.
Sparta[1]	Sandy, mixed, mesic	Entic Hapludolls	Mollisols.
Starks	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Stronghurst	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Tama	Fine-silty, mixed, mesic	Typic Argiudolls	Mollisols.
Tice	Fine-silty, mixed, mesic	Fluvaquentic Hapludolls	Mollisols.
Timula	Coarse-silty, mixed, mesic	Typic Eutrochrepts	Inceptisols.
Titus	Fine, montmorillonitic, mesic	Fluvaquentic Haplaquolls	Mollisols.
Ursa	Fine, montmorillonitic, mesic	Typic Hapludalfs	Alfisols.
Virden	Fine, montmorillonitic, mesic	Typic Argiaquolls	Mollisols.
Wakeland	Coarse-silty, mixed, mesic	Aeric Fluvaquents	Entisols.
Worthen	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.

[1] Camden and Sparta soils are taxadjuncts to the series. Camden soils are too silty in the lower B horizon, and Sparta soils have a sandy loam band in the lower B horizon and upper C horizon that is too thick for the series.

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 notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Organic matter. A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition. The ratings used in this survey have the following limits: *low*—below 2 percent, by volume; *moderate*—2 to 4 percent; and *high*—more than 4 percent. These percentages apply to all of the surface layer for soils that have no subsurface layer and to the upper 10 inches for soils that have a subsurface layer.

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

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

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

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 the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

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

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are 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.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

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

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

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

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read the description of the mapping unit and the description of the soil series to which the mapping unit belongs. In referring to a capability unit, first read the section "Capability Grouping" on page 67. Other information is given in tables as follows:

Acreage and extent, table 3, page 11.
Predicted yields, table 4, page 78.
Woodland, table 5, page 82.
Wildlife, table 6, page 92.
Recreation, table 7, page 94.
Engineering uses of the soils, tables 8, 9, 10, and 11, pages 98 through 141.

Map symbol	Mapping unit	Page	Capability unit		Woodland group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
5D2	Blair silt loam, 7 to 12 percent slopes, eroded	18	IIIe-13	72	3o1	5	4
5D3	Blair soils, 7 to 12 percent slopes, severely eroded	19	IVe-13	75	3o1	5	4
5E3	Blair soils, 12 to 18 percent slopes, severely eroded	19	VIe-7	76	3r2	2	3
6C2	Fishhook silt loam, 4 to 7 percent slopes, eroded	32	IIIe-7	72	3o1	5	4
6C3	Fishhook soils, 4 to 7 percent slopes, severely eroded	32	IVe-7	74	3o1	5	4
6D2	Fishhook silt loam, 7 to 12 percent slopes, eroded	32	IVe-7	74	3o1	5	4
6D3	Fishhook soils, 7 to 12 percent slopes, severely eroded	32	VIe-7	76	3o1	5	4
6E2	Fishhook silt loam, 12 to 18 percent slopes, eroded	32	VIe-7	76	3r2	2	3
7D	Atlas silt loam, 7 to 12 percent slopes	13	IVe-7	74	3o1	5	4
7D3	Atlas soils, 7 to 12 percent slopes, severely eroded	13	VIe-7	76	3o1	5	4
7E2	Atlas silt loam, 12 to 18 percent slopes, eroded	14	VIe-7	76	3r2	2	3
7E3	Atlas soils, 12 to 18 percent slopes, severely eroded	14	VIIe-3	77	3r2	2	3
8C2	Hickory loam, 7 to 12 percent slopes, eroded	38	IIIe-1	71	1o1	1	2
8C3	Hickory soils, 7 to 12 percent slopes, severely eroded	38	IVe-1	73	1o1	1	2
8D2	Hickory loam, 12 to 18 percent slopes, eroded	39	IVe-1	73	1r2	2	3
8D3	Hickory soils, 12 to 18 percent slopes, severely eroded	39	VIe-1	75	1r2	2	3
8E	Hickory loam, 18 to 30 percent slopes	39	VIe-1	75	1r2	3	3
8F	Hickory loam, 30 to 50 percent slopes	39	VIIe-1	76	1r3	3	3
16	Rushville silt loam	54	IIIw-1	72	3w2	7	5
17A	Keomah silt loam, 0 to 2 percent slopes	43	IIw-13	71	2o1	4	4
17B	Keomah silt loam, 2 to 4 percent slopes	43	IIe-13	70	2o1	5	4
17C2	Keomah silt loam, 4 to 7 percent slopes, eroded	43	IIe-13	70	2o1	5	4
17C3	Keomah soils, 4 to 7 percent slopes, severely eroded	43	IIIe-13	72	2o1	5	4
18B2	Clinton silt loam, 2 to 7 percent slopes, eroded	22	IIe-1	68	1o1	1	1
18B3	Clinton soils, 4 to 7 percent slopes, severely eroded	22	IIIe-1	71	1o1	1	1
18C2	Clinton silt loam, 7 to 12 percent slopes, eroded	22	IIIe-1	71	1o1	1	2
18C3	Clinton soils, 7 to 12 percent slopes, severely eroded	23	IVe-1	73	1o1	1	2
30F2	Hamburg silt loam, 30 to 50 percent slopes, eroded	36	VIIe-1	76	5r3	3	3
36A	Tama silt loam, 0 to 2 percent slopes	60	I-1	67	2o1	1	1
36B	Tama silt loam, 2 to 6 percent slopes	61	IIe-14	70	2o1	1	1
37A	Worthen silt loam, 0 to 2 percent slopes	66	I-1	67	2o1	1	1
37B	Worthen silt loam, 2 to 6 percent slopes	66	IIe-14	70	2o1	1	1
41A	Muscatine silt loam, 0 to 2 percent slopes	47	I-5	68	2o1	4	4
41B	Muscatine silt loam, 2 to 4 percent slopes	47	IIe-5	69	2o1	5	4
43A	Ipava silt loam, 0 to 2 percent slopes	41	I-5	68	2o1	4	4
43B	Ipava silt loam, 2 to 4 percent slopes	41	IIe-5	69	2o1	5	4
46A	Herrick silt loam, 0 to 2 percent slopes	37	I-7	68	2o1	4	4
46B	Herrick silt loam, 2 to 4 percent slopes	38	IIe-13	70	2o1	5	4
50	Virden silt loam	65	IIw-1	70	3w2	7	5
61A	Atterberry silt loam, 0 to 2 percent slopes	14	I-5	68	3o1	4	4
61B	Atterberry silt loam, 2 to 6 percent slopes	15	IIe-5	69	3o1	5	4

Map symbol	Mapping unit	Page	Capability unit		Woodland group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
70	Beaucoup silty clay loam	16	IIw-2	70	2w5	7	5
W70	Beaucoup silty clay loam, wet	16	Vw	75	2w5	7	5
70+	Beaucoup silt loam, overwash	16	IIw-2	70	2w5	7	5
71	Darwin silty clay	26	IIIw-2	73	3w6	7	5
77	Huntsville silt loam	40	I-3	68	1o4	1	6
81	Littleton silt loam	45	I-5	68	2o1	4	4
87B	Dickinson sandy loam, 0 to 4 percent slopes	27	IIIs-3	73	3s2	1	1
88B	Sparta loamy sand, 0 to 4 percent slopes	58	IVs-1	75	4s2	8	2
94	Limestone rock land	44	VIIs-2	77	5d3	8	3
109	Racoon silt loam	52	IIIw-1	72	3w2	7	5
112	Cowden silt loam	25	IIw-3	70	3w2	7	5
123	Riverwash, sand and gravel	52	VIIs-3	77	4s2	8	5
132A	Starks silt loam, 0 to 3 percent slopes	59	IIw-13	71	2o1	4	4
134A	Camden silt loam, 0 to 2 percent slopes	20	I-1	67	1o1	1	1
134B	Camden silt loam, 2 to 7 percent slopes	20	IIe-1	68	1o1	1	1
134C2	Camden silt loam, 7 to 12 percent slopes, eroded	20	IIIe-1	71	1o1	1	2
134C3	Camden soils, 7 to 12 percent slopes, severely eroded	20	IVe-1	73	1o1	1	2
134D2	Camden silt loam, 12 to 18 percent slopes, eroded	20	IVe-1	73	1r2	2	3
134D3	Camden soils, 12 to 18 percent slopes, severely eroded	20	VIe-1	75	1r2	2	3
134E	Camden silt loam, 18 to 30 percent slopes	20	VIe-1	75	1r2	3	3
134F	Camden silt loam, 30 to 50 percent slopes	20	VIIe-1	76	1r3	3	3
138	Shiloh silty clay	57	IIw-1	70	2w5	7	5
162	Gorham silty clay loam	33	IIw-2	70	2w5	7	5
180	Dupo silt loam	28	IIw-4	71	2o4	6	6
257A	Clarksdale silt loam, 0 to 2 percent slopes	21	I-7	68	2o1	4	4
257B	Clarksdale silt loam, 2 to 4 percent slopes	21	IIe-13	70	2o1	5	4
257C2	Clarksdale silt loam, 4 to 7 percent slopes, eroded	21	IIe-13	70	2o1	5	4
264C	El Dara sandy loam, 7 to 12 percent slopes	29	IIIe-6	72	3o1	1	2
264C3	El Dara soils, 7 to 12 percent slopes, severely eroded	29	IVe-6	74	3o1	1	2
264D	El Dara sandy loam, 12 to 18 percent slopes	29	IVe-6	74	3r2	2	3
264D3	El Dara soils, 12 to 18 percent slopes, severely eroded	29	VIe-6	76	3r2	2	3
264E2	El Dara sandy loam, 18 to 30 percent slopes, eroded	29	VIe-6	76	3r2	3	3
264F	El Dara soils, 30 to 50 percent slopes	30	VIIe-1	76	3r3	3	3
268A	Mt. Carroll silt loam, 0 to 2 percent slopes	46	I-1	67	1o1	1	1
268B	Mt. Carroll silt loam, 2 to 7 percent slopes	46	IIe-14	70	1o1	1	1
268C2	Mt. Carroll silt loam, 7 to 12 percent slopes, eroded	46	IIIe-14	72	1o1	1	2
271C2	Timula silt loam, 7 to 12 percent slopes, eroded	62	IIIe-1	71	3o1	1	2
271D2	Timula silt loam, 12 to 18 percent slopes, eroded	62	IVe-1	73	3r2	2	3
271E2	Timula silt loam, 18 to 30 percent slopes, eroded	62	VIe-1	75	3r2	3	3
271F	Timula silt loam, 30 to 50 percent slopes	62	VIIe-1	76	3r3	3	3
274A	Seaton silt loam, 0 to 2 percent slopes	55	I-1	67	2o1	1	1
274B	Seaton silt loam, 2 to 7 percent slopes	55	IIe-1	68	2o1	1	1
274C2	Seaton silt loam, 7 to 12 percent slopes, eroded	55	IIIe-1	71	2o1	1	2
274D2	Seaton silt loam, 12 to 18 percent slopes, eroded	56	IVe-1	73	2r2	2	3
274E	Seaton silt loam, 18 to 30 percent slopes	56	VIe-1	75	2r2	3	3
274F	Seaton silt loam, 30 to 50 percent slopes	56	VIIe-1	76	2r3	3	3
275	Joy silt loam	41	I-5	68	2o1	4	4
277A	Port Byron silt loam, 0 to 2 percent slopes	50	I-1	67	3o1	1	1
277B	Port Byron silt loam, 2 to 6 percent slopes	51	IIe-14	70	3o1	1	1
278A	Stronghurst silt loam, 0 to 2 percent slopes	60	IIw-13	71	3o1	4	4
278B	Stronghurst silt loam, 2 to 6 percent slopes	60	IIe-13	70	3o1	5	4
279A	Rozetta silt loam, 0 to 2 percent slopes	53	I-1	67	2o1	1	1
279B	Rozetta silt loam, 2 to 7 percent slopes	53	IIe-1	68	2o1	1	1
279C2	Rozetta silt loam, 7 to 12 percent slopes, eroded	53	IIIe-1	71	2o1	1	2

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Page	Capability unit		Woodland group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
279C3	Rozetta soils, 7 to 12 percent slopes, severely eroded	54	IVe-1	73	2o1	1	2
280B	Fayette silt loam, 2 to 7 percent slopes	30	IIe-1	68	2o1	1	1
280C2	Fayette silt loam, 7 to 12 percent slopes, eroded	30	IIIe-1	71	2o1	1	2
280C3	Fayette soils, 7 to 12 percent slopes, severely eroded	30	IVe-1	73	2o1	1	2
280D2	Fayette silt loam, 12 to 18 percent slopes, eroded	31	IVe-1	73	2r2	2	3
280D3	Fayette soils, 12 to 18 percent slopes, severely eroded	31	VIe-1	75	2r2	2	3
284	Tice silty clay loam	61	I-6	68	2o4	6	6
331	Haymond silt loam	36	I-3	68	1o4	1	6
333	Wakeland silt loam	66	IIw-4	71	2o4	6	6
334	Birds silt loam	17	IIIw-4	73	2w5	7	5
386A	Downs silt loam, 0 to 2 percent slopes	27	I-1	67	2o1	1	1
386B	Downs silt loam, 2 to 7 percent slopes	27	IIe-14	70	2o1	1	1
386C2	Downs silt loam, 7 to 12 percent slopes, eroded	28	IIIe-14	72	2o1	1	2
404	Titus silty clay	63	IIIw-2	73	2w5	7	5
415	Orion silt loam	49	I-6	68	2o4	6	6
451	Lawson silt loam	44	I-6	68	2o4	6	6
452	Riley silty clay loam	52	IIw-6	71	2o4	6	6
470C2	Keller silt loam, 4 to 7 percent slopes, eroded	42	IIe-10	69	3o1	5	4
470D2	Keller silt loam, 7 to 12 percent slopes, eroded	42	IIIe-7	72	3o1	5	4
472C2	Baylis silt loam, 7 to 12 percent slopes, eroded	15	IVe-1	73	3o1	1	2
472C3	Baylis soils, 7 to 12 percent slopes, severely eroded	15	VIe-2	75	3o1	1	2
472D2	Baylis silt loam, 12 to 18 percent slopes, eroded	16	VIe-2	75	3r2	2	3
472D3	Baylis soils, 12 to 18 percent slopes, severely eroded	16	VIIe-2	76	3r2	2	3
551E2	Gosport silt loam, 12 to 18 percent slopes, eroded	34	VIe-2	75	3r2	2	3
551E3	Gosport soils, 12 to 18 percent slopes, severely eroded	34	VIIe-2	76	3r2	2	3
551F2	Gosport silt loam, 18 to 50 percent slopes, eroded	34	VIIe-2	76	3r2	3	3
603	Blackoar silt loam	18	IIw-2	70	3w6	7	5
604	Sandy alluvial land	54	IIIs-3	73	3s2	8	5
605D2	Ursa silt loam, 7 to 12 percent slopes, eroded	64	IVe-7	74	3o1	1	2
605D3	Ursa soils, 7 to 12 percent slopes, severely eroded	64	VIe-7	76	3o1	1	2
605E2	Ursa silt loam, 12 to 18 percent slopes, eroded	64	VIe-7	76	3r2	2	3
605E3	Ursa soils, 12 to 18 percent slopes, severely eroded	64	VIIe-3	77	3r2	2	3
605F2	Ursa silt loam, 18 to 30 percent slopes, eroded	64	VIIe-3	77	3r2	3	3
606F	Goss cherty silt loam, 15 to 50 percent slopes	35	VIIs-2	77	4f3	8	3
660C2	Coatsburg silt loam, 4 to 7 percent slopes, eroded	24	IIIe-7	72	3o1	5	4
660D2	Coatsburg silt loam, 7 to 12 percent slopes, eroded	24	IVe-7	74	3o1	5	4
858B	Port Byron-Mt. Carroll-Urban land complex, 1 to 6 percent slopes	51	------	--	---	--	--
928C2	NewGlarus-Palsgrove silt loams, 7 to 12 percent slopes, eroded	48	IVe-1	73	3o1	1	2
928D2	NewGlarus-Palsgrove silt loams, 12 to 18 percent slopes, eroded	48	VIe-2	75	3r2	2	3
931E	Seaton-Goss complex, 18 to 30 percent slopes	56	VIe-1	75	2r2	3	3
931F	Seaton-Goss complex, 30 to 50 percent slopes	56	VIIe-1	76	2r3	3	3
932C2	Clinton-El Dara complex, 7 to 12 percent slopes, eroded	23	IIIe-1	71	1o1	1	2
932C3	Clinton-El Dara complex, 7 to 12 percent slopes, severely eroded	23	IVe-1	73	1o1	1	2
932D3	Clinton-El Dara complex, 12 to 18 percent slopes, severely eroded	23	VIe-1	75	1r2	2	3
936D2	Fayette-Hickory complex, 12 to 18 percent slopes, eroded	31	IVe-1	73	2r2	2	3

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Page	Capability unit		Woodland group	Wildlife group	Recreation group
			Symbol	Page	Symbol	Number	Number
936D3	Fayette-Hickory complex, 12 to 25 percent slopes, severely eroded	31	VIe-1	75	2r2	2	3
937E	Seaton-Hickory complex, 18 to 30 percent slopes	56	VIe-1	75	2r2	3	3
937F	Seaton-Hickory complex, 30 to 50 percent slopes	56	VIIe-1	76	2r3	3	3
U274C	Seaton-Urban land complex, 1 to 7 percent slopes	56	------	--	---	--	--
U274D	Seaton-Urban land complex, 7 to 15 percent slopes	57	------	--	---	--	--
B.P.	Borrow pits	19	------	--	---	--	--
C.F.	Cut and fill land	25	------	--	---	--	--
Q.U.	Quarry	51	------	--	---	--	--
S.M.	Strip mine	59	------	--	---	--	--

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