SOIL SURVEY OF

Clark 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 1966–73. 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 Clark County Soil and Water Conservation District.

 This soil survey is Illinois Agricultural Experiment Station Report No. 103.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms 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 of the soils of Clark 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 woodland suitability 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 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 that have a moderate limitation can be colored yellow, and those that have 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 "Use and Management of Soils for Crops" and "Use of Soils for Woodland."

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

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife Habitat."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and for recreation areas in the sections "Engineering Uses of the Soils" and "Use of the Soils for Recreational Development."

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 Clark 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 in the section "Environmental Features Affecting Soil Use."

Cover: Broad, flat plain of soil association 2 showing dark areas of Newberry soils and lighter areas of Cisne soils. About 90 percent of Clark County is farmland.

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SOIL SURVEY OF CLARK COUNTY, ILLINOIS

BY F. L. AWALT, SOIL CONSERVATION SERVICE

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

CLARK COUNTY is in eastern Illinois (fig. 1). It is bounded on the east by the state of Indiana.

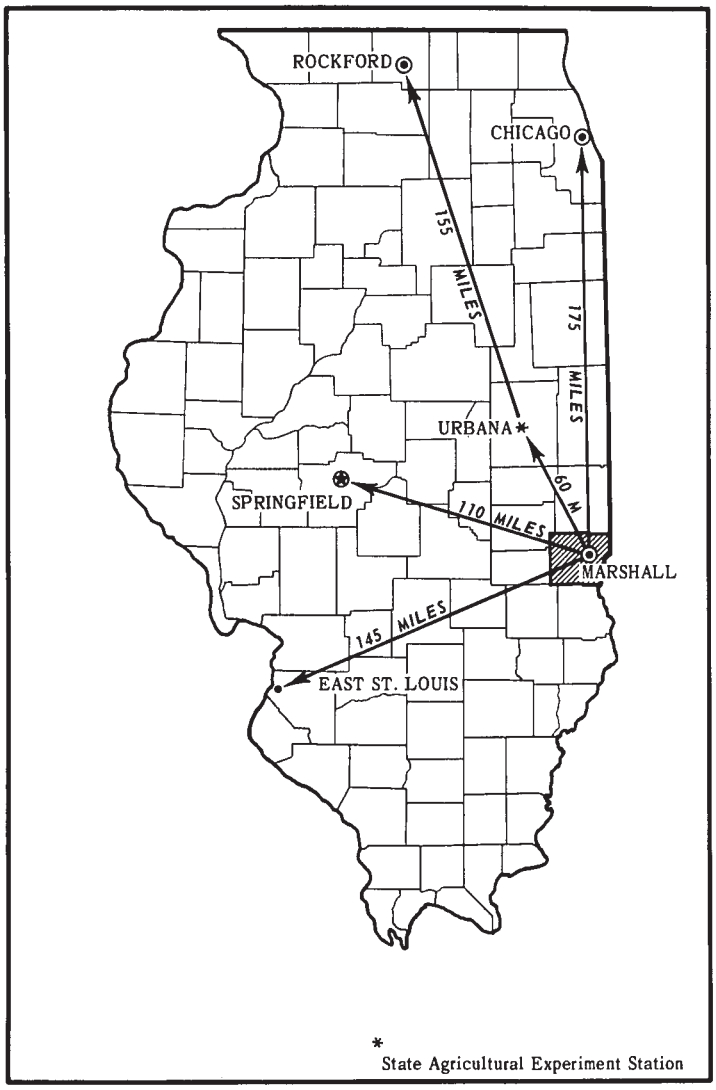

Figure 1.—Location of Clark County in Illinois.

It has an area of about 323,200 acres and a population (1970) of 16,216. The rural population (1970) was 8,380 (*19*)[1], and the population of Marshall, the county seat, was 3,468.

About 90 percent of Clark County is farmland. About 212,891 acres of this farmland is used for crops, 39,923 acres is used for woodland, and 38,638 acres is used for pasture. Cash-grain and general farming are the main types of enterprises in the county. Hogs and beef cattle are the main livestock enterprises (*20*).

Most of the soils of the county are on uplands. They consist mainly of a loess-covered glacial till plain that is dissected by streams. In areas of steeper soils near streams the material is mainly glacial till. The morainic area in the northwestern part of the county is more rolling than the till plain. Bottom lands are widespread along all streams of any size.

All the streams of the survey area drain into the Wabash River. The western part of the county drains into North Fork Embarras River, and the central part drains into Mill Creek. The eastern part of the county drains into Big Creek, Clear Creek, Crooked Creek, and others.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Clark 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 nature 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 dis-

[1] Italic numbers in parentheses refer to Literature Cited, p. 101.

tant. 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. Wynoose and Ava, 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 layer 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 affects management. For example, Bluford silt loam, 0 to 2 percent slopes, is one of several phases in the Bluford series.

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

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

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

A soil complex consists of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two dominant soils, and the pattern and relative proportions are about the same in all areas. Generally the name of a soil complex consists of the names of the dominant soils joined by a hyphen. Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded, is a complex in Clark County.

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

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

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

General Soil Map

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

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

The names of some soil associations are unlike those appearing on recently published surveys in adjacent counties. This is because of a change in concept of soil series in the application of the soil classification system and because of varying percentages of the major soils in different soil associations.

The soil associations in this survey area have been grouped in five general kinds of landscapes for broad interpretive purposes. Each of the broad groups and the soil associations in it are described in the following paragraphs.

Nearly Level to Strongly Sloping Soils that Formed in Thin Loess and Glacial Till on Glacial Moraine Uplands

This area consists of one soil association on the glacial moraine uplands around Westfield. It is

characterized by hills, mounds, and long slopes, and by short, steep slopes where bottom land interfingers into the moraine.

1. Miami-Xenia-Drummer association

Nearly level to strongly sloping, well drained, moderately well drained, and poorly drained soils that have moderately slow to moderate permeability

This association consists of nearly level to strongly sloping soils on uplands (fig. 2). Slopes are rounded and long for the most part, but in places areas of steep soils have short slopes. The northwestern part of the association is less sloping. Drainageways are broad and U-shaped in cross section. This is the highest area of the county.

The association occupies about 2 percent of the county. It is about 38 percent Miami soils, 26 percent Xenia soils, 20 percent Drummer soils, and 16 percent less extensive soils.

Miami soils are on sides of drainageways and on hillsides. They are gently sloping to strongly sloping and are well drained. The surface layer typically is very dark grayish-brown and brown silt loam about 7 inches thick. The subsoil is silty clay loam in the upper 5 inches and clay loam to a depth of 48 inches. The underlying material is calcareous clay loam till.

Xenia soils are on mounds and hilltops. They are gently sloping to moderately sloping and are moderately well drained. The surface layer typically is dark grayish-brown silt loam about 9 inches thick. The subsoil is about 43 inches thick. The upper part is silty clay loam, and the lower part is clay loam. The underlying material is calcareous clay loam till.

Drummer soils are in the bottom of drainageways and in the broader areas in the northwestern part of the association. They are nearly level and are poorly drained. The surface layer typically is silty clay loam about 20 inches thick. The upper part is black, and the lower part is dark gray. The subsoil is silty clay loam about 29 inches thick. The underlying material is stratified clay loam and loam.

Less extensive in this association are Millbrook, Brenton, and Starks soils. The nearly level to gently sloping Millbrook and Starks soils are somewhat poorly drained and are scattered throughout the association. The nearly level to gently sloping, somewhat poorly drained Brenton soils are in the broader areas along with Drummer soils.

The soils of this association are well suited to corn,

Figure 2.—Typical landscape in association 1. Gently sloping Xenia soils are in foreground, and moderately sloping to strongly sloping Miami soils are in background.

soybeans, small grain, and hay. Available water capacity is high in most of the soils and very high in Drummer soils. The main concerns of management are controlling water erosion, improving drainage, and maintaining tilth and fertility.

Most of this association is used for cultivated crops. Areas of more sloping and steep soils are used for pasture or woodland. The main enterprise is growing cash crops, but feeding of cattle and hogs is also a source of income. The soils have high potential for all cultivated crops grown in the county.

Nearly Level to Steep Soils that Formed in Loess and Glacial Drift on the Dissected Till Plain

This area consists of two soil associations on the till plain uplands. It is characterized by a broad, flat plain that has occasional low mounds or bumps on the surface. Steep-sided drainageways cut into the area from larger streams. Shallow depressions are scattered throughout.

2. *Cisne-Ebbert-Hoyleton association*

Nearly level to moderately sloping, very poorly drained to somewhat poorly drained soils that have very slow and slow permeability

This association consists of a flat, loess-covered till plain that has occasional very low mounds (fig. 3). Low-lying wet areas are scattered throughout. Drainageways that cut into the association are shallow and V-shaped. Ditches have been dug to provide drainage for low-lying areas.

The association occupies about 13 percent of the county. It is about 68 percent Cisne soils, 13 percent Ebbert soils, 12 percent Hoyleton soils, and 7 percent less extensive soils.

Cisne soils are in flat areas. They are nearly level and are poorly drained. The surface layer typically is grayish-brown silt loam about 9 inches thick. The subsurface layer is silt loam about 9 inches thick. It is grayish brown in the upper part and light brownish gray in the lower part. The subsoil is about 38 inches thick. The upper part is heavy silty clay loam, and the lower part is silty clay loam. The underlying material is silty clay loam.

Ebbert soils are in shallow depressions. They are nearly level and are very poorly drained and poorly drained. The surface layer typically is very dark gray silt loam about 11 inches thick. The subsurface layer

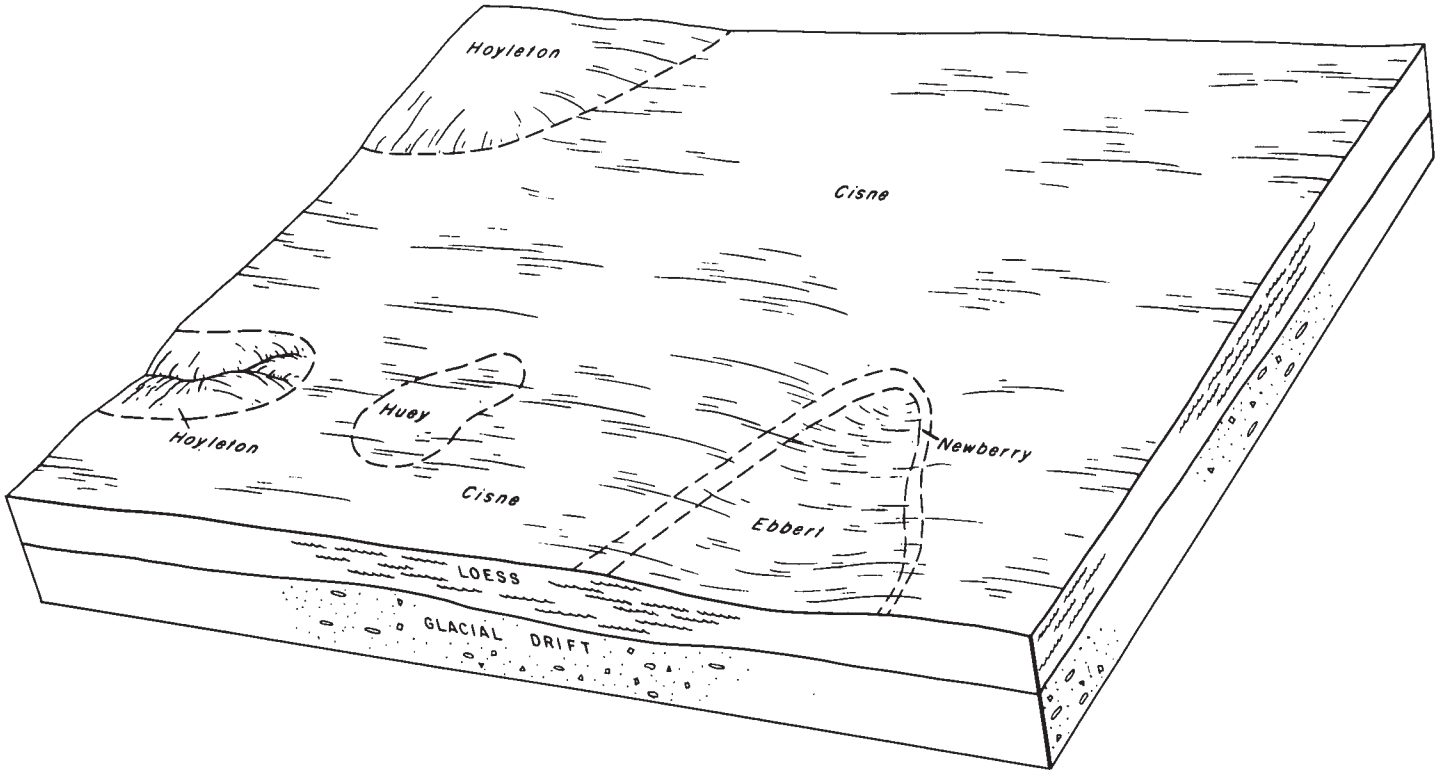

Figure 3.—Relationship of soils to topography and underlying material in the Cisne-Ebbert-Hoyleton soil association.

is dark-gray silt loam about 6 inches thick. The soil is silty clay loam about 39 inches thick. The underlying material is silty clay loam that contains noticeable amounts of sand.

Hoyleton soils are in low moundlike areas and on sides of drainageways. They are nearly level to moderately sloping and are somewhat poorly drained. The surface layer typically is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is pale-brown silt loam about 10 inches thick. The subsoil is about 41 inches thick. The upper 32 inches is silty clay loam, and the lower 9 inches is silt loam. The underlying material is silt loam that contains noticeable amounts of sand.

Less extensive in this association are Newberry and Huey soils. The nearly level, poorly drained Newberry soils generally are between the low-lying Ebbert soils and the Cisne soils. The nearly level, poorly drained Huey soils are in slick spots throughout the association. They contain large amounts of sodium.

The soils of this association are well suited to corn, soybeans, small grain, and hay. The high content of sodium limits crop growth in the Huey soils. Areas generally are small and are managed along with surrounding soils. Cultivated crops respond well to management. The main concerns of management are improving drainage and maintaining tilth and fertility. Erosion control is a concern on sloping soils.

Most of this association is used for cultivated crops and some pasture. The main enterprises are general farming and growing cash crops. Livestock enterprises generally are of the confined type or feeder operations.

3. Bluford-Hickory-Wynoose association

Nearly level to gently sloping, somewhat poorly drained and poorly drained soils that have slow and very slow permeability, and strongly sloping to very steep, well drained and moderately well drained soils that have moderate permeability

This association consists of a flat, loess-covered till plain that has drainageways interfingering from narrow bottom land. Soils in areas between the steeper slopes and next to the drainageways and flats have very gentle slopes (fig. 4). Areas of narrow, flat bottom land along drainageways are in this association.

The association occupies about 16 percent of the county. It is about 31 percent Bluford soils, 26 percent Hickory soils, 17 percent Wynoose soils, and 26 percent less extensive soils.

Bluford soils are nearly level to gently sloping and are somewhat poorly drained. The surface layer typically is brown silt loam about 8 inches thick. The subsurface layer is silt loam about 14 inches thick. The upper part is yellowish brown, and the lower part is pale brown. The subsoil is about 38 inches thick. The upper 26 inches is a silty clay loam, and the lower 12 inches is slightly brittle silt loam.

Hickory soils are on steep slopes next to drainageways. They are strongly sloping to very steep and are well drained to moderately well drained. The surface layer typically is very dark brown and dark grayish-brown loam about 3 inches thick. The subsurface layer is brown loam about 5 inches thick. The subsoil is clay loam about 34 inches thick. The underlying material is heavy loam. In places bedrock exposures are near the base of some slopes.

Wynoose soils are in flat areas. They are nearly level and are poorly drained. The surface layer typically is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is grayish-brown and light-gray silt loams about 11 inches thick. The subsoil is silty clay loam about 30 inches thick. The underlying material is light silty clay loam.

Less extensive in this association are Ava, Blair-Atlas, Newberry, and Shoals soils. The gently sloping to strongly sloping, moderately well drained Ava soils are on breaks between flat areas and steep slopes near drainageways. The moderately sloping to strongly sloping, somewhat poorly drained Blair-Atlas soils are at the upper ends of drainageways that finger into the flats. The nearly level, poorly drained Newberry soils are in shallow depressions in the flat areas. The nearly level, somewhat poorly drained Shoals soils are in flat bottom land.

The soils of this association are well suited to crops commonly grown in the county. Organic-matter content is low in all the soils except Newberry and is moderate in those soils. Available water capacity is high in all the soils except Atlas and Ava, and it is moderate in those soils. The main concerns of management are improving drainage on flat areas, controlling erosion on sloping areas, and maintaining tilth and fertility.

Most of this association is used for cultivated crops, but a few areas of steep soils are used for woodland and pasture. The main enterprises are general farming and some growing of cash crops. The soils have moderate potential for all cultivated crops commonly grown.

Nearly Level to Strongly Sloping Soils that Formed in Wind- and Water-Deposited Material on Terraces and Outwash Plains

This area consists of two soil associations on terraces and outwash plains. It is characterized by broad, flat areas that have occasional rounded mounds and very short slope breaks to bottom land.

4. Drummer-Brooklyn-Camden association

Nearly level to strongly sloping, poorly drained, well drained, and moderately well drained soils that have moderate and slow permeability

This association consists of a broad, flat plain that has short slope breaks to areas of bottom land. The western part of the association consists entirely of the broad plain. It is at the base of the morainal area south of Westfield.

The association occupies about 2 percent of the county. It is about 30 percent Drummer soils, 25 percent Brooklyn soils, 15 percent Camden soils, and 30 percent less extensive soils.

Drummer soils are in broad, flat areas. They are nearly level and are poorly drained. The surface layer typically is silty clay loam about 20 inches thick. The upper part is black, and the lower part is very dark gray. The subsoil is silty clay loam about 29 inches

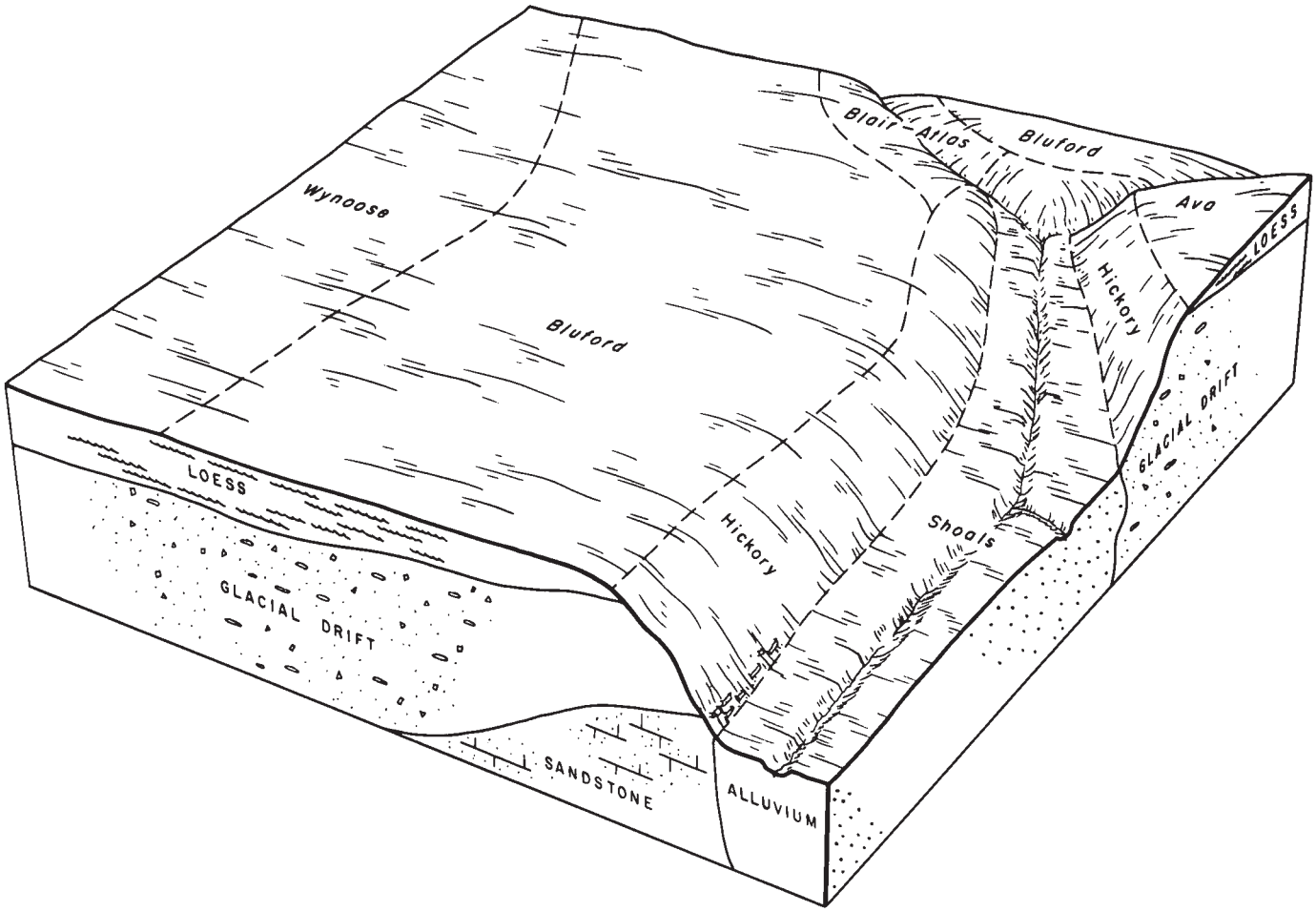

***Figure 4.*—Topography, soils, and underlying material in association 3.**

thick. The underlying material is stratified clay loam and loam.

Brooklyn soils are in flat areas. They are nearly level and are poorly drained. The surface layer typically is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is grayish-brown silt loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is heavy silty clay loam, and the lower part is silty clay loam. The underlying material is layered loam, sandy loam, and silt loam.

Camden soils are on flats and in areas of short slope breaks. They are nearly level to strongly sloping and are well drained to moderately well drained. The surface layer typically is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is about 27 inches thick. The upper part is silty clay loam, and the lower part is clay loam to loam. The underlying material is generally stratified sandy loam and loam, but in a few areas it is gravel.

Less extensive in this association are Sexton and Starks soils. The nearly level, poorly drained Sexton soils are in flat areas. The nearly level to gently sloping, somewhat poorly drained Starks soils are in slightly higher flat areas.

The soils of this association are well suited to corn, soybeans, wheat, and hay. Available water capacity is high in all the soils of the association and very high in Drummer soils. The main concerns of management are improving drainage and maintaining tilth and fertility. Erosion control is important on sloping soils.

Most of this association is used for cultivated crops. The main enterprise is growing cash crops. The soils have high potential for all cultivated crops grown in the county.

5. *Carmi-Disco-Stockland association*

Nearly level to moderately sloping, well-drained soils that have moderately rapid permeability

This association consists of broad, flat areas that have short slope breaks to the nearby bottom land. Small rounded rises are scattered throughout the area. The towns of West Union and Darwin are in this association. Limestone is close to the surface in a small area south of West Union.

The association occupies about 3 percent of the county. It is about 60 percent Carmi soils, 21 percent Disco soils, 14 percent Stockland soils, and 5 percent less extensive soils.

Carmi soils are in broad, flat areas. They are nearly level and are well drained (fig. 5). The surface layer typically is very dark brown sandy loam about 23

inches thick. The subsoil is about 37 inches thick. The upper 4 inches is coarse sandy loam, and the next 4 inches is gravelly sandy clay loam. The next 5 inches is gravelly coarse sandy loam, and the 7 inches below it is loamy coarse sand. Below this is 3 inches of gravelly loamy coarse sand over 14 inches of coarse sand. The underlying material is sand and gravel.

Disco soils are on slight rises. They are nearly level to gently sloping and are well drained. The surface layer typically is very dark gray sandy loam about 24 inches thick. The subsoil is sandy loam about 12 inches thick. The underlying material is sand.

Stockland soils are in flat areas and on breaks to bottom land. They are nearly level to moderately sloping and are well drained. The surface layer typically is black sandy loam about 10 inches thick. The next layer is very dark gray very gravelly sandy loam 4 inches thick. The subsoil is about 36 inches thick. It is layered gravelly sandy loam, gravelly sandy clay loam, gravelly coarse sandy loam, and gravelly coarse sand. The underlying material is gravelly coarse sand.

Less extensive in this association are Ade, Lamont, and Channahon soils. Ade soils are on rounded rises. They are nearly level to moderately sloping and are somewhat excessively drained. Lamont soils are on rounded rises and breaks to bottom land. They are nearly level to moderately sloping and steep and are well drained. Channahon soils are in areas that have limestone. They are nearly level to gently sloping and are well drained.

The soils of this association are suited to corn, small grain, and hay. Available water capacity is low to moderate in all the soils. The main concerns of management are controlling soil blowing, maintaining fertility and organic-matter content, conserving moisture, and using sprinkler irrigation.

Most of this association is used for cultivated crops or hay. The soils are better suited to small grain and hay than to other crops. Irrigation and market development offer potential for specialty crops. Irrigation can be used to ensure good growth of other crops commonly grown in the county.

The soils of this association are sources of sand and gravel.

Nearly Level to Very Steep Soils that Formed in Loess on the Dissected Till Plain

This area consists of three soil associations on the till plain uplands. It is characterized by broad, flat

Figure 5.—**Typical landscape of soil association 5. Nearly level Carmi soils are in foreground, and nearly level Disco soils are on very slight rises in background.**

areas that have a few low, broad rises and steep-sided drainageways that cut into the area. Narrow, flat bottom lands are in the drainageways.

6. *Cowden-Ebbert-Oconee association*

Nearly level to gently sloping, very poorly drained to somewhat poorly drained soils that have slow permeability

This association consists of a broad, smooth till plain that has a few slight rises and shallow depressions. Drainageways that cut into the area are shallow and small. Ditches have been dug to supplement natural drainage.

The association occupies about 7 percent of the county. It is about 62 percent Cowden soils, 19 percent Ebbert soils, 11 percent Oconee soils, and 8 percent less extensive soils.

Cowden soils are in broad, smooth areas. They are nearly level and are poorly drained. The surface layer typically is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is silt loam about 11 inches thick. The upper part is dark grayish brown and the lower part is light brownish gray. The subsoil is silty clay loam about 28 inches thick. The underlying material is silt loam and silty clay loam.

Ebbert soils are in shallow depressions. They are nearly level and are very poorly drained to poorly drained. The surface layer typically is very dark gray silt loam about 11 inches thick. The subsurface layer is dark gray silt loam about 6 inches thick. The subsoil is silty clay loam about 39 inches thick. The underlying material is silty clay loam that has noticeable amounts of sand.

Oconee soils are on slight rises and on sides of drainageways. They are nearly level to gently sloping and are somewhat poorly drained. The surface layer typically is very dark grayish-brown silt loam about 8 inches thick. The subsurface layer is silt loam about 10 inches thick. The upper part is grayish brown and the lower part is light gray. The subsoil is silty clay loam about 42 inches thick.

Less extensive in this association are Newberry, Shiloh, and Huey soils. The poorly drained Newberry soils and the very poorly drained Shiloh soils are in shallow depressions. The Huey soils contain large amounts of sodium. They are scattered throughout the association.

The soils of this association are well suited to crops. The high content of sodium in Huey soils limits crop growth. Available water capacity is high or very high in the soils of this association except for Huey soils in which it is low. The main concerns of management are improving drainage and maintaining fertility and tilth. Controlling erosion is a minor concern in areas of sloping soils.

This association is used mainly for growing cash crops. When drained, these soils have a high potential for all crops commonly grown in the county.

7. *Stoy-Weir-Hickory association*

Nearly level to gently sloping, somewhat poorly drained and poorly drained soils that have slow and very slow permeability, and strongly sloping to very steep, well drained and moderately well drained soils that have moderate permeability

This association consists of a broad, smooth plain that has a few slight rises (fig. 6). Steep-sided drainageways that adjoin narrow, flat bottom land cut into the plain. Broad, shallow depressions are near the center of some flat areas. Very slight rises are between the flat areas and the steep drainageways. Occasionally bedrock is exposed near the base of the steep slopes.

The association occupies about 41 percent of the county. It is about 26 percent Stoy soils, 22 percent Weir soils, 20 percent Hickory soils, and 32 percent less extensive soils.

Stoy soils are on the slight rises and in flat areas. They are nearly level to gently sloping and are somewhat poorly drained. The surface layer typically is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is yellowish-brown silt loam about 8 inches thick. The subsoil is silty clay loam about 29 inches thick. The underlying material is silt loam.

Weir soils are in the flat areas. They are nearly level and are poorly drained (fig. 7). The surface layer typically is dark grayish-brown silt loam about 10 inches thick. The subsurface layer is light brownish-gray silt loam about 13 inches thick. The subsoil is about 37 inches thick. The upper 29 inches is silty clay loam, and the lower 8 inches is silt loam. The underlying material is silt loam.

Hickory soils are on sides of drainageways. They are strongly sloping to very steep and are well drained to moderately well drained. The surface layer typically is very dark brown and dark grayish-brown loam about 3 inches thick. The subsurface layer is brown loam about 5 inches thick. The subsoil is clay loam about 34 inches thick. The underlying material is heavy loam. Bedrock crops out near the bases of some slopes.

Less extensive in this association are Hosmer, Blair-Atlas, Shoals, and Racoon soils. Hosmer soils are on narrower ridges between drainageways. They are gently sloping and have a dense, brittle fragipan at a depth of about 2½ feet. Blair-Atlas soils are at the upper ends of drainageways. The nearly level, somewhat poorly drained Shoals soils are on narrow bottom lands. The poorly drained Racoon soils are in depressions in the broad flat areas.

The soils of this association are well suited to row crops. Organic-matter content is low in all the soils. Available water capacity mainly is high, but it is moderate in Atlas soils. The main concern of management is improving drainage and tilth of nearly level soils. Controlling erosion is important on strongly sloping to very steep soils. Some type of permanent vegetation should be maintained in areas where soils are steep or very steep.

Most areas of nearly level soils of this association are used for cultivated crops. Areas of sloping soils are used for cultivated crops and pasture. Areas of steep soils are used for pasture and woodland. The areas of sloping and steeper soils have potential for beef cattle enterprises.

8. *Iva-Hickory-Alford association*

Nearly level to strongly sloping, somewhat poorly drained and well drained soils that have slow and

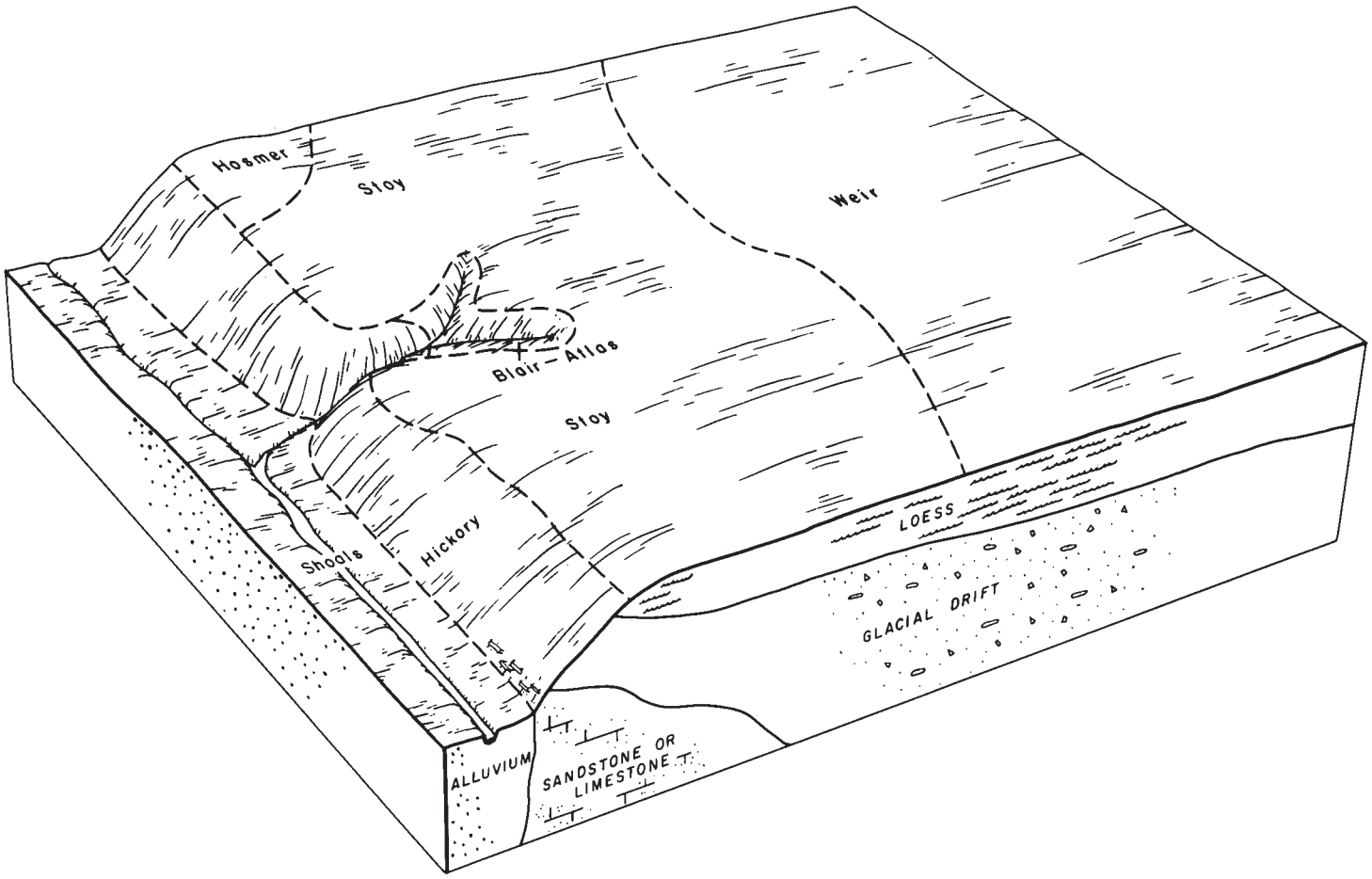

Figure 6.—**Topography, soils, and underlying material in association 7.**

Figure 7.—**Nearly level Weir soils along with Stoy soils at slightly higher elevation in the background, in soil association 7. Trees in background cover steeper Hickory soils.**

moderate permeability, and strongly sloping to very steep, well drained and moderately well drained soils that have moderate permeability

This association consists of bluff areas along the Wabash Valley. Side slopes are steep to very steep and have a well-developed drainage pattern that cuts back into the upland. The ridgetops near the bluff have gentle slopes that gradually blend into flat, broader areas. Bedrock outcrops are common near the bases of the steep slopes. In places old bench terraces are in the association.

The association occupies about 2 percent of the county. It is about 24 percent Iva soils, 22 percent Hickory soils, 17 percent Alford soils, and 37 percent less extensive soils.

Iva soils are in flat, broader areas. They are nearly level and are somewhat poorly drained. The surface layer typically is dark grayish-brown silt loam about 9 inches thick. The subsurface layer is light brownish-gray silt loam about 3 inches thick. The subsoil is 42 inches thick. The upper 36 inches is silty clay loam, and the lower 6 inches is heavy silt loam. The underlying material is silt loam.

Hickory soils are on side slopes. They are strongly sloping to very steep and are well drained to moderately well drained. The surface layer typically is very

dark brown and dark grayish-brown loam about 3 inches thick. The subsurface layer is brown loam about 5 inches thick. The subsoil is clay loam about 34 inches thick. The underlying material is heavy loam.

Alford soils are on ridgetops near bluffs and on upper sides of drainageways. They are gently sloping to strongly sloping and are well drained. The surface layer typically is brown silt loam about 9 inches thick. The subsurface layer is brown silt loam about 6 inches thick. The subsoil is about 45 inches thick. The upper 40 inches is silty clay loam, and the lower 5 inches is silt loam. The underlying material is silt loam.

Less extensive in this association are Muren, Lamont, Colp, and Alvin soils. The nearly level to moderately sloping, moderately well drained Muren soils are between Alford and Iva soils on the landscape. The well-drained Lamont soils are on ridgetops and, in places, on side slopes. They have a sandy loam surface layer. The moderately well drained Colp soils are on bench terraces. They have a silty clay subsoil. The well-drained Alvin soils are on ridgetops. They have a fine sandy loam surface layer.

The nearly level to moderately sloping soils of this association are well suited to row crops, small grain, and hay. The steeper soils are more suited to pasture or woodland. The main concerns of management are controlling water erosion, improving pasture and hayland, improving woodland, and maintaining fertility. Improving drainage is a concern in areas of nearly level soils.

Most of the association is used for pasture and woodland. The areas of nearly level and gently sloping soils are used for cultivated crops. The main enterprise is general farming. The association shows good potential for beef cattle and woodland enterprises.

Nearly Level Soils that Formed in Alluvium on Bottom Lands

This area consists of one soil association on bottom lands. It is characterized by broad, flat areas of the Wabash River bottom land and somewhat narrower flat bottom land of the Wabash River tributaries.

9. Shoals-Stonelick-Genesee association

Nearly level, somewhat poorly drained and well-drained soils that have moderate and moderately rapid permeability

This association consists of broad, nearly level soils of the Wabash River bottom land (fig. 8). These flat areas have occasional sloughs and old oxbows. The narrower areas along tributaries leading to the broad bottom lands generally have trees adjacent to the streams. They do not have prominent oxbows but do have old channel scars.

The association occupies about 14 percent of the county. It is about 55 percent Shoals soils, 14 percent

Figure 8.—Typical landscape of the broad, nearly level bottom land in association 9. Petrolia soils are in foreground.

Stonelick soils, 10 percent Genesee soils, and 21 percent less extensive soils.

Shoals are the main soils in areas of the narrow tributaries. They are somewhat poorly drained. The surface layer typically is dark grayish-brown silt loam about 9 inches thick. The underlying material is mainly silt loam. Layers of loam, sandy loam, and loamy sand are below a depth of 19 inches.

Stonelick soils are in large areas of some of the narrow tributaries and are scattered throughout the association. In most areas these soils are well drained. They consist of mixed sandy and silty material. The surface layer typically is dark-brown fine sandy loam about 10 inches thick. The underlying material is layered loam, sandy loam, fine sandy loam, loamy sand, coarse silt, and sand.

Genesee soils are slightly higher than the surrounding soils and often are next to streams. They are well drained. The surface layer typically is dark grayish-brown silt loam about 10 inches thick. The underlying material is layered silt loam, loam, sandy loam, and loamy sand.

Less extensive in this association are Ambraw, Tice, Darwin, and Petrolia soils. The poorly drained Ambraw silty clay loams are in low, flat areas of the large bottom lands. The somewhat poorly drained Tice soils are in slightly higher areas. The poorly drained to very poorly drained Darwin silty clays and the poorly drained Petrolia silty clay loams are in flat areas and in old stream channels.

These soils are well suited to row crops, pasture, and trees. Available water capacity mainly is high to very high, but it is low to moderate in Stonelick soils. The main concerns of management are controlling flooding and streambank erosion and improving drainage. Maintaining tilth is important on the minor soils of the association.

Most of the broad areas of this association are used for growing row crops. Narrower areas are used for row crops, pasture, and woodland (fig. 9). Odd areas and oxbows are often used for woodland. The soils have high potential for row crops and woodland. Flooding generally occurs annually in spring.

Descriptions of the Soils

The soil series and mapping units in Clark County are described in this section. Each soil series is described in detail, and then, briefly, each mapping unit in that series is described. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping

Figure 9.—**Narrow bottom land that is used for pasture in soil association 9. (Shoals are among the soils in this area.)**

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 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 of 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.

A numerical symbol is in front of the name of each mapping unit. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and woodland suitability group in which the mapping unit has been placed. The page for the description of each capability unit, and the woodland suitability group to which the soil is assigned can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The approximate acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*16*).

The soil lines generally join across the State line. Names of the soils differ in some instances because of different slope ranges in the two states. Also, some series names differ because of differences in dominant soils in one county as opposed to another or because of small acreages. For example, most of the Starks soils in Clark County reflect the silty nature of the areas mapped. This is the dominant condition. In Vigo County, Indiana, however, the Whitaker series was mapped. This series reflects the dominantly coarser textured soils in this similar material in Vigo County.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Ade loamy sand, 1 to 6 percent slopes	716	0.2
Alford silt loam, 2 to 7 percent slopes	940	.3
Alford silt loam, 7 to 12 percent slopes, eroded	411	.1
Alvin fine sandy loam, 1 to 4 percent slopes	740	.2
Alvin fine sandy loam, 4 to 7 percent slopes, eroded	583	.2
Alvin fine sandy loam, 7 to 12 percent slopes, eroded	258	.1
Ambraw clay loam	1,416	.4
Armiesburg silty clay loam	544	.2
Ava silt loam, 2 to 4 percent slopes	7,976	2.5
Ava silt loam, 4 to 7 percent slopes, eroded	3,957	1.2
Ava silt loam, 7 to 12 percent slopes, eroded	1,206	.4
Blair-Atlas silt loams, 4 to 10 percent slopes, eroded	4,639	1.4
Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded	5,797	1.8
Bluford silt loam, 0 to 2 percent slopes	5,905	1.8
Bluford silt loam, 2 to 4 percent slopes	9,856	3.0
Brenton silt loam	519	.2
Brooklyn silt loam	1,492	.5
Camden silt loam, 0 to 2 percent slopes	628	.2
Camden silt loam, 2 to 7 percent slopes	3,528	1.1
Camden silt loam, 7 to 15 percent slopes, eroded	684	.2
Carmi sandy loam	6,891	2.1
Channahon silt loam	141	(1)
Chauncey silt loam	597	.2
Cisne silt loam	27,681	8.6
Colp silt loam, 1 to 7 percent slopes	555	.2
Colp silt loam, 7 to 12 percent slopes, eroded	199	(1)
Cowden silt loam	13,285	4.1
Darwin silty clay	1,154	.4
Disco sandy loam, 1 to 4 percent slopes	2,286	.7
Drummer silty clay loam	3,072	.9
Ebbert silt loam	12,009	3.7
Genesee silt loam	4,606	1.4
Hickory loam, 7 to 12 percent slopes, eroded	2,624	.8
Hickory clay loam, 7 to 12 percent slopes, severely eroded	1,960	.6
Hickory loam, 12 to 18 percent slopes, eroded	3,648	1.1
Hickory clay loam, 12 to 18 percent slopes, severely eroded	1,781	.6
Hickory loam, 18 to 60 percent slopes, eroded	32,443	10.0
Hosmer silt loam, 2 to 4 percent slopes	4,876	1.5
Hoyleton silt loam, 0 to 2 percent slopes	1,769	.5
Hoyleton silt loam, 2 to 4 percent slopes	2,906	.9
Hoyleton silt loam, 4 to 7 percent slopes, eroded	408	.1
Huey silt loam	427	.1
Iva silt loam, 0 to 2 percent slopes	1,737	.5
Jules silt loam	460	.1
Lamont fine sandy loam, 1 to 6 percent slopes	603	.2
Lamont fine sandy loam, 12 to 25 percent slopes, eroded	292	.1
Lawson silt loam	1,712	.5
Miami silt loam, 4 to 7 percent slopes, eroded	747	.2
Miami clay loam, 4 to 7 percent slopes, severely eroded	499	.2
Miami silt loam, 7 to 15 percent slopes, eroded	507	.2
Miami clay loam, 7 to 15 percent slopes, severely eroded	615	.2
Millbrook silt loam	1,384	.5
Muren silt loam, 1 to 6 percent slopes	1,123	.4
Newberry silt loam	15,984	4.9
Oconee silt loam, 0 to 2 percent slopes	1,020	.3
Oconee silt loam, 2 to 4 percent slopes	1,276	.4
Petrolia silty clay loam	2,407	.7
Racoon silt loam	1,068	.3
Sexton silt loam	767	.2
Shiloh silty clay loam	1,826	.6
Shoals silt loam	24,480	7.6
Starks silt loam	1,789	.6
Stockland sandy loam, 0 to 4 percent slopes	1,496	.5
Stockland sandy loam, 4 to 7 percent slopes	332	.1
Stonelick fine sandy loam	6,151	1.9
Stoy silt loam, 0 to 2 percent slopes	18,086	5.6
Stoy silt loam, 2 to 5 percent slopes	17,045	5.4
Tice silty clay loam	1,405	.4
Weir silt loam	30,093	9.4
Wynoose silt loam	8,326	2.6
Xenia silt loam, 2 to 7 percent slopes	2,264	.7
Water	593	.2
Total	323,200	100.0

[1] Less than 0.1 percent.

Ade Series

The Ade series consists of deep, nearly level to sloping, somewhat excessively drained soils on stream terraces. These soils formed in wind- and water-deposited sand. The native vegetation was prairie grasses.

In a representative profile the surface layer is very dark grayish-brown and dark-brown loamy sand about 12 inches thick. The subsoil is more than 48 inches thick. The upper part is brown loamy sand. Below this is dark yellowish-brown sand over yellowish-brown sand. The lower part is brown sand that has lenses of dark-brown loamy sand.

The content of organic matter, available water capacity, and fertility are low. The soils are rapidly permeable.

Most of the acreage is used for crops. The soils are better suited to small grain or alfalfa than to other crops.

Representative profile of Ade loamy sand, 1 to 6 percent slopes, in a cultivated field, 1,200 feet south and 45 feet west of the northeast corner of NW¼NE¼ sec. 10, T. 9 N., R. 11 W.:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) loamy sand; weak, fine, granular structure; very friable; slightly acid; abrupt, smooth boundary.

A12—7 to 12 inches, dark brown (10YR 3/3) loamy sand; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary.

B21—12 to 19 inches, brown (10YR 4/3) loamy sand; weak, medium, subangular blocky structure; very friable; slightly acid; clear, smooth boundary.

B22—19 to 34 inches, dark yellowish brown (10YR 4/4) sand; single grained; loose; slightly acid; clear, smooth boundary.

B23—34 to 42 inches, yellowish brown (10YR 5/4) sand; single grained; loose; slightly acid; abrupt, smooth boundary.

A&B—42 to 60 inches, A part: brown (10YR 5/3) sand; single grained; loose. B part: dark brown (7.5YR 4/4) loamy sand; single grained; very friable; lenses ½ to 4 inches thick that have a combined thickness of about 6 inches; neutral.

The solum ranges from 54 to more than 60 inches in thickness. The Ap and A12 horizons are dark brown, brown, or very dark grayish brown.

Ade soils are sandier than the texture limit given in the defined range of the series, but this difference does not alter their usefulness or behavior.

Ade soils have a thinner A horizon and contain less clay than the associated Disco soils. They have less gravel in the subsoil than the Carmi and Stockland soils, although they are in the same landscape as these soils.

98B—Ade loamy sand, 1 to 6 percent slopes. This soil is on long, narrow terraces in large areas of bottom land. Included in mapping are a few small areas of soils that have gravel below a depth of 40 inches. Also included are areas of soils on the lee side of dunelike mounds where the surface layer is dark and is thicker than the one in this soil.

This soil is suited to small grain and alfalfa. Most areas are used for crops. If sprinkler irrigation is used, the soil is suited to specialty crops and row crops. Runoff is slow. Droughtiness is the main limitation to use of this soil. Exposed areas are subject to soil blowing. Capability unit IIIs–1; woodland suitability group 3s2.

Alford Series

The Alford series consists of deep, gently sloping to strongly sloping, well-drained soils on uplands. These soils formed in loess more than 60 inches thick. The native vegetation was hardwood trees, mainly oak and hickory.

In a representative profile the surface layer is brown silt loam about 9 inches thick. The subsurface layer, also brown silt loam, is about 6 inches thick. The subsoil is about 45 inches thick. The upper part is dark yellowish-brown light silty clay loam, the middle part is yellowish-brown silty clay loam, and the lower part is yellowish-brown silt loam.

The content of organic matter is low. Available water capacity is high, and fertility is medium. The soils are moderately permeable.

Most of the acreage is used for crops or pasture, but a few areas are wooded.

Representative profile of Alford silt loam, 2 to 7 percent slopes, in idle cropland, 165 feet north and 700 feet west of the southeast corner of SW¼ sec. 20, T. 11 N., R. 10 W.:

Ap—0 to 9 inches, brown (10YR 4/3) silt loam; moderate, fine and medium, granular structure; friable; many roots; medium acid; abrupt, smooth boundary.

A2—9 to 15 inches, brown (10YR 5/3) silt loam; few, medium, faint, brown (10YR 4/3) mottles; moderate, medium and coarse, granular structure; friable; common roots; strongly acid; clear, smooth boundary.

B1t—15 to 22 inches, dark yellowish brown (10YR 4/4) light silty clay loam; moderate and strong, medium, subangular blocky structure; firm; common roots; discontinuous, thin, brown (7.5YR 4/4) clay films on faces of peds; strongly acid; gradual, smooth boundary.

B21t—22 to 31 inches, yellowish brown (10YR 5/4) silty clay loam; strong, coarse, subangular blocky structure parting to strong, medium, subangular blocky; firm; common roots; nearly continuous, thin, brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

B22t—31 to 44 inches, yellowish brown (10YR 5/4) silty clay loam; strong, coarse, subangular blocky structure; firm; few roots; nearly continuous, thin, brown (7.5YR 4/4) clay films on faces of peds; few root channels filled with brown (10YR 5/3) silt loam; very strongly acid; gradual, smooth boundary.

B31t—44 to 55 inches, yellowish brown (10YR 5/6) light silty clay loam; weak, medium and coarse, subangular blocky structure; firm; few roots; patchy, thin, brown (7.5YR 4/4) clay films on faces of peds; few root channels filled with brown (10YR 5/3) silt loam; very strongly acid; gradual, smooth boundary.

B32t—55 to 60 inches, yellowish brown (10YR 5/6) silt loam; weak, coarse, subangular blocky structure; friable; no roots; patchy brown (7.5YR 4/4) clay films on faces of peds; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is dark grayish brown, grayish brown, or brown. The A2 horizon is brown or dark yellowish brown. The B horizon ranges from medium acid to very strongly acid.

Alford soils formed in the same kind of material as Hosmer and Muren soils. Unlike Hosmer soils, they have no fragipan. Alford soils do not have the gray colors in the lower part of the B horizon that are typical of associated Muren soils.

308B—Alford silt loam, 2 to 7 percent slopes. This soil is on ridgetops and in narrow bands between flat

areas on uplands and steeper soils on side slopes. It has the profile described as representative of the series. Included in mapping are small areas where the surface layer has eroded enough to expose the yellowish-brown subsoil.

This soil is suited to crops and pasture. Runoff is medium. The hazard of erosion is slight to moderate, and controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 1o1.

308D2—Alford silt loam, 7 to 12 percent slopes, eroded. This soil is mainly on the upper parts of sides of ridges, generally near the ends of the ridges in the areas of deep loess. It has a profile similar to the one described as representative of the series, but the combined surface and subsurface layers are thinner in this soil. In places part of the plow layer is made up of subsoil material.

Included with this soil in mapping are small wooded areas of uneroded Alford silt loam that has 7 to 12 percent slopes. Also included are a few small areas of steeper soils.

This soil is suited to all crops commonly grown in the county. Runoff is medium to rapid. Controlling erosion and maintaining fertility are the main concerns of management. This soil generally is unsuited to erosion control by terraces and contour stripcropping, and in many places erosion is more easily controlled by planting small grains, grasses, and legumes. Capability unit IIIe–1; woodland suitability group 1o1.

Alvin Series

The Alvin series consists of deep, nearly level to strongly sloping, well-drained soils on uplands and terraces. These soils formed in moderately coarse textured and sandy material. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark-brown fine sandy loam about 8 inches thick. The subsurface layer is dark yellowish-brown fine sandy loam about 2 inches thick. The subsoil is about 50 inches thick. The upper part is yellowish-brown heavy sandy loam, the middle part is brown heavy sandy loam and sandy loam, and the lower part is yellowish-brown loamy sand that has bands of brown sandy loam.

The content of organic matter is low. Available water capacity is moderate, and fertility is low. The soils are moderately rapidly permeable.

Most of the acreage is used for crops and pasture. The soils are better suited to small grains, hay, or pasture than to other crops.

Representative profile of Alvin fine sandy loam, 1 to 4 percent slopes, in a cultivated field, 878 feet east and 312 feet south of the northwest corner of NE¼ sec. 19, T. 10 N., R. 11 W.:

Ap—0 to 8 inches, dark brown (10YR 4/3) fine sandy loam, pale brown (10YR 6/3) when dry; weak, fine, granular structure; very friable; common roots; neutral; abrupt, smooth boundary.

A2—8 to 10 inches, dark yellowish brown (10YR 4/4) fine sandy loam; weak, medium and coarse, granular structure; friable; few roots; neutral; clear, smooth boundary.

B1—10 to 13 inches, yellowish brown (10YR 5/4) heavy sandy loam; moderate, medium, subangular blocky structure; firm; few roots; thin, discontinuous, reddish brown (5YR 4/4) clay films; medium acid; gradual, smooth boundary.

B21t—13 to 24 inches, brown (7.5YR 4/4) heavy sandy loam; moderate, medium and coarse, subangular blocky structure; firm; few roots; thin, discontinuous reddish-brown (5YR 4/4) clay films; medium acid; gradual, smooth boundary.

B22t—24 to 37 inches, brown (7.5YR 4/4) sandy loam; weak, coarse, subangular blocky structure; very friable; thin, discontinuous, reddish brown (5YR 4/4) clay films; few pockets of loamy sand; strongly acid; gradual, smooth boundary.

B3—37 to 60 inches, yellowish brown (10YR 5/4) loamy sand that has bands of brown (7.5YR 4/4) sandy loam; weak, coarse, subangular blocky structure; very friable to loose; bands are ½ to 3 inches thick and have a combined thickness of about 12 inches; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is very dark grayish brown, grayish brown, or dark brown. The B2 horizons are brown or yellowish brown. They range from medium acid to very strongly acid.

Alvin soils formed in the same kind of material as Lamont soils. They contain more clay than Lamont soils. Alvin soils are more sandy than the associated Camden soils.

131B—Alvin fine sandy loam, 1 to 4 percent slopes. This soil is in small, irregularly shaped areas on higher terraces; on bluffs along larger streams; and in areas below the moraine in the northwestern part of the county. It has the profile described as representative of the series. Included in mapping are small areas where the soil is more poorly drained than this one.

This soil is suited to pasture, crops, and trees. It is well suited to small grains and alfalfa. Growth of row crops is limited by lack of available water during dry periods. Erosion is a concern of management on slopes. Capability unit IIe–1; woodland suitability group 2o1.

131C2—Alvin fine sandy loam, 4 to 7 percent slopes, eroded. This soil is on side slopes and in higher positions in irregularly shaped areas on terraces and uplands adjacent to the larger streams. It has a profile similar to the one described as representative of the series, but the solum of this soil is generally thinner and the subsurface layer is mixed with the surface layer. In about half of the areas of this soil the subsoil is exposed during plowing. These areas appear browner than the surrounding soils. Included in mapping are small areas of severely eroded soils.

This soil is suited to crops, pasture, and trees. It is better suited to small grains, pasture, or trees than to other uses. Row crops can be grown. Lack of available water limits crop growth during dry periods. Controlling erosion and maintaining fertility are concerns of management. Capability unit IIIe–1; woodland suitability group 2o1.

131D2—Alvin fine sandy loam, 7 to 12 percent slopes, eroded. This soil is on the sides and drainageways of terraces. Slopes generally are short. The profile is similar to the one described as representative of the series, but this soil is thinner than the representative soil and the surface and subsurface layers in this soil are mixed. The subsoil is exposed in about half of the cultivated areas.

Included with this soil in mapping are small areas of

severely eroded soils. Also included are areas of soils that have less clay in the subsoil than this one.

Most areas of this soil are used for pasture and trees. It is better suited to pasture, trees, or hay than to other uses. The soil has been cultivated in the past, and in places areas continue to be used for crops. Growth of crops is limited by the moderate available water capacity. Runoff is rapid, but crops can be grown if erosion is controlled. Shape and length of slope limit some erosion-control practices. Capability unit IIIe–1; woodland suitability group 2o1.

Ambraw Series

The Ambraw series consists of deep, nearly level, poorly drained soils on bottom land in flood plains of the larger streams. These soils formed in water-laid sediment. The native vegetation was hardwood trees, sedges, and grasses.

In a representative profile the surface layer is very dark grayish-brown clay loam about 14 inches thick. The subsoil is about 31 inches thick. The upper 23 inches is dark-gray clay loam mottled with brown and yellowish brown. The lower 8 inches is mixed sandy clay loam, clay loam, loam, and sandy loam. The underlying material is dark-gray sandy clay loam.

The content of organic matter is moderate. Available water capacity is high, and natural fertility is medium to high. The soils are moderately permeable. They are subject to flooding.

Representative profile of Ambraw clay loam in a cultivated field, 90 feet north and 285 feet east of the southwest corner of NW¼ sec. 15, T. 9 N., R. 11 W.:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) clay loam; weak, medium, granular structure; firm; many roots; slightly acid; abrupt, smooth boundary.

A12—8 to 14 inches, very dark gray (10YR 3/1) clay loam; weak, coarse, subangular blocky structure; firm; many roots; slightly acid; abrupt, smooth boundary.

B1g—14 to 18 inches, dark gray (10YR 4/1) clay loam; common, fine, distinct dark brown (10YR 4/3 and 3/3) mottles; fine and medium, subangular blocky structure; firm; many roots; medium acid; clear, smooth boundary.

B21g—18 to 27 inches, dark gray (10YR 4/1) clay loam; common, fine, distinct, dark brown (7.5YR 3/2 and 4/4) mottles; moderate, fine and medium, prismatic structure parting to weak and moderate, medium, subangular blocky; firm; discontinuous, very dark gray (10YR 3/1) films on faces of peds; common roots and few concretions of iron-manganese; medium acid; gradual, smooth boundary.

B22g—27 to 37 inches, dark gray (N 4/0) clay loam; common, fine and medium, distinct, brown (10YR 5/3), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/8) mottles; moderate, fine and medium prismatic structure parting to weak, medium, subangular blocky; firm; discontinuous, very dark gray (10YR 3/1) films on faces of peds; few roots; medium acid; gradual, smooth boundary.

B3g—37 to 45 inches, dark gray (N 4/0) sandy clay loam, clay loam, and thin strata of loam and sandy loam; many, medium, distinct, dark brown (7.5YR 3/2) and strong brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure grading to massive; firm; slightly acid; gradual, wavy boundary.

Cg—45 to 60 inches, dark gray (N 4/0) sandy clay loam; many, medium, distinct, dark yellowish brown (10YR 3/4) and dark brown (7.5YR 4/4) mottles and few, fine, distinct, strong brown (7.5YR 5/6) mottles; massive; friable; pockets and layers of clay loam and silty clay loam; common dark concretions; slightly acid to neutral.

The Ap horizon is heavy loam, silty clay loam, or clay loam. The A horizon ranges from 10 to 24 inches in thickness. In the major part of the Bg horizon reaction ranges from medium acid to strongly acid. In places the lower part of the solum is 15 percent gravel.

Ambraw soils are darker colored than nearby Petrolia soils. They are not so clayey as the associated Darwin soils. Ambraw soils are more poorly drained than the Tice soils.

302—Ambraw clay loam (0 to 2 percent slopes). This nearly level soil is in rather large irregularly shaped areas mainly in the Wabash River Flood Plain. Included in mapping are small areas of soils that have more clay in the subsoil than this one.

Flooding and lack of drainage are the main limitations to the use of this soil. In places overflow limits use of this soil to annual summer crops, and some years the summer crops are damaged by water. Maintaining tilth is a minor concern of management. Capability unit IIw–2; woodland suitability group 2w5.

Armiesburg Series

The Armiesburg series consists of deep, well drained and moderately well drained soils on nearly level bottom lands. These soils formed in water-laid sediment. The native vegetation was hardwood trees.

In a representative profile the surface layer is very dark grayish-brown and dark-brown silty clay loam about 13 inches thick. The subsoil is brown silty clay loam about 47 inches thick.

The content of organic matter is moderate. Available water capacity is high, and fertility is medium to high. The soils are moderately permeable. They are subject to flooding. Most of the acreage is used for crops.

Representative profile of Armiesburg silty clay loam in a cultivated field, about 640 feet south and 30 feet east of the northwest corner of SW¼ sec. 24, T. 9 N., R. 11 W.:

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

A12—7 to 13 inches, dark brown (10YR 3/3) silty clay loam; moderate, fine, granular structure; firm; neutral; gradual, smooth boundary.

B1—13 to 26 inches, brown (10YR 4/3) silty clay loam; moderate, fine and medium, granular structure; firm; few dark brown (10YR 3/3) coatings; neutral; gradual, smooth boundary.

B21—26 to 35 inches, brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; firm; few dark grayish brown (10YR 4/2) films on faces of peds; neutral; gradual, smooth boundary.

B22—35 to 58 inches, brown (10YR 4/3) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; few dark brown (10YR 3/3) films on faces of peds; neutral; gradual, smooth boundary.

B3—58 to 60 inches, brown (10YR 4/3) silty clay loam; weak, medium, subangular blocky structure; firm; neutral.

The solum ranges from 35 to more than 60 inches in thickness. The Ap horizon is dark brown or very dark grayish brown. In a few places the lower parts of the B22 and B3 horizons are mottled with gray.

Armiesburg soils are better drained than the associated Tice soils. They are darker colored and finer textured than the associated Genesee soils.

597—Armiesburg silty clay loam (0 to 2 percent slopes). This nearly level soil is in somewhat continuous, irregularly shaped ribbon-like areas parallel with the river on bottom land. It is also in small irregularly shaped areas on bottom land.

Overflow is the only limitation to the use of this soil. This soil is intensively used for crops, especially summer annuals. It is well suited to crops if damaging overflow does not occur during the growing season. Capability unit I–1; woodland suitability group 1o4.

Atlas Series

The Atlas series consists of moderately sloping to strongly sloping soils on till plains. They are on the sides and upper ends of drainageways. These soils are mapped only in complex with Blair soils. The Atlas soils are deep and somewhat poorly drained. They formed in loess and Illinoian glacial drift. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark-brown silt loam about 7 inches thick. The subsoil is about 34 inches thick. The upper part is yellowish-brown silty clay loam over light brownish-gray silty clay loam, and the next part is grayish-brown silty clay. The lower part is gray silty clay. The underlying material is gray clay that has silt loam in the upper part.

The content of organic matter is low. Available water capacity is moderate, and fertility is low. The soils are very slowly permeable.

Atlas soils are better suited to hay, pasture, or woodland than to other uses. Many areas are used for crops.

Representative profile of Atlas silt loam in an area of Blair-Atlas silt loams, 4 to 10 percent slopes, eroded; in a cultivated field about 600 feet north and 100 feet west of the southeast corner of SW¼SE¼ sec. 5, T. 11 N., R. 11 W.:

Ap—0 to 7 inches, dark brown (10YR 4/3) silt loam; weak, fine and medium, granular structure; friable; many roots; neutral; abrupt, smooth boundary.

B1—7 to 10 inches, yellowish brown (10YR 5/4) light silty clay loam; few, fine, faint, yellowish brown (10YR 5/6) mottles; moderate, fine, angular blocky structure; firm; few roots; very strongly acid; clear, smooth boundary.

IIB21—10 to 16 inches, light brownish gray (10YR 6/2) silty clay loam that has noticeable amounts of sand; many, fine, distinct, yellowish brown (10YR 5/6) mottles; strong, coarse, angular blocky structure; firm; few roots; extremely acid; gradual, smooth boundary.

IIB22—16 to 25 inches, grayish brown (10YR 5/2) silty clay that has noticeable amounts of sand; many, medium, distinct, brown (7.5YR 5/4) mottles; moderate, medium, prismatic structures parting to moderate, medium, angular blocky; firm; few roots; extremely acid; gradual, smooth boundary.

IIB23—25 to 33 inches, grayish brown (10YR 5/2) heavy silt clay that has noticeable amounts of sand; many, fine, distinct, brown (7.5YR 5/4) mottles and common, fine, faint, gray (10YR 5/1) mottles; moderate, medium, angular blocky structure; very firm; no roots; few pebbles; extremely acid; gradual, smooth boundary.

IIB3—33 to 41 inches, gray (10YR 5/1) silty clay that has noticeable amounts of sand; many, fine, distinct, brown (7.5YR 5/4) mottles and common, fine, distinct, brown (10YR 5/3) mottles; weak, coarse, angular blocky structure; very firm; extremely acid; abrupt, smooth boundary.

IIC1—41 to 44 inches, grayish brown (10YR 5/2) silt loam that has noticeable amounts of sand; many, fine, distinct, brown (7.5YR 5/4) mottles and common, fine, faint, brown (10YR 5/3) mottles; massive; firm; medium acid; clear, smooth boundary.

IIC2—44 to 60 inches, gray (10YR 5/1) clay that has noticeable amounts of sand; common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; very firm; few pebbles; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is brown, dark brown, or dark grayish brown. The B horizon is silty clay loam, silty clay, heavy clay loam, or clay.

Atlas soils have a finer textured B horizon than the associated Bluford, Blair, and Hickory soils. They are more poorly drained than Hickory soils.

Ava Series

The Ava series consists of deep, gently sloping to strongly sloping, moderately well drained soils that have a fragipan. These soils formed in loess and glacial drift. The native vegetation was trees, mainly oak and hickory.

In a representative profile the surface layer is brown silt loam about 7 inches thick. The subsurface layer is yellowish-brown silt loam about 4 inches thick. The subsoil is yellowish-brown silty clay loam about 32 inches thick. The lower 17 inches of the subsoil is a fragipan. The underlying material, at a depth of about 43 inches, is yellowish-brown loam.

The content of organic matter is low. Available water capacity is moderate, and fertility is low. The soils are moderately slowly permeable in the upper part and very slowly permeable in the lower part.

Ava soils are suited to crops, pasture, or woodland. Most of the acreage is used for crops and pasture.

Representative profile of Ava silt loam, 2 to 4 percent slopes, in a cultivated field, 417 feet south and 582 feet west of the northeast corner of SW¼SW¼ sec. 4, T. 10 N., R. 13 W.:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; moderate, fine and medium, granular structure; friable; neutral; abrupt, smooth boundary.

A2—7 to 11 inches, yellowish brown (10YR 5/4) silt loam; weak, medium, platy structure parting to moderate, fine and medium, granular; friable; few, thin, light gray (10YR 7/1) when dry, silt grains on faces of peds; few very fine accumulations of iron-manganese; strongly acid; clear, smooth boundary.

B2t—11 to 22 inches, yellowish brown (10YR 5/6) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; thin, patchy, brown (7.5YR 4/4) clay films on faces of peds; common, thin, light gray (10YR 7/1) silt grains on some peds; few very fine accumulations of iron-manganese; very strongly acid; clear, smooth boundary.

B&A—22 to 26 inches, yellowish brown (10YR 5/4) light silty clay loam (B part); common, fine, distinct, strong brown (7.5YR 5/6) mottles and few, medium, faint, grayish brown (10YR 5/2) mottles; strong, medium, subangular blocky structure; firm; thin, discontinuous, brown (7.5YR 4/4) clay films on faces of peds; many, continuous, pale brown

(10YR 6/3) silt grains, white (10YR 8/1) when dry (A part); common fine accumulations of iron-manganese; very strongly acid; clear, smooth boundary.

Bx1—26 to 35 inches, yellowish brown (10YR 5/4) silty clay loam; common, medium, faint, grayish brown (10YR 5/2) mottles and common, fine, distinct, strong brown (7.5YR 5/6) mottles; weak, medium, prismatic structure parting to moderate, medium and coarse, angular blocky; firm; thin, discontinuous dark brown (7.5YR 4/4) clay films on faces of peds; common fine accumulations of iron-manganese; common, dark brown (1.5YR 4/4) iron stains and few, dark reddish brown (2.5YR 3/4) iron stains; light brownish gray (10YR 6/2) medium silty clay loam streaks about 5 inches apart; strongly acid; gradual, smooth boundary.

IIBx2—35 to 43 inches, yellowish brown (10YR 5/6) light silty clay loam that has about 15 percent sand; many, medium, distinct, grayish brown (10YR 5/2) mottles and few, fine, faint, strong brown (7.5YR 5/6) mottles; weak, medium, prismatic structure parting to weak, coarse, angular blocky; firm and somewhat brittle; few dark brown (7.5YR 4/4) and reddish brown (5YR 4/4) iron stains; strongly acid; gradual, smooth boundary.

IICx—43 to 60 inches, yellowish brown (10YR 5/6) loam; common, medium, faint, strong brown (7.5YR 5/6) mottles and common, medium, distinct, light brownish gray (10YR 6/2) mottles; massive, some vertical faces; thin, patchy, brown (7.5YR 5/4) clay films on vertical faces of peds; firm in place, friable after shattered; few very fine accumulations of iron-manganese; few, dark brown (7.5YR 4/4) iron stains; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is brown, dark brown, or dark grayish brown. Depth to the fragipan ranges from 24 to 32 inches.

Ava soils are better drained and have a more strongly developed fragipan than the associated Bluford soils. Ava soils have less sand in the solum than the associated Hickory soils, and, unlike these soils, the Ava soils have a fragipan. Ava soils formed in loess and glacial drift; the similar Hosmer soils, however, formed entirely in loess.

14B—Ava silt loam, 2 to 4 percent slopes. This soil generally is on ridgetops between areas of steeper soils. It also is on the tops or caps of low to fairly high rounded hills. It has the profile described as representative of the series. Areas of this soil in woodland have a thin darker layer at the surface.

Included with this soil in mapping are small, nearly level areas of Ava soils. Also included is a small acreage of eroded Ava silt loam that has slopes of 2 to 4 percent.

Most areas of this soil are suited to cultivated crops. Runoff is medium. Controlling erosion and maintaining fertility are the main concerns of management. This soil is easy to work. Capability unit IIe–2; woodland suitability group 2o1.

14C2—Ava silt loam, 4 to 7 percent slopes, eroded. This soil generally is on cultivated sides of drainageways and rounded hills and, in places, on ridgetops. In places the surface layer has been removed by erosion. Some of the yellowish-brown subsurface layer and subsoil generally are turned up when plowed. This soil has a profile similar to the one described as representative of the series, but the surface layer of this soil is thinner than the one in the representative profile.

Included with this soil in mapping is a small acreage of uneroded Ava silt loam, 4 to 7 percent slopes, that generally is in permanent pasture or trees. The wooded areas generally have a thin darker layer at the surface. Also included is a small acreage of severely eroded Ava soils, 4 to 7 percent slopes, that has a more cloddy surface.

This soil is suited to all crops commonly grown in the county. Runoff is medium. Controlling erosion, maintaining fertility, and, in places, maintaining good tilth are the main concerns of management. This soil generally is unsuited to contouring and terracing in areas on sides of drainageways, but it is suited to these practices in areas on the rounded hills. Capability unit IIIe–2; woodland suitability group 2o1.

14D2—Ava silt loam, 7 to 12 percent slopes, eroded. This soil generally is on the sides of drainageways, commonly forming the upper, less steeper part of the sides. It has a profile similar to the one described as representative of the series, but the surface layer of this soil generally is thinner than the one in the representative profile. The plow layer includes some surface and subsoil material. A small acreage of this soil is only slightly eroded. In wooded areas, the soil has a thin, darker surface layer.

Controlling erosion and maintaining fertility are the main concerns of management. Maintaining tilth is also a concern where the subsoil is plowed up. Runoff is rapid. Some areas of this soil on long slopes are suited to contour stripcropping, which allows for more intensive cultivation without severe erosion. If tilled crops are grown, erosion-control measures and much fertilization are needed. Capability unit IIIe–2; woodland suitability group 2o1.

Blair Series

The Blair series consists of sloping to strongly sloping soils on uplands, mainly on sides of drainageways near the upper ends. These soils are mapped only in complex with Atlas soils. The Blair soils are deep and somewhat poorly drained. They formed in Illinoian glacial drift. The native vegetation was probably hardwood trees, mainly oak and hickory.

In a representative profile the surface layer is dark grayish-brown silt loam about 3 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is more than 53 inches thick. The upper part is yellowish-brown silty clay loam mottled with grayish-brown, and the lower part is mostly grayish-brown silty clay loam mottled with yellowish brown.

The content of organic matter is low. Available water capacity is high, and fertility is low. The soils are moderately slowly permeable.

Blair soils are better suited to hay, pasture, or woodland than to other uses. Many areas are used for crops.

Representative profile of Blair silt loam in an area of Blair-Atlas silt loams, 4 to 10 percent slopes, eroded, 150 feet north and 175 feet east of the southwest corner of SE¼ sec. 21, T. 9 N., R. 14 W.:

A1—0 to 3 inches, dark grayish brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; medium acid; clear, smooth boundary.

A2—3 to 7 inches, brown (10YR 5/3) silt loam that has noticeable amounts of sand; weak, thick, platy structure; friable; strongly acid; clear, smooth boundary.

B1—7 to 10 inches, yellowish brown (10YR 5/4) light silty clay loam that has noticeable amounts of sand; few, fine, faint, grayish brown (10YR 5/2) mottles; moderate, fine, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—10 to 16 inches, yellowish brown (10YR 5/4) silty clay loam that has noticeable amounts of sand; common, fine, faint, grayish brown (10YR 5/2) mottles and few, fine, distinct, brown (7.5YR 5/4) mottles; moderate, fine and medium, subangular blocky structure; firm; very strongly acid; gradual, smooth boundary.

B22t—16 to 24 inches, grayish brown (10YR 5/2) silty clay loam that has noticeable amounts of sand; common, medium, distinct, yellowish brown (10YR 5/4) mottles and few, fine, distinct dark yellowish brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; very firm; common, thin, discontinuous, gray (10YR 5/1) clay films on faces of peds; common black (N 2/0) stains of iron-manganese on structure cleavage faces; very strongly acid; gradual, smooth boundary.

B23t—24 to 30 inches, grayish brown (10YR 5/2) silty clay loam that has noticeable amounts of sand; common, medium, distinct yellowish brown (10YR 5/4 and 5/8) mottles; moderate, medium, subangular blocky structure; very firm; few, thin, discontinuous, gray (10YR 5/1) clay films on faces of peds; dark gray (10YR 4/1) coatings on root channels; strongly acid; gradual, smooth boundary.

B31—30 to 50 inches, grayish brown (10YR 5/2) silty clay loam that has noticeable amounts of sand; many, coarse, distinct yellowish brown (10YR 5/4 and 5/8) mottles; weak, coarse, subangular blocky structure; firm; medium acid; gradual, smooth boundary.

B32—50 to 60 inches, yellowish brown (10YR 5/4) light silty clay loam that has noticeable amounts of sand; few, coarse, distinct, grayish brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure; firm; slightly acid.

The solum ranges from 50 to more than 60 inches in thickness. The Ap horizon is dark grayish brown to yellowish brown and is 3 to 10 inches thick. The A2 horizon is brown or yellowish brown. The B horizon is yellowish-brown, brown, or grayish-brown silty clay loam or clay loam. In places in areas of severely eroded soils, the B1 horizon is mixed with the Ap horizon. The C horizon generally is below a depth of 60 inches. It is gray, yellowish-brown, or grayish-brown clay loam or loam.

Blair soils are in positions similar to those of the Bluford and Stoy soils. Blair soils formed primarily in Illinoian glacial drift, however, while Bluford soils formed in loess and glacial drift. Stoy soils, on the other hand, formed entirely in loess. Blair soils are more poorly drained than the associated Hickory soils.

927C2—Blair-Atlas silt loams, 4 to 10 percent slopes, eroded. These soils are in small, irregularly shaped areas at the upper ends of drainageways and on long, narrow sides of drainageways. The mapped areas are about 65 percent Blair silt loam and about 35 percent Atlas silt loam. The Atlas part of the complex appears as a darker band running parallel to the drainageways. The Blair and Atlas soils in this unit have the profiles described as representative of their respective series. In about 40 percent of the mapped areas, the subsoil is mixed with the surface layer.

Included with these soils in mapping are small areas of gently sloping soils and a few small areas where soils have slopes of more than 10 percent.

These soils are better suited to small grains or pasture than to other uses. Row crops can be grown occasionally. Most areas are used for crops or pasture. Areas are often wet in spring, and seedbeds are difficult to prepare under these circumstances. Runoff is medium. Controlling erosion is the main concern of management. Capability unit IIIe–3; woodland suitability group 3o1.

927C3—Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded. These soils are in small, irregularly shaped areas at the upper ends of drainageways. They have been intensively cropped. The mapping unit is about 70 percent Blair soils and about 30 percent Atlas soils. The surface layer is mainly yellowish-brown subsoil material. It dominantly is silty clay loam, but in places it is clay loam, silt loam, and silty clay. The surface layer has been removed by erosion or incorporated in the plow layer with part of the subsoil in at least 75 percent of the area.

Included with these soils in mapping are several small areas where slopes are more than 10 percent.

These soils are better suited to pasture or hay than to other uses. Most areas have been used for crops in the past, and many areas continue to be used for crops along with surrounding areas of other soils. Low content of organic matter and the silty clay loam texture make the surface difficult to work. Wetness in spring makes seedbeds difficult to prepare. Runoff is rapid. Controlling erosion and maintaining tilth are the main concerns of management. Capability unit IVe–2; woodland suitability group 3o1.

Bluford Series

The Bluford series consists of deep, nearly level to gently sloping, somewhat poorly drained soils on uplands. They are on ridgetops, on sides of drainageways and, in a few places, on foot slopes below areas of steeper soils. These soils formed in loess and glacial drift. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is brown silt loam about 8 inches thick. The subsurface layer is silt loam about 14 inches thick. The upper part is yellowish brown, and the lower part is pale brown. The subsoil is about 38 inches thick. The upper part is light brownish-gray heavy silty clay loam; the next part is yellowish-brown silty clay loam; and the next part is yellowish-brown light silty clay loam in the upper part and yellowish-brown silt loam in the lower part.

The content of organic matter and fertility are low. Available water capacity is high. The soils are slowly permeable.

Most of the acreage is used for crops or pasture, but a few areas are in trees.

Representative profile of Bluford silt loam, 0 to 2 percent slopes, in a cultivated field, about 700 feet north and 200 feet east of the southwest corner of sec. 2, T. 9 N., R. 14 W.:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; few roots; strongly acid; abrupt, smooth boundary.

A21—8 to 17 inches, yellowish brown (10YR 5/4) silt loam; moderate, medium, granular structure; friable; few roots; very strongly acid; clear, smooth boundary.

A22—17 to 22 inches, pale brown (10YR 6/3) silt loam; few, fine, distinct, yellowish brown (10YR 5/6) mottles and few, fine, distinct, light gray (10YR

7/1) when dry mottles; weak, coarse, granular structure parting to moderate, fine, granular; friable; few roots; very strongly acid; clear, smooth boundary.

B21t—22 to 26 inches, light brownish gray (10YR 6/2) heavy silty clay loam; few, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; firm; few roots; light gray (10YR 7/1) when dry silt grains on faces of peds; very strongly acid; gradual, smooth boundary.

B22t—26 to 34 inches, yellowish brown (10YR 5/6) silty clay loam; common, fine and medium, distinct, grayish brown (10YR 5/2) mottles and few, fine, faint, yellowish brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm; few roots; continuous, thin, grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

B23t—34 to 40 inches, yellowish brown (10YR 5/4) silty clay loam; many, coarse, distinct, light brownish gray (10YR 6/2) mottles and few, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure parting to moderate, medium, subangular blocky; firm; few roots; continuous, medium, grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

IIBx1—40 to 48 inches, yellowish brown (10YR 5/6) light silty clay loam; few, fine, distinct, gray (10YR 6/1) and pale brown (10YR 6/3) mottles; weak, coarse, subangular blocky structure; firm, slightly brittle; grayish brown (10YR 5/2) clay films in root channels; very strongly acid; gradual, smooth boundary.

IIBx2—48 to 60 inches, yellowish brown (10YR 5/6) silt loam that contains noticeable amounts of sand; common, medium, distinct, pale brown (10YR 6/3) mottles and few, fine, distinct, gray (10YR 6/1) mottles; weak, coarse, subangular blocky structure; firm; slightly brittle; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is dark grayish brown, grayish brown, or brown. The A2 and B horizons range from medium acid to extremely acid.

Bluford soils formed in loess and glacial drift; the similar Stoy soils formed entirely in loess. Bluford soils are better drained than the associated Wynoose soils.

13A—Bluford silt loam, 0 to 2 percent slopes. This nearly level soil is mainly on ridgetops in fairly narrow areas. It is also on slight rises in areas of Wynoose soils. It has the profile described as representative of the series.

This soil is suited to cultivated crops. Excessive tillage causes surface crusting. Runoff is slow, and the hazard of erosion is slight. Drainage and maintaining fertility are the main concerns of management. Wetness is a concern, especially in the larger areas of this soil. Capability unit IIw–3; woodland suitability group 3o1.

13B—Bluford silt loam, 2 to 4 percent slopes. This soil is mainly in narrow bands between the flat Wynoose soils and such steeper soils as Blair or Hickory. It is also on low, rounded hills, on sides of drainageways, mainly near the heads, and on foot slopes below areas of steeper soils.

Included with this soil in mapping are small areas of a soil on foot slopes that has a subsoil at a depth of more than 24 inches. Also included are areas of sloping soils near the heads of draws.

This soil is generally suited to cultivated crops or pasture. Runoff is medium. Controlling erosion and maintaining fertility are the main concerns of management. Capability unit IIe–3; woodland suitability group 3o1.

Brenton Series

The Brenton series consists of deep, nearly level, somewhat poorly drained soils in small- and medium-sized areas on the outwash plain. In places small areas of Brenton soils are on terraces. These soils formed in loess and glacial outwash. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark brown to black silt loam about 18 inches thick. The subsoil is about 29 inches thick. It is mainly grayish-brown silty clay loam mottled with yellowish brown. The underlying material is mixed grayish-brown and yellowish-brown, stratified loam and sandy loam.

The content of organic matter is high. Available water capacity is very high, and fertility is medium to high. The soils are moderately permeable. Most of the acreage is used for crops.

Representative profile of Brenton silt loam, in a cultivated field, 1,005 feet north and 90 feet east of the southwest corner of NW¼ sec. 19, T. 12 N., R. 14 W.:

Ap—0 to 8 inches, very dark brown (10YR 2/2) silt loam; strong, very fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A12—8 to 15 inches, black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; medium acid; clear, smooth boundary.

A13—15 to 18 inches, very dark gray (10YR 3/1) silt loam, very dark grayish brown (10YR 3/2) in small areas; strong, fine and medium, granular structure; friable; medium acid; clear, smooth boundary.

B1—18 to 24 inches, dark grayish brown (10YR 4/2) light silty clay loam; few, fine, faint, yellowish brown (10YR 5/4) mottles; strong, very fine, subangular blocky structure; friable; common, discontinuous, very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear, smooth boundary.

B21t—24 to 32 inches, grayish brown (2.5Y 5/2) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; moderate and strong, fine, subangular blocky structure; firm; common, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; gradual, smooth boundary.

B22t—32 to 37 inches, grayish brown (2.5Y 5/2) silty clay loam; many, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; moderate, medium, subangular blocky structure; few, discontinuous, grayish brown (10YR 5/2) clay films on faces of peds; firm; few dark grayish brown (10YR 4/2) coatings in root channels; slightly acid; clear, wavy boundary.

IIB3t—37 to 47 inches, grayish brown (2.5Y 5/2) clay loam; many, fine and medium, distinct, yellowish brown (10YR 5/4 and 5/8) mottles and common, medium, distinct, dark yellowish brown (10YR 4/4) mottles; weak and moderate, medium and coarse, subangular blocky structure; firm; few dark grayish brown (10YR 4/2) clay films in root channels; slightly acid; gradual, wavy boundary.

IIC—47 to 60 inches, mixed grayish brown (10YR 5/2), yellowish brown (10YR 5/4 and 5/6), and dark yellowish brown (10YR 4/4) stratified loam and sandy loam; massive; friable; neutral.

The solum ranges from 35 to 55 inches in thickness. Below the Ap horizon reaction ranges from medium acid to

neutral. The A horizon ranges from 10 to 20 inches in thickness. It is black, very dark brown, very dark grayish brown, or very dark gray. The B horizon is silty clay loam and clay loam mottled mainly with grayish brown and yellowish brown. The C horizon is sandy loam, silt loam, and loam and is stratified in most areas. The C horizon ranges from neutral to mildly alkaline.

Unlike the associated Millbrook soils, Brenton soils have no A2 horizon. Brenton and Starks soils formed in similar material, but Brenton soils have a thicker, darker colored A horizon.

149—Brenton silt loam (0 to 3 percent slopes). This soil is in small, irregularly shaped areas.

Included with this soil in mapping are a few small areas of soils that have loamy sand in the underlying material. Also included are very small areas of soils that have a light-colored subsurface layer, small areas of soils that are well drained, and small areas of soils that lack stratification in the lower subsoil.

This soil is well suited to cultivated crops. Runoff is slow. No main concerns of management exist, but wetness is a minor concern in places. The hazard of erosion is slight, except in areas of more sloping soils. Capability unit I–2; woodland suitability group 2o1.

Brooklyn Series

The Brooklyn series consists of deep, nearly level, poorly drained soils on the outwash plain. These soils formed in silty material and outwash. The native vegetation was probably sedges and grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is grayish-brown silt loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is grayish-brown heavy silty clay loam, and the lower part is grayish-brown and light brownish-gray silty clay loam. The underlying material is grayish-brown, yellowish-brown, and light brownish-gray layered loam, sandy loam, and silt loam.

The content of organic matter is moderate. Available capacity is high, and fertility is low to medium. The soils are slowly permeable.

Brooklyn soils are suited to crops and pasture. Most areas are used for crops.

Representative profile of Brooklyn silt loam in a cultivated area, 25 feet south and 535 feet west of the northeast corner of NW¼ sec. 8, T. 11 N., R. 14 W.:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) when dry; moderate, fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A12—7 to 9 inches, very dark grayish brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

A2—9 to 15 inches, grayish brown (10YR 5/2) silt loam; few, fine, distinct, yellowish brown (10YR 5/6) mottles; weak, medium, platy structure; friable; very strongly acid; clear, smooth boundary.

B21t—15 to 20 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine, subangular blocky structure; firm; few, thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear, smooth boundary.

B22t—20 to 28 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, fine and medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine, prismatic structure parting to moderate, medium, subangular blocky; firm; few, thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; gradual, wavy boundary.

B23t—28 to 37 inches, grayish brown (10YR 5/2) silty clay loam; many, medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine, prismatic structure parting to moderate, medium, subangular blocky; firm; common, very thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds and in root channels; strongly acid; gradual, wavy boundary.

IIB3—37 to 44 inches, grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) silty clay loam that has noticeable amounts of sand; many, fine, distinct, yellowish brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm; few very dark gray (10YR 3/1) clay films in root channels; medium acid; clear, wavy boundary.

IIC—44 to 60 inches, mixed grayish brown (10YR 5/2), yellowish brown (10YR 5/4 and 5/8), and light brownish gray (10YR 6/2) stratified loam, sandy loam, and silt loam; massive; friable; slightly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is very dark grayish brown or very dark gray and is 7 to 9 inches thick. The A12 horizon is lacking in places. The A2 horizon is grayish brown, dark gray, or dark grayish brown and is 5 to 12 inches thick. The B horizon is grayish-brown, gray, olive-gray, or dark grayish-brown silty clay loam or clay loam. It is very strongly acid to slightly acid. The IIB3 horizon is medium acid to moderately alkaline. The IIC horizon is slightly acid to moderately alkaline.

Brooklyn soils have less sand and gravel in the lower part of the B horizon than the texture limit given in the defined range for the series, but this difference does not alter their behavior or usefulness.

Brooklyn soils contain more sand in the lower part of the B horizon than the associated Cowden soils. Brooklyn and Sexton soils formed in similar material, but Brooklyn soils have a darker colored A horizon or Ap horizon.

136—Brooklyn silt loam (0 to 2 percent slopes). This soil is in small to large, irregularly shaped areas on the outwash plain. Areas are smooth and have rises that are very slight compared to those in the surrounding areas. Included in mapping are small areas of soils that have a thicker, dark-colored surface layer.

This soil is well suited to crops if excess water is removed. Runoff is slow, and the hazard of erosion is slight. Wetness and slow permeability are the main hazards to the use of this soil. Capability unit IIw–1; woodland suitability group 3w2.

Camden Series

The Camden series consists of deep, nearly level to strongly sloping, moderately well drained and well drained soils in areas mainly on the outwash plain. Camden soils are also on terraces of some of the larger flood plains in the county. These soils formed in thin deposits of loess underlain by stratified, coarser, waterlaid sediment. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish-brown silty clay loam, and the lower part is yellowish-brown to brown light silty clay loam

to loam. The underlying material is mixed yellowish-brown, grayish-brown, pale-brown, and dark yellowish-brown, stratified sandy loam and loam.

The content of organic matter is low. Available water capacity is high. Natural fertility is medium, and the soils respond very well to fertilization. They are moderately permeable.

Representative profile of Camden silt loam, 2 to 7 percent slopes, in a cultivated field, 340 feet north and 100 feet east of the southwest corner of SE¼ sec. 33, T. 12 N., R. 14 W.:

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—7 to 11 inches, brown to dark brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; yellowish brown (10YR 5/4) when rubbed; medium acid; clear, smooth boundary.

B1—11 to 14 inches, dark yellowish brown (10YR 4/4) light silty clay loam; moderate, fine and very fine, subangular blocky structure; friable; few brown to dark brown (10YR 4/3) coatings on faces of peds; strongly acid; clear, smooth boundary.

B2t—14 to 24 inches, silty clay loam that has dark yellowish brown (10YR 4/4) ped exteriors and yellowish brown (10YR 5/4) ped interiors; strong, fine, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B31—24 to 30 inches, yellowish brown (10YR 5/4) light silty clay loam; common, fine, distinct, dark yellowish brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

IIB3—30 to 38 inches, brown (10YR 5/3) heavy loam; common, fine, faint, yellowish brown (10YR 5/4 and 5/8) and grayish brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

IIC—38 to 60 inches, mixed yellowish brown (10YR 5/4 and 5/6), grayish brown (10YR 5/2), pale brown (10YR 6/3), and dark yellowish brown (10YR 4/4) stratified loam and sandy loam; massive; friable; slightly acid.

The solum ranges from 35 to 50 inches in thickness. The silty material ranges from 20 to 40 inches in thickness. Material below the Ap horizon ranges from strongly acid to neutral. The upper part of the B horizon is silty clay loam, and the lower part is clay loam or loam. The C horizon generally is sandy loam, loam, or silt loam, but in places it is loamy sand.

Camden soils contain less sand in the solum than the associated Alvin soils. Camden and Colp soils are on stream terraces. Camden soils are coarser textured in the B and C horizons than Colp soils. They are better drained than the associated Starks soils.

134A—Camden silt loam, 0 to 2 percent slopes. This nearly level soil generally is in small, somewhat round areas mainly near streams on the outwash plain. It has a profile similar to the one described as representative of the series, but the combined surface and subsurface layers of this soil are thicker than the combined ones in the representative profile.

Included with this soil in mapping are several large areas of soils that have stratified sand and gravel below a depth of 5 feet. The largest area is in the northwestern part of the county in the flood plain of North Fork of Embarras River Creek. Also included are small areas of soils in the northwestern part of the county that have a very dark grayish-brown surface layer.

This soil is well suited to intensive cultivation of all crops commonly grown in the county. Runoff is slow. The hazard of erosion is slight, and the soil is easily worked. Some small areas that are inaccessible or have steeper soils are suited to pasture or trees. Capability unit I–2; woodland suitability group 1o1.

134B—Camden silt loam, 2 to 7 percent slopes. This soil generally is in small and either round or irregularly shaped areas. The round areas generally are slightly elevated on the rather flat outwash plain and in rather high, isolated areas. The irregularly shaped areas generally are on sides of drainageways and on terrace breaks into bottom lands. This soil has the profile described as representative of the series.

Included with this soil in mapping is a small acreage of a soil that has sand and gravel in the underlying material. Also included are areas of gently sloping knobs where the underlying material is loamy sand, small areas of soils that are more eroded than this one, and small areas of soils in the northwestern part of the county that have a very dark grayish-brown surface layer.

This soil is well suited to crops, pasture, or trees. Runoff is medium. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 1o1.

134D2—Camden silt loam, 7 to 15 percent slopes, eroded. This soil is on small, irregularly shaped breaks into bottom land and drainageways. It is mainly near streams in the outwash plain, especially in the North Fork of Embarras River Flood Plain. This soil has a profile similar to the one described as representative of the series, but the surface and subsurface layers are thinner in this soil than they are in the representative profile.

Included with this soil in mapping are a few areas of severely eroded soils where the plow layer is mostly subsoil. Also included are small areas where loamy sand or some gravel is in the underlying material.

This soil is suited to pasture or trees but has limited suitability for crops. Runoff is rapid, and the hazard of erosion is moderate. Capability unit IIIe–1; woodland suitability group 1o1.

Carmi Series

The Carmi series consists of deep, nearly level, well-drained soils on stream terraces. These soils formed in loamy, sandy, and gravelly outwash material. The native vegetation was mainly tall prairie grasses.

In a representative profile the surface layer is very dark brown sandy loam about 23 inches thick. The subsoil is dark brown and is about 37 inches thick. The upper 4 inches is coarse sandy loam, and the next 4 inches is gravelly sandy clay loam. The 5 inches below this is gravelly coarse sandy loam, the next 7 inches is loamy coarse sand, and the next 3 inches is gravelly loamy coarse sand. The lower 14 inches of the subsoil is coarse sand (fig. 10).

The content of organic matter is moderate. Available water capacity is low to moderate, and fertility is low. The soils are moderately rapidly permeable.

Carmi soils are suited to crops, hay, or specialty crops. Most areas are used for crops.

Representative profile of Carmi sandy loam in a

Figure 10.—Profile of Carmi sandy loam. Arrow indicates approximate depth to point where gravel content increases. Numbers indicate depth in feet.

cultivated field, 6 feet south and 58 feet east of the northwest corner of SW¼NW¼ sec. 33, T. 9 N., R. 11 W.:

Ap—0 to 7 inches, very dark brown (10YR 2/2) sandy loam, dark gray (10YR 4/1) when dry; weak, medium and coarse, granular structure; friable; common roots; slightly acid; abrupt, smooth boundary.

A12—7 to 18 inches, very dark brown (10YR 2/2) sandy loam, dark grayish brown (10YR 4/2) when dry; weak, very coarse, granular structure; friable; common roots; medium acid; gradual, smooth boundary.

A3—18 to 23 inches, dark brown (10YR 3/3) heavy sandy loam; weak, very coarse, granular structure; friable; common roots; strongly acid; clear, smooth boundary.

B21—23 to 27 inches, dark brown (10YR 3/3) heavy sandy loam; weak, very coarse, granular structure; friable; common roots; few pebbles; continuous coatings on pebbles; strongly acid; clear, smooth boundary.

IIB22—27 to 31 inches, dark brown (10YR 3/3) gravelly sandy clay loam; weak, medium, subangular blocky structure; firm; common roots; continuous coatings on pebbles; strongly acid; clear, smooth boundary.

IIB23—31 to 36 inches, dark brown (10YR 3/3) gravelly coarse sandy loam; weak, medium, subangular blocky structure; firm; common roots; continuous coatings on pebbles; strongly acid; clear, smooth boundary.

IIB31—36 to 43 inches, dark brown (7.5YR 3/2) loamy coarse sand; weak, medium and coarse, subangular blocky structure; very friable; few roots; few pebbles; discontinuous coatings on pebbles; strongly acid; abrupt, smooth boundary.

IIB32—43 to 46 inches, dark brown (7.5YR 3/2) gravelly loamy coarse sand; weak, coarse, subangular blocky structure; very friable; few roots; discontinuous coatings on pebbles; strongly acid; abrupt, smooth boundary.

IIB33—46 to 60 inches, dark brown (7.5YR 3/2) coarse sand; very weak, coarse, subangular blocky structure; very friable; few roots; few pebbles; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. Depth to the gravelly material ranges from 20 to 40 inches. Reaction is strongly acid to mildly alkaline throughout. The Ap and A12 horizons are very dark brown, black, very dark grayish-brown, or very dark gray coarse sandy loam, sandy loam, or loam. The B1 horizon is very dark brown, very dark grayish brown, or dark brown. Other B horizons are dark brown, dark yellowish brown, dark reddish brown, or brown.

Carmi soils formed in the same kind of material as Stockland soils, but Carmi soils have gravelly textures starting at greater depths. Carmi soils contain more gravel than the associated Disco soils.

286—Carmi sandy loam (0 to 2 percent slopes). This nearly level soil is in broad, smooth areas that are large to small and irregularly shaped.

Included with this soil in mapping are small areas of soils that do not have gravel in the subsoil. Also included are several areas of soils that have a loam surface layer. In a few places these areas are large. They are in depressions or in areas that are slightly lower than the surrounding soils. A few small areas of soils that have a thin, dark-colored surface layer are also included.

This soil is well suited to wheat. Most areas are used for crops. Runoff is slow. Lack of available water generally limits growth of crops. Soil blowing is a hazard on this soil where it is left bare. Capability unit IIs–1; woodland suitability group 3s2.

Channahon Series

The Channahon series consists of shallow, nearly level, well-drained soils on a limestone terrace. These soils formed in silty material on limestone bedrock. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark brown silt loam about 10 inches thick. The subsoil is dark yellowish-brown light silty clay loam about 8 inches thick. Below the subsoil is mixed light-gray and brownish-yellow limestone bedrock.

The content of organic matter is moderate. Available water capacity is low. Natural fertility is medium

to high; however, the total plant nutrient supply is limited by the shallow rooting zone. The soils are moderately permeable. They are suited to pasture.

Representative profile of Channahon silt loam in a cultivated field, about 45 feet north and 55 feet west of the southeast corner of NE¼ sec. 30, T. 9 N., R. 11 W.:

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

A3—7 to 10 inches, dark brown (10YR 3/3) silt loam; moderate, fine and medium, granular structure; friable; slightly acid; clear, smooth boundary.

Bt—10 to 18 inches, dark yellowish brown (10YR 3/4) light silty clay loam; moderate and strong, fine and very fine, subangular blocky structure; friable; discontinuous, thin, very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; abrupt, smooth boundary.

IIR—18 inches, light gray (10YR 7/2) and brownish yellow (10YR 6/6) limestone bedrock.

Soil material below the Ap horizon ranges from neutral to slightly acid. The A horizon ranges from 6 to 12 inches in thickness. It is black, very dark brown, dark brown, or very dark grayish brown. The A horizon generally is silt loam, but it is loam in places. The Bt horizon is silty clay loam or clay loam. Depth to bedrock ranges from 10 to 20 inches but generally is about 18 inches. Small fragments of limestone in the solum range from very few to common.

Channahon soils are shallower to bedrock than any other soils in the county.

315—Channahon silt loam (0 to 2 percent slopes). This soil is in the more level areas of the limestone terraces south of West Union. In places fragments of stone are on the surface (fig. 11). Some areas of this soil have been quarried.

Included with this soil in mapping are small areas of gently sloping Channahon silt loam. Also included are areas of steeper soils along the breaks into bottom land.

Some areas of this soil are used for small grains or meadow. Runoff is slow. Maintaining tilth and fertility are concerns of management. Lack of moisture is frequently a concern where any of the cultivated crops are grown. Capability unit IIIs–1; woodland suitability group 3d2.

Chauncey Series

The Chauncey series consists of deep, poorly drained soils in areas of the broad, level uplands. These soils originally formed in loess, but in many places the upper part of the surface layer has formed in local silty

Figure 11.—**Rock at shallow depth limits rooting in Channahon soils.**

wash. The native vegetation was mainly prairie grasses and some trees.

In a representative profile the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsurface layer is about 16 inches thick. The upper part is grayish-brown silt loam, and the lower part is light-gray silt loam mottled with yellowish brown. The subsoil is about 24 inches thick. It is grayish-brown silty clay loam mottled with gray and yellowish brown. The underlying material is light brownish-gray silt loam.

The content of organic matter is moderate. Available water capacity is high. The content of phosphorus is low to very low, and the content of potash is low to medium. The soils are slowly permeable. They are suited to crops and pasture.

Representative profile of Chauncey silt loam in a cultivated field, 165 feet north and 250 feet west of the southeast corner of NE¼SE¼ sec. 15, T. 9 N., R. 13 W.:

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

A12—8 to 12 inches, very dark grayish brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; medium acid; clear, smooth boundary.

A21—12 to 18 inches, grayish brown (10YR 5/2) silt loam that has areas of dark grayish brown (10YR 4/2); common, fine, faint, yellowish brown (10YR 5/4 and 5/6) mottles; weak, medium, platy structure; friable; strongly acid; gradual, smooth boundary.

A22—18 to 28 inches, light gray (10YR 7/2) and light brownish gray (10YR 6/2) silt loam; common, fine and medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; weak, medium, platy structure; friable; few stains of iron; very strongly acid; abrupt, smooth boundary.

B2t—28 to 42 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm; few light gray (10YR 7/2) grains of silt in upper few inches of this layer; common, thin, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; strongly acid; clear, smooth boundary.

B3—42 to 52 inches, grayish brown (10YR 5/2) light silty clay loam; common, coarse, distinct, yellowish brown (10YR 5/4 and 5/8) mottles; weak, medium, subangular blocky structure; firm; few, thin, discontinuous, gray (10YR 5/1) clay films on faces of peds; medium acid; gradual, smooth boundary.

C—52 to 60 inches, light brownish gray (10YR 6/2) silt loam that has noticeable amounts of sand; common, medium and coarse, distinct, yellowish brown (10YR 5/4 and 5/6) and grayish brown (10YR 5/2) mottles; massive; friable; medium acid.

The A horizon ranges from 24 to 36 inches in thickness. The combined Ap and A1 horizons range from 10 to 20 inches in thickness. Soil material below the Ap horizon ranges from medium acid to very strongly acid. In places the B horizon is underlain by a buried soil that formed in Illinoian glacial drift during the Sangamon age.

Chauncey soils are deeper to the B horizon than the associated Cisne, Cowden, and Newberry soils. Unlike Newberry soils, Chauncey soils have an abrupt textural change between the A and B horizons.

287—Chauncey silt loam (0 to 2 percent slopes). This soil is in small circular areas and medium-sized irregularly shaped areas generally at slightly lower elevation than surrounding soils. It receives sediment from the surrounding soils.

This soil is suited to crops. Runoff is slow to ponded. Wetness and fertility are the main limitations to the use of this soil. Permeability is too slow for tile to function adequately. Diversions are sometimes needed to intercept water from higher areas. Capability unit IIIw–1; woodland suitability group 3w2.

Cisne Series

The Cisne series consists of deep, nearly level, poorly drained soils on uplands. These soils formed in loess and Illinoian glacial drift. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is about 9 inches thick. The upper part is grayish-brown silt loam mottled with dark yellowish brown, and the lower part is light brownish-gray silt loam mottled with yellowish brown. The subsoil is about 38 inches thick. The upper part is grayish-brown heavy silty clay loam mottled with strong brown, and the lower part is gray silty clay loam mottled with yellowish brown and that has some sand. The underlying material is grayish-brown silty clay loam mottled with yellowish brown and gray.

The content of organic matter is low. Available water capacity is high, and fertility is low. The soils are very slowly permeable. Most of the acreage is used for crops.

Representative profile of Cisne silt loam in a cultivated field, 120 feet north and 560 feet east of the southwest corner of SE¼SW¼ sec. 34, T. 10 N., R. 14 W.:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) when dry; weak, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A12—6 to 9 inches, very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) when dry; moderate, fine, granular structure; friable; medium acid; clear, smooth boundary.

A21—9 to 14 inches, grayish brown (10YR 5/2) silt loam, pale brown (10YR 6/3) when dry; common, fine, distinct, dark yellowish brown (10YR 4/4) mottles; moderate, medium, platy structure; friable; medium acid; gradual, smooth boundary.

A22—14 to 18 inches, light brownish gray (10YR 6/2) silt loam, white (10YR 8/2) when dry; common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; weak, thick, platy structure; very strongly acid; abrupt, smooth boundary.

B21t—18 to 30 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, fine, prominent, strong brown (7.5YR 5/6 and 5/8) mottles; gray (10YR 5/1) ped exteriors; moderate, fine and medium, prismatic structure parting to moderate, medium subangular blocky; very firm; common, thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; upper 2 inches has thick, discontinuous, light gray (10YR 7/2) silt grains on faces of peds; very dark grayish brown (10YR 3/2) clay films in root channels; very strongly acid; gradual, smooth boundary.

B22t—30 to 40 inches, gray (10YR 5/1) heavy silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, medium, prismatic structure parting to moderate, medium, subangular blocky; very firm; few, thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; dark gray (10YR 4/1) clay films in root channels; very strongly acid; gradual, wavy boundary.

IIB3—40 to 56 inches, gray (10YR 5/1) silty clay loam that has noticeable amounts of sand; common, medium, prominent, strong brown (7.5YR 5/6) mottles and few, fine, prominent, dark brown to brown (7.5YR 4/4) mottles; moderate, medium and coarse, subangular blocky structure grading to weak in the lower part; firm; few dark gray (10YR 4/1) clay films in root channels; strongly acid; gradual, wavy boundary.

IIC—56 to 60 inches, grayish brown (10YR 5/2) silty clay loam that has noticeable amounts of sand; many, coarse, distinct, yellowish brown (10YR 5/6 and 5/8) mottles and few, fine, faint gray (10YR 5/1) mottles; massive; firm; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The A horizon ranges from 15 to 24 inches in thickness. The Ap and A12 horizons are very dark grayish brown, very dark gray, or very dark brown. Soil material below the Ap horizon ranges from medium acid to very strongly acid. In many places the B horizon has angular blocky structure. Light-gray grains of silt are lacking in places in the upper few inches of the B21t horizon. Few to many accumulations of iron and manganese generally are in all horizons.

Cisne soils have thinner combined Ap and A1 horizons and are not so deep to the subsoil as the associated Chauncey soils. Cisne and Wynoose soils formed in similar material, but Cisne soils have a darker colored surface layer. Cisne soils have a darker colored surface layer and contain less exchangeable sodium than the associated Huey soils.

2—Cisne silt loam (0 to 2 percent slopes). This nearly level soil is in rather large open areas. Included in mapping in some of the larger areas of this soil are small spots of Huey and Hoyleton soils.

This soil is suited to intensive cropping. Runoff is slow, and the hazard of erosion is slight. This soil is easily tilled. Wetness and fertility are the main limitations to its use. Capability unit IIIw–1; woodland suitability group 4w2.

Colp Series

The Colp series consists of deep, nearly level to strongly sloping, moderately well drained soils on stream terraces. These soils formed in silty material and fine-textured lakebed sediment. The native vegetation was hardwood trees.

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 about 49 inches thick. The upper part is yellowish-brown silty clay loam, the next part is light olive-brown silty clay, the next part is grayish-brown heavy silty clay loam, and the lower part is olive-brown and light olive-brown silty clay loam.

The content of organic matter is low. Available water capacity is high, and fertility is low. The soils are slowly permeable.

Most of the acreage is idle cropland, but a few areas are wooded.

Representative profile of Colp silt loam, 1 to 7 percent slopes, in a cultivated field, 445 feet south and 60 feet east of the northwest corner of NE¼NE¼ sec. 35, T. 11 N., R. 11 W.:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) when dry; moderate, medium, granular structure; friable; many roots; few soft accumulations of iron and manganese; slightly acid; abrupt, smooth boundary.

A2—8 to 11 inches, brown (10YR 5/3) silt loam; common, medium, distinct, yellowish brown (10YR 5/6) mottles; moderate, thin, platy structure parting to moderate, fine, granular; friable; common roots; strongly acid; clear, smooth boundary.

B1t—11 to 19 inches, yellowish brown (10YR 5/4) silty clay loam; few, medium, distinct, yellowish brown (10YR 5/8) mottles; strong, medium, subangular blocky structure; firm; common roots; few, soft accumulations of iron and manganese; continuous, thin, pale brown (10YR 6/3) silt grains on faces of peds; very strongly acid; gradual, smooth boundary.

IIB21t—19 to 34 inches, light olive brown (2.5Y 5/4) silty clay; strong, coarse, angular blocky structure; firm; common roots; few accumulations of iron and manganese; continuous grayish brown (2.5Y 5/2) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

IIB22t—34 to 49 inches, grayish brown (2.5Y 5/2) heavy silty clay loam; common, medium, faint, light yellowish brown (2.5Y 6/4) mottles; strong, coarse and very coarse, angular blocky structure; very firm; common roots; few, soft, black (N 2/0) accumulations of iron and manganese; moderately grayish brown (10YR 5/2) clay films on faces of peds; thick in root channels; medium acid; clear, smooth boundary.

IIB23t—49 to 54 inches, mixed grayish brown (10YR 5/2) and light olive brown (2.5Y 5/4 and 5/6) heavy silty clay loam; moderate, coarse, angular blocky structure; very firm; common roots; few soft accumulations of iron and manganese; moderately alkaline, slight effervescence; clear, smooth boundary.

IIB3t—54 to 60 inches, mixed olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/4) silty clay loam; weak, coarse, angular blocky structure; very firm; few roots; discontinuous, grayish brown (2.5Y 5/2) clay films; moderately alkaline; strong effervescence.

The solum ranges from 45 to more than 60 inches in thickness. The Ap horizon is very dark grayish brown, dark grayish brown, brown, or grayish brown. An A1 horizon, less than 8 inches thick, is present where the soil is not plowed. The A2 horizon is light yellowish brown, pale brown, or brown. In places the A2 horizon has been mixed with Ap horizon by plowing. The B horizon is yellowish brown, light olive brown, brown, dark brown, olive brown, or grayish brown. The lower B horizon is strongly acid to moderately alkaline.

Colp soils are in positions in the landscape that are similar to those of Camden and Starks soils. Colp soils are more clayey in the subsoil than Camden and Starks soils and better drained than Starks soils.

122B—Colp silt loam, 1 to 7 percent slopes. This soil is on the broader, nearly level tops of stream terraces and in areas around drainageways and crests of escarpments to the bottom land. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of somewhat poorly drained soils that formed in the same material as this soil. Also included are areas of eroded soils that have their surface and subsurface layers mixed because of plowing. Areas of soils that have short, steep slopes are shown on the soil map by a spot symbol.

This soil is suited to crops, pasture, or trees. It is used for crops or it is idle and brushy. Most of these areas have been cropped in the past. The small size of the areas of this soil and access problems limit its use for crops. Runoff is slow to medium. Erosion is a hazard in areas of sloping soils. Wetness is a hazard in the areas of somewhat poorly drained soils. Capability unit IIIe–2; woodland suitability group 3o1.

122D2—Colp silt loam, 7 to 12 percent slopes, eroded. This strongly sloping soil is in generally narrow areas on sides of terraces. In a few places where terraces are small, this soil forms the entire terrace. It has a profile similar to the one described as representative of the series, but the combined surface and subsurface layers are thinner in this soil. These layers generally are mixed in cultivated areas.

Included with this soil in mapping are small areas of uneroded soils that are similar to those described as representative of the series, but they are more sloping. Small areas of severely eroded soils that have short, steep slopes are shown on the soil map by a spot symbol.

This soil is better suited to small grains, hay, or pasture than to other uses. It is also suited to trees. Runoff is rapid. Erosion and low fertility are limitations to use of this soil. Slow water movement causes seepy spots. Capability unit IVe–2; woodland suitability group 3o1.

Cowden Series

The Cowden series consists of deep, nearly level, poorly drained soils on uplands. These soils formed in loess. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is about 11 inches thick. The upper part is dark grayish-brown silt loam, and the lower part is light brownish-gray silt loam mottled with yellowish brown. The subsoil is silty clay loam about 28 inches thick. The upper part is grayish brown, the middle part is gray, and the lower part is light brownish gray. The underlying material is pale-brown silt loam mottled with yellowish brown, and gray silty clay loam mottled with yellowish brown.

The content of organic matter is moderate. Available water capacity is high, and fertility is low. These soils are slowly permeable. They are suited to crops and pasture.

Representative profile of Cowden silt loam in a cultivated field, 495 feet south and 40 feet east of the northwest corner of sec. 19, T. 11 N., R. 14 W.:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A12—6 to 9 inches, very dark grayish brown (10YR 3/2) silt loam; weak, medium, granular structure; friable; medium acid; abrupt, smooth boundary.

A21—9 to 14 inches, dark grayish brown (10YR 4/2) silt loam; common, fine, distinct, yellowish brown (10YR 5/6) mottles and areas of grayish brown (10YR 5/2), especially in the lower part; moderate, medium, platy structure; friable; medium acid; gradual, smooth boundary.

A22—14 to 20 inches, light brownish gray (10YR 6/2) silt loam; common, fine, distinct, yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

B21t—20 to 29 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, fine, distinct, yellowish brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm; few, thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; upper 1 inch has some discontinuous light gray (10YR 7/2) grains of silt on faces of peds; very strongly acid; gradual, smooth boundary.

B22tg—29 to 41 inches, gray (10YR 5/1) heavy silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine and medium, prismatic structure parting to medium, subangular blocky; firm; common, thin, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; very dark gray (10YR 3/1) clay films in root channels; very strongly acid; gradual, smooth boundary.

B3—41 to 48 inches, light brownish gray (10YR 6/2) light silty clay loam; many, medium, prominent, yellowish brown (10YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; some dark gray (10YR 4/1) clay films in root channels; medium acid; gradual, smooth boundary.

C1—48 to 56 inches, pale brown (10YR 6/3) silt loam; many, medium, distinct, yellowish brown (10YR 5/8) mottles; massive; friable; medium acid; clear, wavy boundary.

IIC2b—56 to 60 inches, gray (10YR 5/1) silty clay loam that has noticeable amounts of sand; common, medium, prominent, yellowish brown (10YR 5/8) mottles; massive; firm; slightly acid.

The solum ranges from 40 to more than 60 inches in thickness. The A horizon ranges from 17 to 24 inches in thickness. The Ap and A12 horizons are very dark grayish brown, very dark gray, or very dark brown. Their combined thickness ranges from 6 to 10 inches. Grains of silt on faces of peds in the upper 1 or 2 inches of the B21t horizon are lacking in places. The B horizon ranges from medium acid to very strongly acid. Accumulations of iron-manganese generally are in all horizons, ranging from few to many.

Cowden soils formed in positions similar to those of Cisne soils. The solum of Cowden soils formed entirely in loess; the solum of Cisne soils formed in both loess and glacial drift. Also, the solum of Cisne soils has more sand in the lower part. Cowden and Weir soils formed in similar material, but Cowden soils have a darker colored Ap horizon. Cowden soils are more poorly drained than the associated Oconee soils.

112—Cowden silt loam (0 to 2 percent slopes). This nearly level soil is in large, broad areas. Included in mapping are small areas of Huey, Oconee, and Newberry soils.

Most areas of this soil are used for crops. The soil is easily tilled and is suited to intensive cropping. Runoff is slow, and erosion is not a concern. This soil is unsuited to tile drainage because of its slow permeability. Wetness and fertility are the main limitations to the use of this soil. Capability unit IIw–1; woodland suitability group 3w2.

Darwin Series

The Darwin series consists of deep, nearly level, poorly drained and very poorly drained soils on low-lying bottom land. These soils formed in water-laid silt and clay. The native vegetation was mainly sedges, grasses, and trees.

In a representative profile the surface layer is very dark gray silty clay about 13 inches thick. The subsoil is about 47 inches thick. It is dark-gray silty clay mottled with dark yellowish brown.

The content of organic matter is moderate. Available water capacity is moderate to high, and natural fertility is medium. These soils are very slowly permeable, and they are subject to flooding. They are suited to row crops or trees.

Representative profile of Darwin silty clay in a

cultivated field, 495 feet south and 30 feet east of the northwest corner of sec. 26, T. 9 N., R. 11 W.:

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

A12—6 to 13 inches, very dark gray (10YR 3/1) silty clay; moderate, medium, granular structure; very firm; few, fine, dark brown (10YR 3/3) stains of iron; neutral; clear, smooth boundary.

B1g—13 to 20 inches, dark gray (N 4/0) silty clay that has very dark gray (10YR 3/1) ped exteriors; common, fine, distinct, dark yellowish brown (10YR 4/4) mottles and few, fine, prominent, dark brown to brown (7.5YR 4/4) mottles; moderate, fine and medium, angular blocky structure; very firm; neutral; gradual, smooth boundary.

B21g—20 to 32 inches, dark gray (N 4/0) silty clay that has very dark gray (10YR 3/1) ped exteriors; common, fine, distinct, dark yellowish brown (10YR 4/4) mottles and few, fine, prominent, brown (7.5YR 4/4) mottles; strong, fine, prismatic structure parting to strong, fine and medium, angular blocky; neutral; clear, smooth boundary.

B22g—32 to 40 inches, dark gray (N 4/0) silty clay that has very dark gray (10YR 3/1) ped exteriors; common, medium, distinct, dark yellowish brown (10YR 4/4) mottles and common, medium, prominent, dark brown (7.5YR 4/4) mottles; strong, fine and medium, prismatic structure parting to strong, medium, angular blocky; very firm; neutral; gradual, smooth boundary.

B31g—40 to 51 inches, dark gray (5Y 4/1) silty clay that has some very dark gray (5Y 3/1 and N 3/0) ped exteriors; common, medium, distinct, dark yellowish brown (10YR 4/4) mottles; moderate, medium, angular blocky structure; very firm; neutral; gradual, smooth boundary.

B32g—51 to 60 inches, same as B31g horizon but contains more sand and has small pebbles present in a few places.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon ranges from heavy silty clay loam to clay. The Ap and A12 horizons are very dark gray, very dark brown, very dark grayish brown, or black. The A horizon generally is about 15 inches thick, but thickness ranges from 10 to 18 inches. Reaction in the B horizon ranges from slightly acid to mildly alkaline.

Darwin soils are more clayey than the associated Ambraw and Petrolia soils. They have a thicker, darker colored A horizon than Petrolia soils.

71—Darwin silty clay (0 to 2 percent slopes). This soil is in long, somewhat continuous, low-lying, large areas of bottom land, generally in old channel swales.

Included with this soil in mapping are areas where silty clay loam overwash is present. Also included are small areas where the soils have a heavy clay loam surface layer. These areas are generally near the sandy terrace breaks.

Wetness, tilth, and flooding are the main limitations to the use of this soil. This soil is unsuited to tile drainage because of its very slow permeability. Overflow limits use to summer annual crops. Weed control generally is needed for cultivated row crops. Capability unit IIIw–2; woodland suitability group 3w6.

Disco Series

The Disco series consists of deep, nearly level to gently sloping, well-drained soils on river terraces. These soils formed in loamy and sandy material. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark gray sandy loam about 24 inches thick. The subsoil is sandy loam about 12 inches thick. The upper part is very dark grayish brown, and the lower part is dark yellowish brown. The underlying material is dark yellowish-brown sand.

The content of organic matter is moderate. Available water capacity is moderate, and natural fertility is low. The soils are moderately rapidly permeable.

Disco soils are used for crops. They are well suited to small grains and alfalfa.

Representative profile of Disco sandy loam, 1 to 4 percent slopes, in a cultivated field, about 68 feet south and 35 feet east of the northwest corner of sec. 23, T. 9 N., R. 11 W.:

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

A12—8 to 17 inches, very dark gray (10YR 3/1) sandy loam; weak, fine and medium, granular structure; friable; neutral; gradual, smooth boundary.

A3—17 to 24 inches, very dark gray (10YR 3/1) sandy loam; few, medium, faint, very dark grayish brown (10YR 3/2) mottles; weak, fine, subangular blocky structure; friable; slightly acid; gradual, smooth boundary.

B2—24 to 34 inches, very dark grayish brown (10YR 3/2) sandy loam; few, coarse, faint, dark yellowish brown (10YR 3/4) mottles; weak, fine, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B3—34 to 36 inches, dark yellowish brown (10YR 4/4) sandy loam; weak, fine, subangular blocky structure; very friable; few pebbles; medium acid; clear, smooth boundary.

C—36 to 60 inches, dark yellowish brown (10YR 4/4) sand, light yellowish brown (10YR 6/4) when dry; single grained; loose; medium acid.

The solum ranges from 36 to 60 inches in thickness. The A horizon ranges from 24 to 30 inches in thickness. It is black, very dark gray, very dark brown, or very dark grayish brown. Reaction in this horizon ranges from neutral to medium acid. The B2 horizon is light loam or sandy loam.

Disco and Lamont soils formed in similar material, but Disco soils have a thicker darker colored A horizon than Lamont soils. Disco soils have less gravel in the solum than the associated Carmi soils.

266B—Disco sandy loam, 1 to 4 percent slopes. This soil is mainly in areas of broad terraces. Included in mapping are a few areas of soils that have thin layers of gravelly sand below a depth of 30 inches. Also included are a few areas of somewhat poorly drained soils.

This soil is better suited to small grains or alfalfa than to other crops. It is suited to all crops grown in the county. Runoff is slow. Droughtiness and soil blowing are the main limitations to its use. Capability unit IIIs–1; woodland suitability group 3s2.

Drummer Series

The Drummer series consists of deep, nearly level, poorly drained soils. These soils are only in the area of Wisconsin glaciation in the northwestern part of the county. They formed in deposits of loess and outwash or glacial till. The native vegetation was marsh grasses and sedges.

In a representative profile the surface layer is silty clay loam about 20 inches thick. The upper part is

black, and the lower part is very dark gray. The subsoil is silty clay loam about 29 inches thick. The upper part is grayish brown and has mottles of yellowish brown. Faces of peds in this part are coated with very dark gray clay films. The lower part is olive gray and has mottles of olive brown. Faces of peds and root channels are coated with dark-gray clay films. The underlying material is light brownish-gray loam and light clay loam mottled with yellowish brown.

The content of organic matter is high. Available water capacity is very high. The soils are naturally slightly acid to neutral in reaction. The content of phosphorus is low to medium, and the content of potassium is high. The soils are moderately permeable. Most of the acreage is used for crops.

Representative profile of Drummer silty clay loam in a cultivated field, 10 feet south and 50 feet east of the northwest corner of NE¼NW¼ sec. 19, T. 12 N., R. 14 W.:

Ap—0 to 7 inches, black (10YR 2/1) silty clay loam; moderate, fine, granular structure; friable; sand grains in places; slightly acid; abrupt, smooth boundary.

A12—7 to 16 inches, black (10YR 2/1) silty clay loam; moderate, fine and medium, granular structure; firm; slightly acid; clear, smooth boundary.

A13—16 to 20 inches, very dark gray (10YR 3/1) silty clay loam; few, fine, distinct, yellowish brown (10YR 5/4) mottles; moderate, fine, subangular blocky structure; firm; slightly acid; clear, smooth boundary.

B1g—20 to 27 inches, grayish brown (2.5Y 5/2) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles and common, fine, faint, dark gray (10YR 4/1) mottles; moderate, fine, prismatic structure parting to moderate, medium, angular blocky; firm; nearly continuous very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; slightly acid; gradual, smooth boundary.

B2g—27 to 38 inches, grayish brown (2.5Y 5/2) silty clay loam; many, fine, distinct, yellowish brown (10YR 5/6) mottles; strong, fine and medium, prismatic structure parting to strong, medium, angular blocky; common, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; firm; neutral; gradual, smooth boundary.

IIB3g—38 to 49 inches, olive gray (5Y 5/2) silty clay loam; common, fine, distinct, light olive brown (2.5Y 5/6) mottles; moderate, medium, subangular blocky structure; firm; few dark gray (5Y 4/1) films in root channels; few, thin, 1- to 2-inch bands; very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay loam outwash in lower part of this layer; neutral; clear, smooth boundary.

IICg—49 to 60 inches, light brownish gray (2.5Y 6/2) stratified light clay loam and loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles and common, fine, faint, grayish brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure grading to massive; friable; few dark gray (10YR 4/1) films in root channels; mildly alkaline.

The solum ranges from 40 to 55 inches in thickness. Loess ranges from 35 to 50 inches in thickness. The IIB3 horizon is silty clay loam or clay loam. The IICg horizon is sandy loam, loam, or silt loam outwash or loam or clay loam till. Depth to mildly alkaline soil material is more than 40 inches.

Drummer soils are not as well drained and contain more clay in the surface layer than the associated Brenton soils.

152—Drummer silty clay loam (0 to 2 percent slopes). This soil is in medium and large, irregularly shaped areas on the outwash plain; small, irregularly shaped areas at the heads of drainageways on the moraine, and medium, long, narrow areas along drainageways.

Included with this soil in mapping are small areas of soils that have a silt loam surface layer. Also included are a few areas of somewhat poorly drained soils.

This soil is suited to intensive cultivation and pasture. Runoff is slow. The soil becomes cloddy and hard if plowed when wet, and it dries out slowly in spring. Soil blowing occurs in places when the soil is fall plowed. Providing adequate drainage and maintaining good tilth are the main concerns of management. Capability unit IIw–1; woodland suitability group 2w3.

Ebbert Series

The Ebbert series consists of deep, nearly level, very poorly drained to poorly drained soils. These soils formed in loess, and they are underlain by Illinoian drift. The native vegetation was mainly sedges and reeds.

In a representative profile the surface layer is very dark gray silt loam about 11 inches thick. The subsurface layer is dark-gray silt loam mottled with yellowish brown. It is about 6 inches thick. The subsoil is about 39 inches thick. The upper part is dark-gray and gray silty clay loam, the middle part is grayish-brown silty clay loam mottled with yellowish brown, and the lower part is gray and grayish-brown light silty clay loam. The underlying material is very dark gray silty clay loam that has some sand grains and a few dark-brown mottles.

The content of organic matter is moderate. Available water capacity is very high, and natural fertility is low to medium. The soils are slowly permeable. Most of the acreage is used for crops.

Representative profile of Ebbert silt loam in a cultivated field, 50 feet south and 660 feet east of the northwest corner of sec. 4, T. 9 N., R. 14 W.:

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

A12—7 to 11 inches, very dark gray (10YR 3/1) silt loam; few, fine, distinct, dark yellowish brown (10YR 4/4) mottles; weak and moderate, fine, granular structure; friable; slightly acid; clear, smooth boundary.

A2—11 to 17 inches, dark gray (10YR 4/1) silt loam; common, fine, distinct, dark yellowish brown (10YR 4/4) mottles; weak, medium, platy structure parting to weak, fine, granular; friable; light gray (10YR 7/1) flecks; small areas where material is very dark gray (10YR 3/1); strongly acid; clear, smooth boundary.

B1g—17 to 20 inches, dark gray (10YR 4/1) and gray (10YR 5/1) silty clay loam; common, fine, distinct, dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm; common, discontinuous, very dark gray (10YR 3/1) clay films on faces of peds; few light gray (10YR 7/1) grains of silt on faces of peds in upper part of this layer; strongly acid; clear, smooth boundary.

B21tg—20 to 32 inches, grayish brown (2.5Y 5/2) silty clay loam; common, fine and medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; moderate,

fine and medium, prismatic structure parting to moderate, medium, angular blocky; firm; common, discontinuous, dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films on faces of peds; medium acid; gradual, smooth boundary.

B22tg—32 to 40 inches, grayish brown (2.5Y 5/2) silty clay loam; common, medium, distinct, yellowish brown (10YR 5/4 and 5/8) mottles; moderate, medium, prismatic structure parting to moderate, medium, angular blocky; firm; common, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; few very dark gray (10YR 3/1) clay films in root channels; medium acid; gradual, smooth boundary.

B3g—40 to 56 inches, gray (10YR 5/1) and grayish brown (10YR 5/2) light silty clay loam; many, medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; weak and moderate, medium, subangular blocky structure; firm, friable in the lower part; few dark gray (10YR 4/1) clay films in root channels; lower few inches is silt loam; slightly acid; clear, smooth boundary.

IICg—56 to 60 inches, very dark gray (10YR 3/1) silty clay loam; few, medium, faint, dark brown (10YR 3/3) mottles; massive; firm; some sand grains; a buried Sangamon age paleosol; slightly acid.

The solum ranges from 45 to more than 60 inches in thickness. The Ap and A12 horizons are very dark gray, black, or very dark grayish brown. Combined, these horizons range from 10 to 16 inches in thickness. Soil material below the Ap horizon ranges from slightly acid to strongly acid. The IIC material is loam, clay loam, silty clay loam, or silt loam.

Ebbert soils have a thicker dark-colored surface layer than the associated Newberry soils. Unlike the associated Cisne, Cowden, and Chauncey soils, Ebbert soils do not have an abrupt textural change from the surface layer to the subsoil.

48—Ebbert silt loam (0 to 2 percent slopes). This nearly level soil is in small, round, medium and large, irregularly shaped depressional areas. It generally is in the lowest part of the depression. Crayfish holes filled with darker colored material are common in this soil.

This soil is suited to crops. Runoff is slow or ponded. This soil is unsuited to tile drainage because of its slow permeability. Poor tilth can develop with poor soil management. Wetness and low fertility are the main limitations to the use of this soil. Capability unit IIw–1; woodland suitability group 3w2.

Genesee Series

The Genesee series consists of deep, well-drained, nearly level soils in various sized areas of bottom land. These soils formed in water-laid silt and sand. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The underlying material is layered brown silt loam, dark yellowish-brown loam and sandy loam, and yellowish-brown and dark yellowish-brown loamy sand, sandy loam, and sand.

The content of organic matter is low. Available capacity is high, and natural fertility is low to medium. The soils are moderately permeable. They are subject to flooding.

Most of the acreage is used for crops, but in places areas are used for woodland.

Representative profile of Genesee silt loam in a cultivated field, about 600 feet west and 260 feet north of the center of sec. 8, T. 11 N., R. 11 W.:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; few roots; mildly alkaline; abrupt, smooth boundary.

C1—10 to 28 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; few roots; mildly alkaline; clear, smooth boundary.

C2—28 to 34 inches, dark yellowish brown (10YR 4/4) loam; massive; friable; few roots; neutral; clear, smooth boundary.

C3—34 to 42 inches, dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; few roots; medium acid; clear, smooth boundary.

C4—42 to 52 inches, 70 percent yellowish brown (10YR 5/4) and 30 percent dark yellowish brown (10YR 4/4) stratified loamy sand and sandy loam; single grained; very friable; few roots; medium acid; clear, smooth boundary.

C5—52 to 60 inches, 60 percent yellowish brown (10YR 5/4) and 40 percent dark yellowish brown (10YR 4/4) stratified sand and loamy sand; single grained; loamy sand is very friable, sand is loose; no roots; medium acid.

The Ap horizon is dark grayish brown, brown, or dark brown and is slightly acid to mildly alkaline. The C horizons are mildly alkaline to medium acid.

Genesee soils are better drained than the associated Shoals soils. They are not so sandy as the associated Stonelick soils.

431—Genesee silt loam (0 to 2 percent slopes). This soil is in small to large, irregularly shaped areas on stream bottoms. Included in mapping are areas near bluffs where soils contain some gravel. Also included are some small spots of sandy soils.

This soil is well suited to row crops commonly grown in the county. Runoff is slow. The soil is subject to flooding that is generally of short duration and is in the spring. Occasionally small areas of this soil along stream channels are scoured by stream overflow. These areas should be kept in permanent vegetation. Capability unit I–1; woodland suitability group 1o4.

Hickory Series

The Hickory series consists of deep, strongly sloping to very steep, moderately well drained and well drained soils on uplands. Most commonly they are on steep bluffs where uplands slope into bottom land. These soils formed in Illinoian-age glacial till. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown and very dark brown loam about 3 inches thick. The subsurface layer is brown loam about 5 inches thick. The subsoil is yellowish-brown clay loam about 34 inches thick. The lower part has grayish brown mottles. The underlying material is mixed grayish-brown, brown, and yellowish-brown heavy loam.

The content of organic matter is low. Available water capacity is high, and natural fertility is low. Unless limed, the surface layer is medium acid to strongly acid. The soils are moderately permeable. They are suited to pasture or woodland.

Representative profile of Hickory loam, 18 to 60 percent slopes, eroded, in a wooded area, 330 feet north and 250 feet west of the southeast corner of SE¼ NW¼ sec. 28, T. 11 N., R. 12 W.:

A11—0 to 1 inch, very dark brown (10YR 2/2) loam;

strong, very fine, granular structure; friable; medium acid; abrupt, smooth boundary.

A12—1 to 3 inches, dark grayish brown (10YR 4/2) loam; strong, very fine, granular structure; friable; very strongly acid; clear, smooth boundary.

A2—3 to 8 inches, brown (10YR 5/3) loam, small areas of dark brown (10YR 4/3); moderate, fine, granular structure; friable; very strongly acid; clear, smooth boundary.

B1—8 to 13 inches, yellowish brown (10YR 5/6) clay loam; strong, very fine, subangular blocky structure; firm; very strongly acid; clear, smooth boundary.

B21t—13 to 26 inches, yellowish brown (10YR 5/6) clay loam; few medium, faint, strong brown (7.5YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm; few, thin, discontinuous, brown (7.5YR 4/4) clay films on faces of peds; strongly acid; gradual, smooth boundary.

B22t—26 to 35 inches, yellowish brown (10YR 5/6) clay loam; common, fine, distinct, strong brown (7.5YR 5/6 and 5/8) and grayish brown (10YR 5/2) mottles; moderate, medium, subangular blocky structure; firm; common, thin, discontinuous, dark brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) clay films on faces of peds; common very dark grayish brown (10YR 3/2) stains in root channels and on some faces of peds; medium acid; gradual, smooth boundary.

B3—35 to 42 inches, yellowish brown (10YR 5/6) light clay loam; common, medium, distinct, grayish brown (10YR 5/2) and brown (10YR 5/3) mottles and few, fine, distinct, strong brown (7.5YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; slightly acid; gradual, wavy boundary.

C—42 to 60 inches, grayish brown (10YR 5/2) and brown (10YR 5/3) heavy loam; few, medium, faint, yellowish brown (10YR 5/4 and 5/6) mottles; massive; compact, friable; moderately alkaline; strongly effervescent.

The solum ranges from 40 to more than 60 inches in thickness. In cleared areas the thin, dark A11 horizon is lacking. Gravel is throughout the profile; it generally increases in content as depth increases. Accumulations of iron-manganese are in all horizons of these soils, ranging from few to common. In the B horizons reaction ranges from very strongly acid to slightly acid. In the C horizon it ranges from neutral to moderately alkaline. Texture of the C horizon ranges from clay loam to loam.

Hickory and Miami soils formed in similar material. Hickory soils are leached to a depth of more than 40 inches. They have a higher content of sand than the associated Alford, Ava, and Hosmer soils. Unlike the Ava and Hosmer soils, Hickory soils have no fragipan.

8D2—Hickory loam, 7 to 12 percent slopes, eroded. This soil is on sides of drainageways that generally are wooded or in permanent pasture. The profile of this soil is similar to the one described as representative of the series, but this soil is less sloping than the representative soil. Included in mapping are small areas of soils that are less sloping than this one and areas of slightly eroded soils.

The soil is suited to crops, pasture, and trees. Runoff is rapid. Controlling erosion and maintaining fertility are the main concerns of management in cleared areas of this soil. Capability unit IIIe–1; woodland suitability group 1o1.

8D3—Hickory clay loam, 7 to 12 percent slopes, severely eroded. This soil is on sides of drainageways that have been cleared of trees and have been cropped rather intensively. Erosion has removed the top two layers of this soil. Originally those layers were the same as the ones shown in the representative profile. Tilth is poor in the plow layer of this soil.

Included with this soil in mapping are small areas of severely eroded soils that are less sloping than this one, areas where the surface layer of the soil is loam, and areas where the surface layer is silty clay loam. Also included are small areas of soils that have 2 to 3 feet of loess underlain by glacial till.

This soil is better suited to hay and pasture than to other uses. It is also suited to trees and to an occasional small-grain crop when grasses and legumes are reestablished. Runoff is rapid on this soil. Some areas need to have gullies filled and brush removed as a part of their renovation. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Capability unit IVe–1; woodland suitability group 1o1.

8E2—Hickory loam, 12 to 18 percent slopes, eroded. This soil is mainly on wooded sides of drainageways and in areas where slopes drain into bottom land. Some areas are cleared and are in permanent pasture. The profile of this soil is similar to the one described as representative of the series, but this soil is less sloping than the representative soil.

Included with this soil in mapping are small areas of slightly eroded and uneroded Hickory loam. Also included are small areas of soils that have 2 to 3 feet of loess underlain by glacial till.

Cleared areas of this soil are suited to hay and pasture. Controlling erosion and maintaining fertility are concerns of management in these areas. Wooded areas of this soil used for timber production need to be managed. Runoff is rapid on this soil. Capability unit IVe–1; woodland suitability group 1r2.

8E3—Hickory clay loam, 12 to 18 percent slopes, severely eroded. This soil is on cleared sides of drainageways and on bluffs that slope into bottom land. In places brush and young trees have grown up in abandoned areas. The surface layer is yellowish-brown clay loam that contains some gravel.

Included with this soil in mapping are small, gullied areas of soils and areas where the surface layer of the soil is silty clay loam. Also included are a few small areas of soils that have 2 or 3 feet of loess over glacial till. Some small areas of exposed bedrock are shown on the soil map by spot symbols (fig. 12).

This soil is better suited to permanent vegetation than to other uses. Runoff is rapid. Erosion, fertility, and tilth are the main limitations to use of this soil. In places gully filling and brush removal are needed for renovation. Capability unit VIe–1; woodland suitability group 1r2.

8F2—Hickory loam, 18 to 60 percent slopes, eroded. This soil is mainly on the wooded sides of drainageways and upland bluffs sloping into bottom land. Some areas of this soil are cleared and are in permanent pasture. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of slightly eroded and uneroded Hickory loam. Exposures of sandstone bedrock are present in places. They are shown on the soil map by spot symbols. These areas are generally near the bases of slopes.

Most areas of this soil are better suited to trees than to other uses. In places cleared areas can be planted to adapted pines or, if accessible to farm machinery,

Figure 12.—**This exposed bedrock near the base of the slope in Hickory soils is shown on the map by a spot symbol.**

they can be seeded in pasture. Runoff is rapid. The main concerns of management are erosion, maintenance of fertility, and slope. Capability unit VIe–1; woodland suitability group 1r2.

Hosmer Series

The Hosmer series consists of deep, gently sloping, moderately well drained soils that have a fragipan. These soils formed in loess. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark-brown silt loam about 8 inches thick. The subsurface layer is dark yellowish-brown silt loam about 3 inches thick. The subsoil is about 49 inches thick. It is yellowish-brown silty clay loam in the upper 12 inches and dark yellowish-brown silt loam in the next 3 inches. The lower part of the subsoil is a brittle fragipan about 34 inches thick. The upper 18 inches is brown light silty clay loam, and the lower 16 inches is strong-brown silt loam.

The content of organic matter is low. Available water capacity is moderate, and natural fertility is low. The soils are slowly permeable. Root growth is somewhat restricted by the compact fragipan.

Most of the acreage is used for crops or pasture, but a few areas remain wooded.

Representative profile of Hosmer silt loam, 2 to 4 percent slopes, in a cultivated field, 30 feet north and 582 feet east of the southwest corner of NW¼SW¼ sec. 36, T. 10 N., R. 12 W.:

Ap—0 to 8 inches, dark brown (10YR 4/3) silt loam; weak, fine, and medium, granular structure; friable; common roots; medium acid; abrupt, smooth boundary.

A2—8 to 11 inches, dark yellowish brown (10YR 4/4) silt loam; moderate, fine and medium, granular structure; friable; few roots; very strongly acid; clear, smooth boundary.

B1—11 to 13 inches, yellowish brown (10YR 5/4) light silty clay loam; weak, fine, subangular blocky structure; friable; few roots; very strongly acid; gradual, smooth boundary.

B2t—13 to 23 inches, yellowish brown (10YR 5/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; thin, dark, yellowish brown (10YR 4/4) clay films on vertical faces of peds; few roots; very strongly acid; clear, smooth boundary.

B&A—23 to 26 inches, dark yellowish brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; firm; few roots; pale brown (10YR 6/3) grains of silt on faces of peds; few fine accumulations of iron and manganese; very strongly acid; clear, smooth boundary.

Bx1—26 to 44 inches, brown (7.5YR 4/4) light silty clay loam; weak, coarse, angular blocky structure; very firm; brittle; few roots in polygonal cracks; nearly continuous, thin, light brownish gray (10YR 6/2) clay films on faces of peds; pale brown (10YR 6/3) material in polygonal cracks; few fine accumulations of iron-manganese; very strongly acid; gradual, smooth boundary.

Bx2—44 to 60 inches, brown (7.5YR 5/4) silt loam; weak, coarse, prismatic structure parting to massive; very firm; few roots in polygonal cracks; few, patchy, light brownish gray (10YR 6/2) clay films on faces of peds; pale brown (10YR 6/3) material in cracks; few fine accumulations of iron and manganese; strongly acid; abrupt, smooth boundary.

The solum ranges from 48 to more than 60 inches in thickness. The Ap horizon is dark brown, brown, or dark grayish brown. The A2 horizon is dark yellowish brown, brown, or yellowish brown. Depth to the fragipan ranges from 25 to 40 inches. The Bx horizons range from 24 to more than 50 inches in thickness.

Hosmer and Ava soils have similar profiles. Hosmer soils formed entirely in loess, however, while Ava soils formed in loess and glacial drift. Unlike the associated Hickory soils, Hosmer soils have a fragipan. Hosmer soils are better drained than the associated Stoy soils.

214B—Hosmer silt loam, 2 to 4 percent slopes. This soil is generally on ridgetops between steeper soils and on long gently sloping areas on upland rises.

Included with this soil in mapping are small areas of level Hosmer soils. Also included are areas of Stoy silt loam in small spots of the broader areas of this soil.

Most areas of this soil are suited to cultivated crops and grasses. Runoff is medium. The main concerns of management are erosion and maintenance of fertility. This soil is easily worked. Capability unit IIe–2; woodland suitability group 2o1.

Hoyleton Series

The Hoyleton series consists of deep, nearly level to moderately sloping, somewhat poorly drained soils on uplands. These soils formed in loess and glacial drift. The native vegetation was mainly prairie grasses and scattered trees.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is pale-brown silt loam about 10 inches thick. The subsoil is about 41 inches thick. The upper part is yellowish-brown silty clay loam mottled with grayish brown; the next part is grayish-brown silty clay loam mottled with yellowish brown; the next part is light brownish-gray silty clay loam mottled with yellowish-brown; and the lower part is mixed brown, gray, and yellowish-brown silt loam.

The content of organic matter is low. Available water capacity is high, and fertility is low. The soils are slowly permeable. Most of the acreage is used for crops or pasture.

Representative profile of Hoyleton silt loam, 0 to 2 percent slopes, in a cultivated field, about 168 feet south and 30 feet east of the center of sec. 34, T. 10 N., R. 13 W.:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) when dry; moderate, medium, granular structure; friable; common roots; neutral; abrupt, smooth boundary.

A21—9 to 14 inches, pale brown (10YR 6/3) silt loam; few, medium, distinct, dark grayish brown (10YR 4/2) mottles; moderate, very fine and fine, granular structure; friable; common roots; medium acid; clear, smooth boundary.

A22—14 to 19 inches, pale brown (10YR 6/3) silt loam; few, fine, distinct, yellowish brown (10YR 5/4) mottles; moderate, fine and medium, granular structure; friable; common roots; medium acid; clear, smooth boundary.

B21t—19 to 27 inches, yellowish brown (10YR 5/4) silty clay loam; many, fine and medium, distinct, grayish brown (10YR 5/2) mottles; moderate, medium, subangular blocky structure parting to moderate, fine, subangular blocky; firm; common roots; light gray (10YR 7/2, dry) silt grains on faces of peds; dark grayish-brown (10YR 4/2) clay films in pores; few, fine, soft iron-manganese accumulations; very strongly acid; gradual, smooth boundary.

B22t—27 to 39 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, distinct yellowish-brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure parting to moderate, medium subangular blocky; firm; common roots; few light gray (10YR 7/2, dry) grains of silt on vertical faces of peds; nearly continuous grayish brown (10YR 5/2) clay films; few soft accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

B23t—39 to 51 inches, light brownish gray (10YR 6/2) silty clay loam; few, fine, faint, light gray (10YR 7/1) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure; firm; few roots; few, discontinuous, dark gray (10YR 4/1) clay films; few soft accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

IIB3—51 to 60 inches, mixed, 40 percent brown (10YR 5/3), 30 percent gray (10YR 6/1), and 30 percent yellowish brown (10YR 5/6) silt loam that has noticeable amounts of sand; weak, coarse, subangular blocky structure; firm; patchy grayish brown (10YR 5/2) and dark gray (10YR 4/1) clay films; few soft accumulations of iron and manganese; strongly acid; clear, smooth boundary.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is black, very dark brown, very dark gray, or very dark grayish brown. The IIB horizon is silt loam, clay loam, light silty clay loam, or loam. Reaction in the IIB horizon ranges from strongly acid to slightly acid. In some profiles red (2.5YR 5/6) mottles are in the B21t and B22t horizons, ranging from few to common.

Hoyleton soils are better drained than the associated Cisne soils. They have more sand in the lower part of the solum than the similar Oconee soils.

3A—Hoyleton silt loam, 0 to 2 percent slopes. This soil generally is on slight rises in the relatively flat till plain. Areas are small, generally less than 10 acres in size. This soil has the profile described as representative of the series.

This soil is suited to crops. Runoff is slow, and the

hazard of erosion is slight. Wetness and fertility are the main limitations to use of this soil. This soil is easily tilled. Capability unit IIw–3; woodland suitability group 3o1.

3B—Hoyleton silt loam, 2 to 4 percent slopes. This soil is on mounded areas in the otherwise flat till plain and on the sides of drainageways near the upper ends. It has a profile similar to the one described as representative of the series. The combined surface and subsurface layers of this soil are thinner than those in the representative profile, however, and this soil is more sloping than the representative soil.

Runoff is medium. Erosion and fertility are the main limitations. Additional surface drainage is needed in places. This soil is easily worked. Capability unit IIe–3; woodland suitability group 3o1.

3C2—Hoyleton silt loam, 4 to 7 percent slopes, eroded. This soil is on sides of mounded areas and drainageways. It has a profile similar to the one described as representative of the series, but the combined surface and subsurface layers of this soil are thinner than those in the representative profile. In most places the plow layer contains material from the upper part of the subsoil. In places the plow layer is reddish and somewhat sticky when wet.

Included with this soil in mapping are small areas of uneroded Hoyleton soils, 4 to 7 percent slopes, that have the profile described as representative of the series. Also included are small areas of severely eroded Hoyleton soils.

This soil is suited to crops or pasture. Runoff is medium, but in places it is rapid on the included severely eroded soils. Erosion is the main concern of management. Capability unit IIIe–3; woodland suitability group 3o1.

Huey Series

The Huey series consists of deep, nearly level to gently sloping, poorly drained soils. These soils formed in loess and glacial drift that contain a large amount of exchangeable sodium. The native vegetation was mainly drought-resistant grasses, weeds, and scattered brushy plants.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is grayish-brown and light brownish-gray silt loam mottled with yellowish brown. It is about 6 inches thick. The subsoil is about 25 inches thick. It is mildly alkaline to strongly alkaline. The upper part is grayish-brown silty clay loam mottled with yellowish brown, and the lower part is light brownish-gray silty clay loam. The underlying material is mixed grayish-brown, strong-brown, and light brownish-gray silty clay loam. It is moderately alkaline to strongly alkaline.

The content of organic matter is low. Available water capacity is low. Natural fertility is low, and the soils do not respond very well to fertilization. The soils are very slowly permeable. They have poor physical characteristics because of the high content of sodium. Most areas are small and are used with surrounding cropland.

Representative profile of Huey silt loam, in a cultivated field, 15 feet south and 330 feet west of the northeast corner of SE¼SE¼ sec. 14, T. 9 N., R. 13 W.:

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

A2—6 to 12 inches, grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) silt loam; common, fine and medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; weak, medium, platy structure; friable; few concretions of iron and manganese; strongly acid; abrupt, smooth boundary.

B21t—12 to 18 inches, grayish brown (10YR 5/2) silty clay loam; many, fine, faint, dark brown (10YR 4/3) mottles and common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; weak, medium, subangular blocky structure; firm; mildly alkaline; clear, smooth boundary.

B22t—18 to 28 inches, grayish brown (10YR 5/2) heavy silty clay loam; many, fine, distinct, yellowish brown (10YR 5/6) mottles and common, fine, faint, gray (10YR 5/1) mottles; weak, medium, subangular blocky structure; very firm; moderately alkaline; gradual, smooth boundary.

IIB3—28 to 37 inches, light brownish gray (10YR 6/2) silty clay loam that contains noticeable amounts of sand; common, medium, distinct, yellowish brown (10YR 5/4 and 5/8) mottles and few, fine, faint, gray (10YR 5/1) mottles; weak, coarse, subangular blocky structure; firm; moderately alkaline; gradual, wavy boundary.

IIC—37 to 60 inches, mixed grayish brown (10YR 5/2), strong brown (7.5YR 5/6 and 5/8), gray (10YR 5/1), and light brownish gray (10YR 6/2) silty clay loam that contains noticeable amounts of sand; massive; firm; moderately alkaline.

The solum ranges from 36 to more than 60 inches in thickness. The Ap horizon is dark grayish brown, dark gray, gray, or grayish brown. In the Ap horizon reaction ranges from strongly acid to slightly alkaline. In the B and C horizons, reaction ranges from mildly alkaline to strongly alkaline. Few-to-many stains and accumulations of iron and manganese are in all horizons of these soils.

Huey soils contain more exchangeable sodium and have a lighter colored Ap horizon than the associated Cisne and Cowden soils.

120—Huey silt loam (0 to 3 percent slopes). Areas of this soil are small, circular, and irregularly shaped. They generally are less than 10 acres in size and are associated with areas of Cisne and Cowden soils. In some areas where this soil is level, subsoil material that has a high content of sodium is mixed with the material in the surface layer. Included in mapping are small areas of better drained soils.

This soil is better suited to wheat or pasture than to other uses. Most areas are cultivated because of their occurrence with larger areas of better soils. Runoff is slow. The concerns of management are tilth, wetness, maintenance of fertility, droughtiness, and erosion where slopes are 1 percent or more. This soil becomes wet and spongy early in fall, which causes difficulty in harvesting. Capability unit IVw–1; woodland suitability group 4t3.

Iva Series

The Iva series consists of deep, nearly level, somewhat poorly drained soils on uplands. These soils formed in loess more than 60 inches thick. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark

grayish-brown silt loam about 9 inches thick. The subsurface layer is light brownish-gray silt loam about 3 inches thick. The subsoil is about 42 inches thick. The upper part is brown silty clay loam mottled with grayish brown, and the middle part is yellowish-brown silty clay loam mottled with gray and grayish-brown. The lower part of the subsoil is yellowish-brown silt loam mottled with grayish brown. The underlying material is mixed brown, yellowish-brown, and gray silt loam.

The content of organic matter is low. Available water capacity is high, and fertility is low to medium. The soils are slowly permeable.

Most of the acreage is used for crops or pasture, but a few areas are used for woodland.

Representative profile of Iva silt loam, 0 to 2 percent slopes, in a pasture, about 45 feet south and 25 feet west of the northeast corner of sec. 16, T. 10 N., R. 11 W.:

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; few roots; slightly acid; abrupt, smooth boundary.

A2—9 to 12 inches, light brownish gray (10YR 6/2) silt loam; common, fine, faint, brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; weak, medium, granular structure; friable; few roots; strongly acid; clear, smooth boundary.

B1—12 to 16 inches, brown (10YR 5/3) light silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6) mottles and many, fine, faint, light brownish gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure parting to moderate, fine, subangular blocky; firm; few roots; continuous grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual, smooth boundary.

B21—16 to 27 inches, brown (10YR 5/3) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6) mottles and many, fine, faint, light brownish gray (10YR 6/2) mottles; moderate, medium and coarse, subangular blocky structure; continuous grayish brown (10YR 5/2) clay films on faces of peds; firm; few roots; very strongly acid; gradual, smooth boundary.

B22—27 to 40 inches, yellowish brown (10YR 5/6) silty clay loam; common, fine, distinct, brown (10YR 5/3) and gray (10YR 6/1) mottles; moderate, coarse, subangular blocky structure; firm; few roots; very strongly acid; gradual, smooth boundary.

B31—40 to 48 inches, yellowish brown (10YR 5/6) light silty clay loam; many, fine, distinct, grayish brown (10YR 5/2) and brown (10YR 5/3) mottles; weak, coarse, subangular blocky structure; firm; few roots; neutral; gradual, smooth boundary.

B32—48 to 54 inches, yellowish brown (10YR 5/4) heavy silt loam; many, fine, distinct, grayish brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure; firm; few roots; mildly alkaline; gradual, smooth boundary.

C—54 to 60 inches, mixture of 40 percent yellowish brown (10YR 5/6), 30 percent brown (10YR 5/3), and 30 percent gray (10YR 6/1) silt loam; massive; mildly alkaline.

The solum ranges from 36 to 60 inches in thickness. The Ap horizon is light brownish gray, grayish brown, or dark grayish brown. The B2 horizon is medium to light silty clay loam. The C horizon is silt loam or silt.

Iva soils are more poorly drained than the associated Muren and Alford soils. They are better drained than the associated Weir soils.

454A—Iva silt loam, 0 to 2 percent slopes. This nearly level soil is on uplands. Areas are irregularly shaped and are small to large in size.

Most areas of this soil are suited to cultivated crops. Drainage is needed for optimum growth of crops. The soil is also suited to pasture and trees. Runoff is slow. Capability unit IIw–3; woodland suitability group 3o1.

Jules Series

The Jules series consists of deep, nearly level, well-drained soils in areas near the streams in the bottom lands of the Wabash River. These soils formed in water-laid silt and sand. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown calcareous silt loam about 10 inches thick. The underlying material is brown, calcareous silt loam to a depth of about 54 inches.

The content of organic matter is low. Available water capacity is high, and natural fertility is medium to high. The soils are moderately permeable. They are subject to flooding.

Representative profile of Jules silt loam in a cultivated field, about 500 feet south and 1,730 feet east of the northwest corner of SW¼ sec. 34, T. 9 N., R. 11 W.:

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

C1—10 to 15 inches, brown (10YR 4/3) silt loam; few, medium, faint, dark grayish brown (10YR 4/2) mottles; massive; friable; some grains of sand; mildly alkaline, calcareous; gradual, smooth boundary.

C2—15 to 28 inches, brown (10YR 4/3) silt loam; massive; friable; some grains of sand; mildly alkaline, calcareous; abrupt, smooth boundary.

C3—28 to 31 inches, brown (10YR 4/3) very fine sand; single grained; loose; mildly alkaline, calcareous; clear, smooth boundary.

C4—31 to 54 inches, brown (10YR 4/3) silt loam; massive; friable; some lenses of sand; few, fine, black (N 2/0) concretions; few grayish brown (10YR 5/2) worm casts; mildly alkaline; calcareous; abrupt, smooth boundary.

In places the Ap horizon of these soils contains more sand than the Ap horizon in the representative profile. The Ap horizon is brown, dark brown, or dark grayish brown. Sandy lenses as thick as 4 inches are in these soils in places.

Jules soils are associated with Armiesburg and Stonelick soils. Their solum contains less clay than the solum of Armiesburg soils. Jules soils are not as sandy as Stonelick soils.

28—Jules silt loam (0 to 2 percent slopes). This soil is generally near the Wabash River. Areas are medium to large in size and irregular in shape. This soil becomes flooded less frequently than the lower lying Darwin soils.

This soil is suited to row crops or hardwood timber. Runoff is slow. The main concerns of management are flooding and scouring. Most flooding occurs in winter and early in spring. The soil is easily worked. Capability unit I–1; woodland suitability group 1o4.

Lamont Series

The Lamont series consists of deep, gently sloping

and moderately steep to steep, well-drained soils in sandy areas of upland and river terraces. These soils formed in wind- and water-laid, moderately coarse textured material. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 8 inches thick. The subsurface layer is fine sandy loam about 12 inches thick. The upper part is yellowish brown, and the lower part is dark yellowish brown. The subsoil is brown sandy loam about 20 inches thick. The underlying material is yellowish-brown loose sand that has an occasional thin band of sandy loam.

The content of organic matter is low. Available water capacity is moderate to low, and natural fertility is low. The soils are moderately rapidly permeable. Most of the acreage is cropland or woodland.

Representative profile of Lamont fine sandy loam, 1 to 6 percent slopes, in a cultivated field, 30 feet south and 420 feet east of the northwest corner of NW¼NE¼ sec. 28, T. 10 N., R. 11 W.:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; slightly acid; gradual, smooth boundary.

A21—8 to 15 inches, yellowish brown (10YR 5/4) fine sandy loam; weak, medium, platy structure; very friable; slightly acid; gradual, smooth boundary.

A22—15 to 20 inches, dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) fine sandy loam; weak, thick, platy structure; very friable; medium acid; clear, smooth boundary.

B2t—20 to 35 inches, brown (7.5YR 4/4) light sandy loam; weak, medium, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B3—35 to 40 inches, brown (7.5YR 4/4) light sandy loam; weak, medium and coarse, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

C—40 to 60 inches, yellowish brown (10YR 5/6) fine sand; single grained; loose; thin band of dark reddish brown (5YR 3/4) sandy loam at a depth of about 50 inches; medium acid.

The solum ranges from 24 to 45 inches in thickness. It is slightly acid to strongly acid. The combined Ap and A2 horizons range from 6 to 24 inches in thickness, but more frequently the range is 15 to 20 inches. The A horizon is sandy loam or fine sandy loam. The B horizon is light loam or sandy loam.

Lamont soils contain more sand and less clay than the associated Alvin soils. Lamont and Disco soils formed in similar material, but Lamont soils have a lighter colored surface layer than Disco soils.

175B—Lamont fine sandy loam, 1 to 6 percent slopes. This soil is in small- and medium-sized, irregularly shaped areas, mainly on high terraces. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of soils that have a loam and loamy sand surface layer. Also included are areas of soils that have less clay in the subsoil.

Nearly all the areas of this soil are cultivated and are used for crops. This soil is well suited to melons and irrigated alfalfa. Runoff is slow. The main limitations are soil blowing and low available water capacity. This soil is well suited to sprinkler irrigation. Capability unit IIIe–4; woodland suitability group 3s2.

175E2—Lamont fine sandy loam, 12 to 25 percent slopes, eroded. This soil is in narrow areas of various lengths. It has a profile similar to the one described as representative of the series, but the surface and subsurface layers of this soil are thinner than those in the representative profile.

Included with this soil in mapping are small areas of a soil that has more sand throughout the profile than this soil and small areas of a soil that has a loamy sand surface layer. Also included are a few small areas of soils that have more clay in the subsoil than this soil.

This soil is better suited to trees, hay, or pasture than to other uses. It is well suited to adapted pine trees. Runoff is medium to rapid. Soil blowing, water erosion, and droughtiness are the main concerns of management. Existing stands of good timber should be managed for timber production. Capability unit VIe–2; woodland suitability group 3s3.

Lawson Series

The Lawson series consists of deep, nearly level, somewhat poorly drained soils in different sized areas of bottom land throughout the county. These soils formed in silt loam alluvium. The native vegetation was mainly tall prairie grasses and scattered trees.

In a representative profile the surface layer is very dark grayish-brown silt loam about 32 inches thick. The underlying material, to a depth of about 45 inches, is dark-gray silt loam mottled with very dark gray, brown, and dark yellowish brown. Below a depth of 45 inches the alluvium generally becomes more sandy.

The content of organic matter, phosphorus, and potassium is high. Available water capacity is very high. The soils are moderately permeable. There is little hazard of erosion except for some streambank cutting. The soils are subject to occasional flooding, but damage is generally slight. Most of the acreage is used for crops or pasture.

Representative profile of Lawson silt loam in a cultivated field, 150 feet south and 865 feet east of the northwest corner of SW¼ sec. 20, T. 12 N., R. 14 W.:

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

A12—7 to 24 inches, very dark grayish brown (10YR 3/2) silt loam and small areas of very dark brown (10YR 2/2) and black (10YR 2/1); moderate, fine, granular structure; friable; slightly acid; gradual, smooth boundary.

A13—24 to 32 inches, very dark grayish brown (10YR 3/2) silt loam; common, coarse, faint, dark grayish brown (10YR 4/2) mottles and common, fine, distinct, dark brown (7.5YR 4/4) mottles; weak and moderate, medium, granular structure; friable; common, very thin, grayish brown (10YR 5/2) silty layers in this horizon; neutral; clear, smooth boundary.

C1—32 to 45 inches, dark gray (10YR 4/1) silt loam; common, medium, faint, very dark gray (10YR 3/1) mottles and few, medium, distinct, brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; massive; friable; neutral; clear, wavy boundary.

C2—45 to 60 inches, alternating thin strata of dark gray (10YR 4/1) silt loam and pale brown (10YR 6/3) fine sand; few, fine, prominent, brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; massive; single grained; friable; neutral.

The A horizon is black, very dark gray, or very dark grayish brown. The Ap horizon is silt loam or loam. The

more sandy alluvium is below a depth of 40 inches. Reaction of the soil material below the Ap horizon ranges from mildly alkaline to slightly acid.

Distinct mottles in the A13 horizon are outside the defined range of the series, but this difference does not alter the behavior or usefulness of the soils.

Lawson soils formed in the same kind of material as Shoals soils, but Lawson soils have a darker colored surface layer than Shoals soils.

451—Lawson silt loam (0 to 2 percent slopes). In places in small areas of bottom land in the northwestern part of the county, areas of this soil extend from one side of the bottom land to the other. In medium and large areas of bottom land in the county, areas of this soil are in a variety of sizes and shapes.

Included with this soil in mapping are small areas of soils that have sand at a depth of less than 30 inches. Also included are small areas of soils that have light-colored silty overwash.

This soil is well suited to crops, pasture, or trees. Drainage is needed for optimum growth of crops. Runoff is slow. If a small area near the stream becomes scoured, it should be kept in grass. Short periods of flooding are a concern of management. Capability unit IIw–4; woodland suitability group 2o4.

Miami Series

The Miami series consists of deep, sloping to moderately steep, well-drained soils. These soils formed in a thin deposit of loess and Wisconsin-age glacial till. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is very dark grayish-brown to brown silt loam about 7 inches thick. The subsoil is about 29 inches thick. The upper 10 inches is brown and dark yellowish-brown silty clay loam, and the lower 19 inches is yellowish-brown clay loam. The underlying material is yellowish-brown and pale-brown, calcareous clay loam and loam.

The content of organic matter is low. Available water capacity is high. The content of phosphorus is low, and the content of potassium is medium. The soils are moderately permeable.

Most of the acreage is used for crops. Areas of more sloping soils are used for pasture and woodland.

Representative profile of Miami silt loam, 7 to 15 percent slopes, eroded, in a cultivated field, 175 feet north and 660 feet east of the southwest corner of SE¼NW¼ sec. 26, T. 12 N., R. 14 W.:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) and brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; slightly acid; clear, smooth boundary.

B1—7 to 12 inches, brown (10YR 4/3) light silty clay loam; moderate, fine, subangular blocky structure; firm; medium acid; clear, wavy boundary.

IIB21t—12 to 17 inches, dark yellowish brown (10YR 4/4) silty clay loam that contains noticeable amounts of sand; moderate, very fine, subangular blocky structure; firm; few, thin, discontinuous, dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear, wavy boundary.

IIB22t—17 to 26 inches, yellowish brown (10YR 5/4) clay loam; strong, fine, subangular blocky structure; firm; common, thin, discontinuous, dark brown (10YR 3/3) clay films on faces of peds; soft accumulations of iron and manganese; strongly acid; gradual, smooth boundary.

IIB23t—26 to 36 inches, yellowish brown (10YR 5/4) clay loam; moderate, medium, subangular blocky structure; firm; common, thin, discontinuous, dark brown (7.5YR 3/2) and dark reddish brown (5YR 3/3) clay films on faces of peds; slightly acid; clear, irregular boundary.

IIC1—36 to 48 inches, yellowish brown (10YR 5/4) clay loam; weak, coarse, subangular blocky structure; firm; few, thin, discontinuous, dark brown (10YR 3/3) clay films on faces of peds and in root channels; mildly alkaline, slightly effervescent; gradual, smooth boundary.

IIC2—48 to 60 inches, pale brown (10YR 6/3) loam with yellowish brown (10YR 5/4) streaks; massive; friable; moderately alkaline; violently effervescent.

The solum ranges from 24 to 42 inches in thickness. The Ap horizon is brown, very dark grayish brown, dark grayish brown, or dark brown. Most areas of gently sloping soils have an A2 horizon. The B horizon is yellowish-brown or brown clay loam or silty clay loam. The C horizon is clay loam or loam.

Miami and Xenia soils formed in similar material, but the loess in Miami soils is thinner than that in Xenia soils.

27C2—Miami silt loam, 4 to 7 percent slopes, eroded. This soil is in small- and medium-sized, irregularly shaped areas mainly on the face of the moraine and in long narrow areas along drainageways. It has a profile similar to the one described as representative of the series, but this soil is less sloping than the representative soil. Included in mapping are small areas of soils that have a thinner subsoil than this one.

This soil is suited to crops, pasture, or trees. Runoff is medium. Erosion and maintenance of fertility are the main concerns of management. Maintaining good surface tilth is a minor concern. Capability unit IIe–1; woodland suitability group 2o1.

27C3—Miami clay loam, 4 to 7 percent slopes, severely eroded. This soil is in small, irregularly shaped areas on the face of the moraine and in small, circular areas throughout the Wisconsin till area in the county. The plow layer is mainly or entirely material from the subsoil. It is mainly clay loam but is heavy silt loam or light silty clay loam in places. Included in mapping are small areas of soils that have a thinner subsoil than this soil.

If erosion is adequately controlled this soil is suited to pasture, trees, and crops. Runoff is rapid. The main concerns of management are controlling erosion and maintaining fertility and tilth. Capability unit IIIe–1; woodland suitability group 2o1.

27D2—Miami silt loam, 7 to 15 percent slopes, eroded. This soil is on the face of the moraine and along drainageways. Areas are small and medium sized. They are irregularly shaped or long and narrow. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of a soil that has a thinner subsoil than this soil and a small acreage of a soil that has a thicker silty subsoil.

If protected from erosion, this soil is suited to all crops commonly grown in the county. Runoff is rapid. Controlling erosion and maintaining fertility are the main concerns of management. Capability unit IIIe–1; woodland suitability group 2o1.

27D3—Miami clay loam, 7 to 15 percent slopes, severely eroded. This soil is along drainageways and on the face of the moraine. Areas are small and medium

sized. They are irregularly shaped or long and narrow. The plow layer is mainly brown clay loam but is silty clay loam in places.

Included with this soil in mapping are small areas of soils that have a thinner subsoil than this soil. Also included are areas of soils that are shallow to carbonates.

This soil is suited to hay and a limited amount of corn and soybeans. It is better suited to hay or pasture than to other uses. An occasional small-grain crop is helpful when grasses and legumes are reestablished. Runoff is rapid. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Capability unit IVe–1; woodland suitability group 2o1.

Millbrook Series

The Millbrook series consists of deep, nearly level, somewhat poorly drained soils on the outwash plain and on stream terraces. These soils formed in a thin deposit of silty material and stratified Wisconsin-age outwash. The native vegetation was mainly prairie grasses and scattered trees.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is dark grayish-brown and grayish-brown silt loam about 9 inches thick. The subsoil is about 30 inches thick. The upper part is dark grayish-brown silty clay loam mottled with yellowish brown, and the part below it is brown silty clay loam mottled with grayish brown. The next part is grayish-brown silty clay loam mottled with yellowish brown, and the lower part is grayish-brown clay loam mottled with yellowish brown. The underlying material is grayish-brown and light brownish-gray stratified loam and sandy loam.

The content of organic matter is moderate. Available water capacity is high, and fertility is medium to high. The soils are moderately slowly permeable.

Representative profile of Millbrook silt loam in a cultivated field, 28 feet south and 110 feet west of the northeast corner of NW¼ sec. 4, T. 11 N., R. 14 W.:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A12—6 to 9 inches, very dark grayish brown (10YR 3/2) silt loam; weak and moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A21—9 to 14 inches, dark grayish brown (10YR 4/2) silt loam and some small areas of very dark grayish brown (10YR 3/2); moderate, fine, granular structure; friable; slightly acid; clear, smooth boundary.

A22—14 to 18 inches, grayish brown (10YR 5/2) silt loam; common, fine, faint, brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles; weak, medium, platy structure parting to weak, fine, granular; friable; medium acid; clear, smooth boundary.

B1—18 to 22 inches, dark grayish brown (10YR 4/2) light silty clay loam; common, medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles and few, fine, faint, grayish brown (10YR 5/2) mottles; moderate, fine, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B21t—22 to 29 inches, brown (10YR 5/3) silty clay loam; common, fine, faint, grayish brown (10YR 5/2) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm; many discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear, smooth boundary.

B22t—29 to 38 inches, grayish brown (10YR 5/2) silty clay loam; many fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, medium, subangular blocky structure; firm; common, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains and accumulations of iron and manganese; medium acid; clear, smooth boundary.

IIB3—38 to 48 inches, grayish brown (2.5Y 5/2) light clay loam; common, fine and medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; weak, coarse, subangular blocky structure; firm; few dark grayish brown (10YR 4/2) clay films in root channels; few stains of iron and manganese; slightly acid; gradual, smooth boundary.

IIC—48 to 60 inches, grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) stratified loam and sandy loam; common, medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; massive but very weak, coarse, blocky structure in the upper part; friable; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The Ap and A1 horizons are very dark grayish brown, black, or very dark brown. The A horizon ranges from 12 to 20 inches in thickness. The lower part of the B horizon is clay loam, loam, or sandy clay loam. The IIC horizon is sandy loam, loam, silt loam, and light clay loam outwash that generally is stratified.

Millbrook soils are better drained than the associated Brooklyn soils. Millbrook soils formed in the same material as Brenton and Starks soils, but they have a lighter colored subsurface layer than Brenton soils. The Ap horizon of Millbrook soils is darker colored than that of Starks soils.

219—Millbrook silt loam (0 to 2 percent slopes). Areas of this soil are mostly small, medium sized, and irregularly shaped. They are mainly on the outwash plain. Some of the small areas are round. A few areas are large.

Included with this soil in mapping are small areas of gently sloping soils that have a slight hazard of erosion in places. Also included are a few areas where soils have more clay in the subsoil than this soil and areas of soils that lack stratification.

Nearly all the areas of this soil are used for crops. A few isolated areas remain in scattered trees or are used for pasture. Runoff is slow, and the hazard of erosion is slight. There are no main concerns of management. Capability unit I–2; woodland suitability group 2o1.

Muren Series

The Muren series consists of deep, nearly level to sloping, moderately well drained soils on uplands. These soils formed in loess. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsurface layer is brown silt loam about 4 inches thick. The subsoil is silty clay loam about 38 inches thick. The upper part, about 4 inches thick, is yellowish brown and has brown mottles; and the middle part, about 23 inches thick, is yellowish brown to brown and has gray mottles. The lower 9 inches of the subsoil is

dark yellowish brown and has brown mottles. The underlying material is yellowish-brown silt loam mottled with gray and brown.

The content of organic matter is low. Available water capacity is high, and fertility is medium. The soils are moderately slowly permeable.

Most of the acreage is used for crops or pasture. The soils are suited to crops, pasture, or woodland.

Representative profile of Muren silt loam, 1 to 6 percent slopes, in a brushy idle area, about 220 feet south and 80 feet east of the northwest corner of NE¼NW¼ sec. 36, T. 11 N., R. 11 W.:

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

A2—10 to 14 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; few roots; strongly acid; clear, smooth boundary.

B1—14 to 18 inches, yellowish brown (10YR 5/4) light silty clay loam; many, fine, faint, brown (10YR 5/3) mottles; weak, fine and medium, subangular blocky structure; firm; few roots; very strongly acid; gradual, smooth boundary.

B21—18 to 25 inches, yellowish brown (10YR 5/4) silty clay loam; many, fine, distinct, light brownish gray (10YR 6/2) mottles and common, fine, faint, yellowish brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure parting to moderate, fine, subangular blocky; firm; few roots; very strongly acid; gradual, smooth boundary.

B22—25 to 32 inches, brown (10YR 5/3) silty clay loam; common, fine, faint, light brownish gray (10YR 6/2) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure parting to moderate, fine and medium, subangular blocky; firm; few roots; very strongly acid; gradual, smooth boundary.

B23—32 to 41 inches, yellowish brown (10YR 5/6) silty clay loam; common, fine, distinct, gray (10YR 6/1) mottles and common, fine, faint, yellowish brown (10YR 5/4) mottles; weak, coarse, subangular blocky structure parting to moderate, medium, subangular blocky; firm; few roots; very strongly acid; gradual, smooth boundary.

B3—41 to 52 inches, dark yellowish brown (10YR 4/4) light silty clay loam; common, fine, faint, brown (10YR 5/3) mottles; very weak, coarse, subangular blocky structure; firm; few roots; fine sandy loam layer 1 inch thick at a depth of 43 inches; very strongly acid; gradual, smooth boundary.

C—52 to 60 inches, yellowish brown (10YR 5/4) silt loam; common, fine, distinct, light brownish gray (10YR 6/2) mottles and common, fine, faint, yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid.

The solum is 40 to 60 inches in thickness. The Ap horizon is dark grayish brown, brown, or dark yellowish brown. The sandy loam band is outside the defined range of the series, but it is common in this county. It ranges from 1 to 5 inches in thickness.

Murean soils are better drained than the associated Iva soils and are more poorly drained than the associated Alford soils.

453B—Muren silt loam, 1 to 6 percent slopes. This soil is on gently sloping ridgetops and in broader upland areas near breaks to steeper side slopes. Included in mapping are small areas of Alford silt loam and areas of soils that are more poorly drained.

This soil is suited to crops, trees, and pasture. Runoff is medium. This soil has a slight hazard of erosion. Maintenance of fertility is a concern of management. Capability unit IIe–1; woodland suitability group 1o1.

Newberry Series

The Newberry series consists of deep, nearly level, poorly drained soils in low-lying areas throughout the county. These soils formed in loess and glacial drift. The native vegetation was mainly grasses and sedges and widely scattered trees.

In a representative profile the surface layer is very dark gray silt loam about 8 inches thick. The subsurface layer is gray silt loam mottled with yellowish-brown. It is about 10 inches thick. The subsoil is about 32 inches thick. It is mostly gray silty clay loam mottled with yellowish brown. The underlying material is mixed dark-gray, gray, and yellowish-brown silty clay loam that has noticeable amounts of sand.

The content of organic matter is moderate. Available water capacity is high, and natural fertility is low to medium. The soils are slowly permeable. The water table is high in spring. Most of the acreage of these soils is used for crops or pasture.

Representative profile of Newberry silt loam in a cultivated field, about 150 feet south and 50 feet west of the northeast corner of sec. 3, T. 9 N., R. 14 W.:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam and small areas of dark gray (10YR 4/1); moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A2—8 to 18 inches, gray (10YR 5/1) silt loam and small areas of silt loam that are dark gray (10YR 4/1) and dark grayish brown (10YR 4/2); common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, thin and medium, platy structure parting to moderate, medium, granular; friable; strongly acid; clear, smooth boundary.

B1tg—18 to 22 inches, gray (10YR 5/1) light silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine, subangular blocky structure; friable; common, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; strongly acid; clear, smooth boundary.

B21tg—22 to 29 inches, gray (10YR 5/1) silty clay loam; many fine, prominent, yellowish brown (10YR 5/8) mottles; moderate, fine and medium, subangular blocky structure; firm; common, discontinuous, dark gray (10YR 4/1) clay films on faces of peds; few very dark gray (10YR 3/1) films in root channels; medium acid; clear, smooth boundary.

B22tg—29 to 34 inches, grayish brown (2.5Y 5/2) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; moderate, fine, prismatic structure parting to moderate, fine, angular blocky; firm; common, discontinuous, gray (10YR 5/1) and few dark gray (10YR 4/1) clay films on faces of peds; medium acid; clear, smooth boundary.

B31tg—34 to 44 inches, gray (10YR 5/1) silty clay loam; common, fine and medium, prominent, yellowish brown (10YR 5/6 and 5/8) mottles and few, fine, faint, grayish brown (2.5Y 5/2) mottles; moderate, medium, subangular blocky structure; firm; few gray (10YR 5/1) clay films on faces of peds; few dark gray (10YR 4/1) clay films in root channels; dark gray (10YR 4/1) light silty clay loam krotovinas; medium acid; gradual, smooth boundary.

IIB32g—44 to 50 inches, gray (10YR 5/1) light silty clay loam; many, fine and medium, prominent, yellowish brown (10YR 5/4 and 5/8) mottles and few,

fine, faint, grayish brown (2.5Y 5/2) mottles; weak, coarse, subangular blocky structure; firm; few gray (10YR 5/1) clay films; common black (N 2/0) stains and fine accumulations of iron and manganese; some grains of sand; slightly acid; gradual, wavy boundary.

IICg—50 to 60 inches, mixed gray (10YR 5/1), dark gray (10YR 4/1), and yellowish brown (10YR 5/6 and 5/8) light silty clay loam that has noticeable amounts of sand; massive; firm; slightly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is very dark gray, dark gray, or very dark grayish brown. The A horizon ranges from 15 to 24 inches in thickness. Few to many accumulations of iron and manganese are in all horizons. Soil material below the Ap horizon ranges from slightly acid to strongly acid.

Newberry soils have thinner dark-colored combined Ap and A12 horizons than the associated Ebbert soils. In Newberry soils the change in texture from the A horizon to the B horizon is gradual; in the associated Cisne and Cowden soils, this change is abrupt.

218—Newberry silt loam (0 to 2 percent slopes). This nearly level soil is in large, irregularly shaped areas and in small, round areas in the lower lying parts of uplands. In places it occupies all of the low-lying area, and in other places it occupies a position between the slightly higher Cisne or Cowden soils and the lower lying Ebbert soils.

If drained, this soil is suited to crops. It is also suited to pasture. Runoff is slow, or the surface is ponded. Wetness and maintenance of fertility are the main concerns of management. Capability unit IIw–1; woodland suitability group 3w2.

Oconee Series

The Oconee series consists of deep, nearly level to gently sloping, somewhat poorly drained soils on uplands. These soils formed in loess. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is very dark grayish-brown silt loam about 8 inches thick. The subsurface layer is silt loam about 10 inches thick. The upper part is brown with grayish-brown mottles, and the lower part is light gray. The subsoil is silty clay loam about 42 inches thick. The upper 7 inches is light brownish gray, the middle 27 inches is yellowish brown with grayish-brown mottles, and the lower 8 inches is light gray with strong-brown mottles.

The content of organic matter is moderate. Available water capacity is high, and fertility is low. The soils are slowly permeable. Most of the acreage is used for crops.

Representative profile of Oconee silt loam, 0 to 2 percent slopes, in a cultivated field, about 550 feet north and 250 feet west of the southeast corner of NE¼ sec. 21, T. 11 N., R. 14 W.:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) when dry; moderate, fine, granular structure; friable; common roots; slightly acid; abrupt, smooth boundary.

A21—8 to 15 inches, brown (10YR 5/3) silt loam, light gray (10YR 7/2) when dry; common, fine, faint, grayish brown (10YR 5/2) mottles; weak, medium, platy structure parting to moderate, medium, granular; friable; few roots; strongly acid; clear, smooth boundary.

A22—15 to 18 inches, light gray (10YR 7/2) silt loam; few, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, medium, granular structure; friable; few roots; strongly acid; clear, smooth boundary.

B21t—18 to 25 inches, light brownish gray (10YR 6/2) medium silty clay loam; many, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; few roots; continuous grains of silt that are white (10YR 8/2) when dry; continuous, thick, light brownish gray (10YR 6/2) clay films on faces of peds; strongly acid; gradual, smooth boundary.

B22t—25 to 34 inches, yellowish brown (10YR 5/4) silty clay loam; many, fine, distinct, grayish brown (10YR 5/2) mottles; moderate, coarse, subangular blocky structure; firm; few roots; discontinuous grains of silt on vertical faces of peds, white (10YR 8/1) when dry; continuous, thick, light brownish gray (10YR 6/2) and discontinuous dark gray (10YR 4/1) clay films on vertical faces of peds; medium acid; gradual, smooth boundary.

B23t—34 to 43 inches, mixture of 40 percent yellowish brown (10YR 5/6), 30 percent yellowish brown (10YR 5/4), and 30 percent grayish brown (10YR 5/2) heavy silty clay loam; weak, coarse, subangular blocky structure; firm: no roots; discontinuous light brownish gray (10YR 6/2) and gray (10YR 6/1) clay films on faces of peds; gray (10YR 5/1) krotovinas; few iron stains; medium acid; gradual, smooth boundary.

B31t—43 to 52 inches, yellowish brown (10YR 5/6) light silty clay loam; common, fine, distinct, light gray (10YR 5/1) krotovinas; few iron stains, medium blocky structure; firm; discontinuous gray (10YR 5/1) clay films on vertical faces of peds; common iron stains; slightly acid; gradual, smooth boundary.

B32tg—52 to 60 inches, light gray (10YR 6/1) light and medium silty clay loam; common, fine and medium, distinct, strong brown (7.5YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; discontinuous gray (10YR 5/1) clay films on vertical faces of peds; neutral; gradual, smooth boundary.

The solum ranges from 50 to more than 60 inches in thickness. The Ap horizon is very dark gray, very dark grayish brown, or very dark brown. The silt grains in the B21t and B22t horizons are lacking in places. In the B2 horizon reaction ranges from very strongly acid to medium acid, and in the B3 horizon it ranges from very strongly acid to neutral.

These soils are less acid in the lower part of the B horizon than the acid limit given in the defined range of the series, and color of the A21 horizon is commonly outside the defined range. These differences do not alter the behavior or usefulness of the soils.

Oconee soils are better drained than the associated Cowden soils. They have less sand in the lower part of the B horizon than the similar Hoyleton soils.

113A—Oconee silt loam, 0 to 2 percent slopes. This nearly level soil is on small, low rises in the till plain. It has the profile described as representative of the series.

The soil is suited to crops. A few areas are used for pasture. Runoff is slow, and the hazard of erosion is slight. Wetness and fertility are the main limitations to use of this soil. This soil is easily tilled. Capability unit IIw–3; woodland suitability group 3o1.

113B—Oconee silt loam, 2 to 4 percent slopes. This soil is on mounds in the flat till plain and on the sides of drainageways. It has a profile similar to the one described as representative of the series, but the A horizon is thinner than the one in that profile, and this soil is more sloping than the representative soil.

This soil is suited to crops. Runoff is medium. Erosion and fertility are the main limitations to use of

this soil. Drainage is needed in places. Capability unit IIe–3; woodland suitability group 3o1.

Petrolia Series

The Petrolia series consists of deep, nearly level, poorly drained soils on bottom land. These soils formed in water-laid sediment. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is dark grayish-brown silty clay loam about 10 inches thick. The underlying material is silty clay loam to a depth of 58 inches and silt loam below that. The upper 9 inches of the underlying material is dark gray, the next 31 inches is gray with yellowish-brown mottles, and the next 8 inches is dark grayish brown. The lower layer is mixed grayish-brown, dark grayish-brown, and brown silt loam.

The content of organic matter is moderate. Available water capacity is high, and fertility is medium to high. The soils are moderately slowly permeable. They are subject to flooding. Most of the acreage of these soils is used for crops.

Representative profile of Petrolia silty clay loam in a cultivated field, about 1,740 feet west and 50 feet north of the southeast corner of sec. 31, T. 11 N., R. 10 W.:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (2.5Y 6/2) when dry; moderate, coarse, granular structure; friable; common roots; moderately alkaline; slight effervescence; abrupt, smooth boundary.

C1g—10 to 19 inches, dark gray (10YR 4/1) silty clay loam; common, fine, distinct, dark brown (10YR 3/3) mottles; moderate, fine and medium, subangular blocky structure; firm; few roots; mildly alkaline; gradual, smooth boundary.

C2g—19 to 31 inches, gray (10YR 5/1) heavy silty clay loam; common, fine, distinct, yellowish brown (10YR 5/4) mottles and common, medium, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure parting to strong, medium, subangular blocky; very firm; few roots; neutral; clear, smooth boundary.

C3g—31 to 41 inches, gray (10YR 5/1) medium silty clay loam that contains noticeable amounts of sand; many, fine, distinct, yellowish brown (10YR 5/6) mottles and common, fine, distinct, yellowish brown (10YR 5/4) mottles; moderate, coarse, subangular blocky structure parting to weak, medium, subangular blocky; firm; few roots; neutral; gradual, smooth boundary.

C4g—41 to 44 inches, gray (10YR 5/1) heavy silty clay loam; many fine, distinct, yellowish brown (10YR 5/4) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, subangular blocky structure; firm; few roots; neutral; clear, smooth boundary.

C5g—44 to 50 inches, gray (10YR 5/1) silty clay loam that has noticeable amounts of sand; common, fine, distinct, yellowish brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; no roots: small pockets of dark yellowish brown (10YR 4/4) sand 1 inch in diameter; neutral; gradual, smooth boundary.

C6g—50 to 58 inches, dark grayish brown (2.5Y 4/2) silty clay loam; few, fine, prominent, strong brown (7.5YR 5/6) mottles and common, fine, distinct, gray (10YR 5/1) mottles; weak, coarse, subangular blocky structure; very firm; neutral; gradual, smooth boundary.

C7g—58 to 60 inches, mixture of 30 percent dark grayish brown (10YR 4/2), 30 percent brown (10YR 5/3), 30 percent grayish brown (2.5Y 5/2), and 10 percent gray (10YR 5/1) silt loam that contains noticeable amounts of sand; massive; firm; neutral.

The Ap horizon is dark grayish brown, grayish brown, or light brownish gray. Reaction ranges from neutral to moderately alkaline in this horizon. The Cg horizons are gray, dark gray, or dark grayish brown. They are stratified silt loam and silty clay loam below a depth of 60 inches, and they have a few thin layers of sand and gravel in places.

Petrolia soils have less clay in the surface layer and subsoil than the associated Darwin soils. Petrolia soils have more clay throughout the profile than the nearby Shoals soils.

288—Petrolia silty clay loam (0 to 2 percent slopes). This nearly level soil is on bottom land. It is in broad, low-lying areas or in areas of narrow, old channels. Included in mapping are small spots of sand and a few areas of soils that have clay loam and silt loam overwash. Also included are old sloughs that have a thicker, dark-colored surface layer and bars of sand and gravel that are adjacent to the Wabash River.

Where protected from overflow, this soil is suited to crops. It is also suited to trees. Runoff is very slow to ponded. Flooding is the main hazard on this soil, and drainage is needed for optimum growth of crops. Maintenance of good tilth is a concern of management. Capability unit IIw–2; woodland suitability group 2w5.

Racoon Series

The Racoon series consists of deep, nearly level, poorly drained soils on uplands. These soils formed in loess. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is grayish-brown silt loam about 9 inches thick. The subsurface layer is gray silt loam about 20 inches thick. The subsoil, to a depth of 60 inches, is gray silty clay loam.

The content of organic matter is low. Available water capacity is high, and natural fertility is low. The soils are slowly permeable. Most of the acreage is used for crops.

Representative profile of Racoon silt loam in a cultivated field, about 30 feet west and 20 feet north of the southeast corner of NE¼ sec. 22, T. 12 N., R. 11 W.:

Ap1—0 to 4 inches, grayish brown (10YR 5/2) silt loam; weak, fine and very fine, granular structure; friable; very few accumulations of iron and manganese; neutral; abrupt, smooth boundary.

Ap2—4 to 9 inches, grayish brown (10YR 5/2) silt loam; few, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, thin, platy structure; friable; very few accumulations of iron and manganese; neutral; abrupt, smooth boundary.

A21—9 to 14 inches, gray (10YR 6/1) silt loam; common, fine, distinct, pale brown (10YR 6/3) mottles and common, fine, prominent, brown (7.5YR 5/4) mottles; moderate, medium, platy structure; friable; few accumulations of iron and manganese; very slightly acid; clear, smooth boundary.

A22—14 to 29 inches, gray (10YR 6/1) silt loam; common, fine, distinct, brown (10YR 5/3) mottles and common, fine, prominent, brown (7.5YR 5/4) mottles; moderate, fine, granular structure; friable; few accumulations of iron and manganese; very strongly acid; clear, smooth boundary.

B21tg—29 to 40 inches, gray (5Y 5/1) silty clay loam; common, fine, prominent, brown (7.5YR 5/4) mot-

tles; moderate, medium, subangular blocky structure; firm; discontinuous pale brown (10YR 6/3) clay films on vertical and horizontal faces of peds; few accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

B22tg—40 to 55 inches, gray (5Y 5/1) silty clay loam; many, fine, prominent, strong brown (7.5YR 5/6) and brown (7.5YR 5/4) mottles; moderate, medium, subangular blocky structure; firm; patchy gray (5Y 5/1) clay films on faces of peds; few accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

B3tg—55 to 60 inches, gray (5Y 5/1) light silty clay loam; many, fine and medium, prominent, strong brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; patchy, gray (5Y 5/1) clay films on faces of peds; few accumulations of iron and manganese; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The A horizon ranges from 24 to 36 inches in thickness. The Ap horizon is dark grayish brown, grayish brown, dark brown, or dark gray. The B horizon ranges from extremely acid to medium acid. It is grayish brown, light brownish gray, light olive gray, or gray.

Racoon soils have a thicker A horizon than the associated Weir and Wynoose soils.

109—Racoon silt loam (0 to 2 percent slopes). This nearly level soil is on uplands. In places areas are in slight depressions. Areas are generally large. Included in mapping are a few small areas of soils that are shallower to the subsoil than this soil.

If drained, this soil is suited to crops. It is also suited to pasture or trees. Runoff is slow, or the surface is ponded. Wetness is the main concern of management. Capability unit IIIw–1; woodland suitability group 3w2.

Sexton Series

The Sexton series consists of deep, nearly level, poorly drained soils mainly on the outwash plain but also on stream terraces. These soils formed in silty material and outwash. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsurface layer is grayish-brown silt loam about 8 inches thick. The subsoil is about 24 inches thick. The upper part is grayish-brown silty clay loam mottled with yellowish brown, the middle part is light brownish-gray silty clay loam, and the lower part is grayish-brown heavy loam mottled with brownish gray. The underlying material is brown sandy loam mottled with light brownish gray.

The content of organic matter is moderate, and the content of phosphorus is low. The content of potassium is medium. Available water capacity is high. The soils are slowly permeable. Most of the acreage is used for crops.

Representative profile of Sexton silt loam in a cultivated field, about 60 feet north and 300 feet west of the southeast corner of sec. 34, T. 12 N., R. 14 W.:

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

A2—9 to 17 inches, grayish brown (10YR 5/2) silt loam; common, fine, faint, dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) mottles and few, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, thin, platy structure parting to moderate, fine, granular; friable; common black (10YR 2/1) and very dark brown (10YR 2/2) stains and very fine accumulations of iron and manganese; strongly acid; clear, smooth boundary.

B21t—17 to 28 inches, grayish brown (10YR 5/2) heavy silty clay loam; common, fine, prominent, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, fine and medium, subangular blocky structure; firm; few, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; common black (N 2/0) stains and accumulations of iron and manganese; strongly acid; clear, smooth boundary.

B22t—28 to 35 inches, light brownish gray (10YR 6/2) silty clay loam; common, fine, prominent, yellowish brown (10YR 5/8) mottles; moderate, fine and medium, angular blocky structure; firm; few, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds, continuous in root channels; few black (N 2/0) stains and accumulations of iron and manganese; very strongly acid; gradual, smooth boundary.

IIB3—35 to 41 inches, grayish brown (10YR 5/2) heavy loam; common, medium, faint, light brownish gray (10YR 6/2), dark yellowish brown (10YR 4/4), and yellowish brown (10YR 5/6) mottles; weak and moderate, medium, subangular blocky structure; friable; few black (N 2/0) stains of iron and manganese; strongly acid; gradual, smooth boundary.

IIC—41 to 60 inches, brown (10YR 5/3) sandy loam; common, medium, faint, light brownish gray (10YR 6/2) mottles; massive; friable; common, medium, dark brown (10YR 3/3) iron-manganese stains; medium acid.

The solum ranges from 36 to more than 60 inches in thickness. The combined Ap and A2 horizons range from 14 to 24 inches in thickness. The Ap horizon is dark grayish brown, grayish brown, or light brownish gray. The A2 and B horizons range from slightly acid to very strongly acid. Depth to outwash material is about 40 inches, but it ranges from 30 to 50 inches. The C horizon is loam, silt loam, sandy loam, and in a few places, loamy sand.

Sexton soils are more poorly drained than the associated Starks soils. Sexton and Brooklyn soils formed in the same material, but Sexton soils have a lighter colored Ap horizon.

208—Sexton silt loam (0 to 2 percent slopes). This nearly level soil occupies small, medium, and large, irregularly shaped areas on the outwash plain. Small areas are on stream terraces.

Included with this soil in mapping are a few spots of soils that have a slightly darker colored surface layer than this soil. Also included are small areas of somewhat poorly drained soils.

This soil is suited to crops, pasture, or trees. Runoff is slow, or the surface is ponded. Wetness and fertility are the main limitations. Permeability is too slow for tilling. Erosion is not a concern of management. Capability unit IIIw–1; woodland suitability group 3w2.

Shiloh Series

The Shiloh series consists of deep, nearly level, very poorly drained soils in depressions in the flat till plains. These soils formed in loess underlain by Illinoian glacial drift. The native vegetation was mainly marsh grasses and sedges.

In a representative profile the surface layer is black heavy silty clay loam about 21 inches thick. The subsoil is 39 inches or more in thickness. The upper part is very dark gray heavy silty clay loam, and the next part is

dark-gray heavy silty clay loam. The part below this is gray heavy silty clay loam, and the lower part is grayish-brown silty clay loam.

The content of organic matter is high. Available water capacity is high, and natural fertility is medium to high. The soils are moderately slowly permeable to slowly permeable. Most of the acreage is used for crops.

Representative profile of Shiloh silty clay loam in a cultivated field, about 120 feet south and 100 feet west of the northeast corner of NW¼NW¼ sec. 20 T. 11 N., R. 14 W.:

Ap—0 to 9 inches, black (10YR 2/1) silty clay loam; weak, medium, granular structure; firm; neutral; abrupt, smooth boundary.

A12—9 to 21 inches, black (10YR 2/1) heavy silty clay loam; moderate, fine and medium, angular blocky structure; firm; slightly acid; gradual, smooth boundary.

B1g—21 to 26 inches, very dark gray (10YR 3/1) heavy silty clay loam that has some black (10YR 2/1) ped exteriors; few, fine, distinct, yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/6) mottles; moderate, fine, angular blocky structure; firm; slightly acid; gradual, smooth boundary.

B21g—26 to 34 inches, dark gray (5Y 4/1) heavy silty clay loam that has some very dark gray (N 3/0) ped exteriors; many, medium, prominent, yellowish brown (10YR 5/6 and 5/8) mottles; moderate and strong, fine and medium, prismatic structure parting to moderate, fine, angular blocky; firm; slightly acid; gradual, smooth boundary.

B22g—34 to 44 inches, gray (N 5/0) heavy silty clay loam; many, medium, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, medium, prismatic structure parting to moderate, medium, angular blocky; firm; dark gray (N 4/0) coatings in root channels and on some ped faces; slightly acid; gradual, smooth boundary.

B3g—44 to 60 inches, grayish brown (2.5Y 5/2) silty clay loam; many, medium, prominent, yellowish brown (10YR 5/6 and 5/8) mottles; weak, medium and coarse, angular blocky structure; firm; dark gray (N 4/0) coatings in root channels; neutral.

The solum ranges from 36 to more than 60 inches in thickness. The Ap horizon is silty clay loam, but it ranges from heavy silt loam to heavy silty clay. Reaction of the soil material below the Ap horizon ranges from medium acid to neutral. The B horizon ranges from silty clay loam to silty clay.

Shiloh soils are finer textured in the A horizon than the associated Cowden soils.

138—Shiloh silty clay loam (0 to 2 percent slopes). This nearly level soil is in small to large, generally round areas in depressions on flat uplands. Included are small areas of soils that have a silt loam surface layer. Also included are areas of soils that have a thinner dark-colored surface layer than this soil.

This soil is suited to crops. Runoff is slow, or the surface is ponded. Wetness is the main concern of management, but at times poor tilth is a concern. Capability unit IIw–1; woodland suitability group 3w2.

Shoals Series

The Shoals series consists of deep, nearly level, somewhat poorly drained soils on bottom land. These soils formed in water-laid sediment. The native vegetation was mixed hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The underlying layers, to a depth of 30 inches, are brown to dark grayish-brown silt loam. Between depths of 30 and 53 inches are layers of mottled, yellowish-brown loam and mottled, strong-brown fine sandy loam. Below a depth of 53 inches are strata of grayish-brown loam, brown sandy loam, and brown loamy sand. The strata are about ½ to 1 inch in thickness.

The content of organic matter is low in these soils. Available water capacity is high, and natural fertility is low to medium. The soils are moderately permeable. They are subject to flooding.

Most of the acreage of these soils is used for crops, but in places areas are wooded.

Representative profile of Shoals silt loam in a cultivated field, about 35 feet south and 30 feet east of where township road crosses Indian boundary in sec. 36, T. 12 N., R. 12 W.:

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) silt loam (and some sand); weak, very fine and fine, granular structure; friable; common roots; mildly alkaline; abrupt, smooth boundary.

C1—9 to 14 inches, brown (10YR 5/3) silt loam (and some sand); many fine, faint, grayish brown (10YR 5/2) mottles and few, fine, faint, dark brown (10YR 4/3) mottles; weak, fine, granular structure; friable; few roots; few iron-manganese stains; mildly alkaline; clear, smooth boundary.

C2—14 to 18 inches, grayish brown (10YR 5/2) silt loam (and some sand); common, fine, distinct, dark yellowish brown (10YR 4/4) mottles and few, fine, faint, gray (10YR 6/1) mottles; weak, medium, granular structure; friable; few roots; few stains of iron-manganese; neutral; clear, smooth boundary.

C3—18 to 25 inches, dark grayish brown (10YR 4/2) silt loam; many fine, faint, grayish brown (10YR 5/2) mottles and common, fine, distinct, brown (10YR 5/3) mottles; weak, medium, granular structure; friable; few roots; few soft accumulations of iron-manganese; neutral; clear, smooth boundary.

C4—25 to 30 inches, brown (10YR 5/3) silt loam (and some sand); common, fine, faint, grayish brown (10YR 5/2) mottles and many fine, faint, yellowish brown (10YR 5/4) mottles; weak, medium, granular structure; friable; few roots; few soft accumulations of iron and manganese; thin ¼-inch layer of loam; neutral; gradual, smooth boundary.

C5—30 to 41 inches, yellowish brown (10YR 5/6) loam; many, fine, prominent, gray (10YR 6/1) mottles and many, fine, distinct, brown (10YR 4/3) mottles; weak, very fine, subangular blocky structure; friable; no roots; few soft accumulations of iron and manganese; few brown (7.5YR 4/2) iron stains; neutral; gradual, smooth boundary.

C6—41 to 53 inches, strong brown (7.5YR 5/6) fine sandy loam; many medium, distinct, grayish brown (10YR 5/2) mottles; massive; friable; few soft accumulations of iron and manganese; few brown (7.5YR 4/2) iron stains; neutral; gradual, smooth boundary.

C7—53 to 60 inches, stratified grayish brown (10YR 5/2) loam and brown (7.5YR 4/2) sandy loam and loamy sand layers about ½ inch to 1 inch thick; massive; friable; neutral.

The Ap horizon is dark grayish brown, grayish brown, or light brownish gray. The C horizon is stratified. In places it contains gravel below a depth of 40 inches.

Shoals soils are more poorly drained than the associated Genesee and Stonelick soils.

424—Shoals silt loam (0 to 2 percent slopes). This soil is on bottom land. Areas of it are throughout the county. They are irregular in shape and size.

Included with this soil in mapping are small areas

of soils that have a loam surface layer. Also included are small areas of soils that are more poorly drained than this soil.

If properly drained, this soil is suited to row crops. Overflow restricts its use to summer annuals, grasses, or trees. Wetness and flooding are the main limitations to use of this soil. Flooding occurs mainly in spring. Capability unit IIw–4; woodland suitability group 2o4.

Starks Series

The Starks series consists of deep, nearly level to gently sloping, somewhat poorly drained soils mainly on the outwash plain. Small areas of Starks soils are also on stream terraces. These soils formed in loess and outwash. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is grayish-brown and brown silt loam about 7 inches thick. The subsoil is about 39 inches thick. The upper part is brown and grayish-brown silty clay loam mottled with yellowish brown, the middle part is light brownish-gray silty clay loam, and the lower part is grayish-brown clay loam mottled with yellowish brown. The underlying material is grayish-brown sandy loam, loam, and silt loam.

The content of organic matter is low. Available water capacity is high, and natural fertility is medium. The soils are moderately slowly permeable. Most of the acreage of these soils is used for crops.

Representative profile of Starks silt loam, in a cultivated field, 25 feet south and 300 feet east of the northwest corner of NE¼ sec. 4, T. 11 N., R. 14 W.:

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

A21—6 to 9 inches, grayish brown (10YR 5/2) with spots of dark grayish brown (10YR 4/2) silt loam; moderate, thin, platy structure; friable; slightly acid; clear, smooth boundary.

A22—9 to 13 inches, brown (10YR 5/3) silt loam; common, fine, faint, grayish brown (10YR 5/2) mottles; weak, medium, platy structure; friable; medium acid; clear, smooth boundary.

B1—13 to 19 inches, brown (10YR 5/3) light silty clay loam; common, fine, faint, yellowish brown (10YR 5/4) mottles; moderate, very fine, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B21t—19 to 28 inches, grayish brown (10YR 5/2) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; firm; few thin, discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; few accumulations of iron and manganese; strongly acid; gradual, smooth boundary.

B22t—28 to 34 inches, light brownish gray (10YR 6/2) silty clay loam; many, fine, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, medium, subangular blocky structure; firm; few thin, discontinuous, dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay films on faces of peds; few accumulations of iron and manganese; strongly acid; gradual, smooth boundary.

IIB31—34 to 40 inches, light brownish gray (10YR 6/2) light silty clay loam that contains noticeable amounts of sand; many, medium, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; moderate, coarse, subangular blocky structure; firm; few accumulations of iron and manganese; medium acid; clear, smooth boundary.

IIB32—40 to 52 inches, grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) clay loam; common, medium, prominent, yellowish brown (10YR 5/4 and 5/8) mottles; weak, coarse, subangular blocky structure; friable; few accumulations of iron and manganese; slightly acid; clear, wavy boundary.

IIC—52 to 60 inches, grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) stratified loam, silt loam, and sandy loam; common, coarse, prominent, yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable, neutral.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is dark grayish brown, brown, or grayish brown. The B horizon is slightly acid to strongly acid. The C horizon is silt loam, loam, sandy loam, or loamy sand in stratified layers. Reaction in the C horizon ranges from medium acid to mildly alkaline.

Starks soils formed in the same kind of material as Millbrook, Camden, and Sexton soils. Starks soils have a lighter colored surface layer than Millbrook soils. Starks soils are not as well drained as Camden soils, but they are better drained than Sexton soils.

132—Starks silt loam (0 to 3 percent slopes). This soil is in small- to medium-sized, slightly elevated areas or broad, flat areas on the outwash plain and stream terraces. Included in mapping are a few areas of soils that are deeper to the outwash material than this soil. Also included are a small acreage of Starks silt loam in the North Fork Embarras Creek flood plain that has gravelly clay loam outwash below a depth of 40 inches, and small acreages of eroded Starks soils.

This soil is well suited to crops, pasture, or trees. Runoff is slow, and the hazard of erosion is slight on the nearly level slopes. The main concerns of management are providing adequate drainage and maintaining fertility and tilth. Erosion control is needed in places in areas where the soil is gently sloping. Capability unit IIw–3; woodland suitability group 2o1.

Stockland Series

The Stockland series consists of deep, nearly level to sloping, well-drained soils on stream terraces. These soils formed in loamy, sandy, and gravelly outwash material. The native vegetation was tall prairie grasses.

In a representative profile the surface layer is sandy loam 14 inches thick. The upper 10 inches is black, and the lower 4 inches is very dark gray. The lower 4 inches is very gravelly. The subsoil is about 36 inches thick. The upper part is very dark grayish-brown gravelly sandy loam, and the next part is dark-brown gravelly sandy clay loam about 10 inches thick. The part below it is brown gravelly sandy loam about 5 inches thick. The lower part is dark yellowish-brown and dark reddish-brown gravelly coarse sand. The underlying material is brown gravelly coarse sand.

The content of organic matter is moderate. Available water capacity is low, and fertility is low. The soils are moderately rapidly permeable.

Most of the acreage is used for crops. The soils are well suited to wheat, hay, or specialty crops. Lack of moisture limits production of most crops.

Representative profile of Stockland sandy loam, 0 to 4 percent slopes, in a cultivated field, 30 feet north

and 560 feet east of the southwest corner of NW¼SW¼ sec. 27, T. 10 N., R. 11 W.:

Ap—0 to 10 inches, black (10YR 2/1) sandy loam; moderate, coarse and very coarse, granular structure; friable; common roots; few pebbles and cobbles 1½ to 4 inches in diameter; medium acid; abrupt, smooth boundary.

A12—10 to 14 inches, very dark gray (10YR 3/1) very gravelly sandy loam; very weak, fine and medium, granular structure; friable; common roots; pebbles generally less than ½ inch in diameter, few pebbles 1 inch in diameter and heavily coated with very dark gray (10YR 3/1) organic material; medium acid; clear, smooth boundary.

B21—14 to 21 inches, very dark grayish brown (10YR 3/2) gravelly sandy loam; weak, fine and medium, subangular blocky structure; friable; common roots; pebbles less than ½ inch in diameter, few pebbles 1 inch in diameter; nearly continuous very dark grayish brown (10YR 3/2) clay-organic films on pebbles; slightly acid; clear, wavy boundary.

B22—21 to 26 inches, dark brown (7.5YR 4/2) gravelly sandy clay loam; weak, medium and coarse, subangular blocky structure; friable; common roots; pebbles generally less than ½ inch in diameter; discontinuous dark brown (7.5YR 3/2) clay coatings on pebbles; neutral; clear, wavy boundary.

B23—26 to 31 inches, dark brown (7.5YR 4/4) gravelly light sandy clay loam; weak, medium and coarse, subangular blocky structure; friable; common roots; discontinuous dark brown (7.5YR 3/2) coatings on pebbles; pebbles generally less than ½ inch in diameter; neutral; clear, wavy boundary.

B31—31 to 36 inches, brown (7.5YR 4/2) gravelly sandy loam; very weak, coarse, subangular blocky structure; friable; few roots; pebbles less than 3 inches in diameter; discontinuous dark brown (7.5YR 3/2) clay films on pebbles and peds; neutral; clear, wavy boundary.

B32—36 to 50 inches, dark yellowish brown (10YR 4/4) and dark reddish brown (5YR 3/4) gravelly coarse sand; very weak, medium and coarse, subangular blocky structure; very friable; few roots; pebbles generally less than 2 inches in diameter; discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; few dark brown (7.5YR 3/2) clay films on pebbles; neutral; abrupt, irregular boundary.

C—50 to 60 inches, brown (10YR 5/3) gravelly coarse sand; single grained; loose; no roots; pebbles generally less than 1½ inches in diameter; moderately alkaline, strong effervescence.

The solum ranges from 40 to more than 60 inches in thickness. Reaction in the solum ranges from medium acid to moderately alkaline throughout. Sand is medium or coarse in size. Depth to gravelly material is 20 inches or less. The Ap and A12 horizons are black, very dark brown, very dark gray, or very dark grayish-brown loam, sandy loam, gravelly loam, or gravelly sandy loam 10 to 18 inches thick. The B horizon has subangular blocky structure or is single grained.

Stockland soils formed in the same kind of material as Carmi soils, but they are gravelly at shallower depths than Carmi soils. Stockland soils contain more gravel than the nearby Disco soils.

155B—Stockland sandy loam, 0 to 4 percent slopes. This nearly level to gently sloping soil is on broad, smooth areas and long, narrow areas that are adjacent to drainageways. It is mainly on terraces. This soil has the profile described as representative of the series. Included in mapping are areas of soils that have a dark-brown or brown surface layer.

Most areas of this soil are used for crops. This soil is well suited to wheat or alfalfa. Runoff is slow. Water erosion is not a hazard. Soil blowing is a hazard if the soil is left unprotected. Lack of moisture limits growth of crops. Capability unit IIIs–1; woodland suitability group 3s2.

155C—Stockland sandy loam, 4 to 7 percent slopes. This moderately sloping soil is on small, irregularly shaped areas that are adjacent to drainageways. In places the areas are long and narrow. This soil has a profile similar to the one described as representative of the series, but in many places gravel is in the surface layer. Included in mapping are areas of soils that have a dark-brown or brown surface layer.

Most areas are used for crops or pasture, and the soil is better suited to these uses than to others. Runoff is slow to medium. Lack of moisture limits growth of crops. Water erosion is a hazard. Capability unit IIIe–4; woodland suitability group 3s2.

Stonelick Series

The Stonelick series consists of deep, well-drained, nearly level soils on bottom land. These soils formed in water-laid sand and silt. The native vegetation was hardwood trees.

In a representative profile the surface layer is dark-brown fine sandy loam about 10 inches thick. The underlying material is layered dark-brown fine sandy loam, dark yellowish-brown loamy sand, brown fine sandy loam, dark yellowish-brown loamy sand, and brown sand.

The content of organic matter is low. Available water capacity is low to moderate, and natural fertility is low to medium. The soils are moderately rapidly permeable. They are subject to flooding. Most of the acreage is used for crops, pasture, or woodland.

Representative profile of Stonelick fine sandy loam in a cultivated field, about 50 feet west and 5 feet south of the northeast corner of SE¼SW¼ sec. 24, T. 12 N., R. 11 W.:

Ap—0 to 10 inches, dark brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; friable; mildly alkaline; weak effervescence; abrupt, smooth boundary.

C1—10 to 17 inches, dark brown (10YR 3/3) fine sandy loam; few, medium, faint, brown (10YR 4/3) mottles; massive; loose; mildly alkaline; weak effervescence; clear, smooth boundary.

C2—17 to 26 inches, dark yellowish brown (10YR 4/4) loamy sand; single grained; loose; few dark yellowish brown (10YR 3/4) worm casts; mildly alkaline; weak effervescence; gradual, smooth boundary.

C3—26 to 35 inches, brown (10YR 4/3) fine sandy loam; massive; friable; mildly alkaline; weak effervescence; gradual, smooth boundary.

C4—35 to 43 inches, dark yellowish brown (10YR 4/4) loamy sand; single grained; loose; mildly alkaline; weak effervescence; abrupt, smooth boundary.

C5—43 to 60 inches, brown (7.5YR 4/4) sand, light yellowish brown (10YR 6/4) when dry; single grained; loose; mildly alkaline, weak effervescence.

The Ap horizon is dark grayish-brown, dark-brown, brown, or yellowish-brown fine sandy loam, sandy loam, loam, loamy fine sand, and coarse silt loam. The C horizon is loam, sandy loam, fine sandy loam, coarse silt loam, loamy sand, and sand. Reaction in these soils is neutral to moderately alkaline.

Stonelick soils are sandier than the associated Genesee and Jules soils.

665—Stonelick fine sandy loam (0 to 2 percent

slopes). This soil is in bottom land of streams throughout the county. Areas are small to very large.

Included with this soil in mapping are several areas of soils that have strongly acid to slightly acid horizons. These are mainly in small, narrow areas of bottom land throughout the county but are also in some of the larger areas of bottom land in the southwestern part of the county. Also included are some small areas of soils that are wetter than this one and areas where the surface layer is loamy sand, sandy loam, coarse silt loam, or loam.

This soil is suited to row crops, pasture, hay, or trees. Inadequate moisture limits growth of crops in some years. Flooding is a hazard. Frequency of flooding is quite variable depending on location. Scouring and streambank erosion along channels is a serious hazard where vegetation has been removed (fig. 13). Capability unit IIs–2; woodland suitability group 2o4.

Stoy Series

The Stoy series consists of deep, nearly level to gently sloping, somewhat poorly drained soils on ridgetops and sides of drainageways on uplands. These soils formed in loess underlain by Illinoian glacial drift. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is yellowish-brown silt loam mottled with grayish brown. It is about 8 inches thick. The subsoil is silty clay loam about 31 inches thick. The upper part is yellowish brown and has grayish-brown mottles, the middle part is grayish brown and has yellowish-brown mottles, and the lower part is pale brown and has grayish-brown mottles. The underlying material is yellowish-brown silt loam mottled with grayish brown.

The content of organic matter is low. Available water capacity is high. Natural fertility is low to medium, but the soils respond very well to fertilization. The soils are slowly permeable.

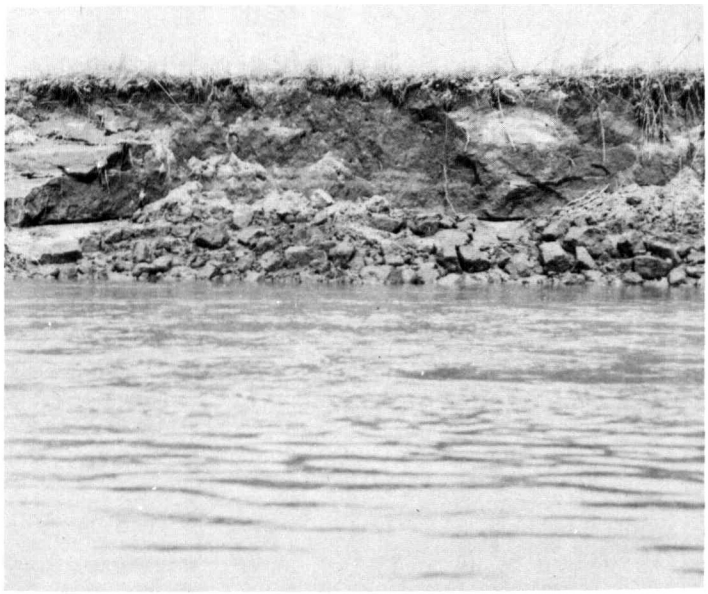

Figure 13.—**Streambank erosion is a severe hazard where trees have been removed from these Stonelick soils.**

Most of the acreage is used for crops or pasture, but a few areas are wooded.

Representative profile of Stoy silt loam, 0 to 2 percent slopes, in a cultivated field, about 50 feet south and 420 feet west of the northeast corner of NW¼NW¼ sec. 23, T. 9 N., R. 12 W.:

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—8 to 16 inches, yellowish brown (10YR 5/4) silt loam; common, fine, faint, grayish brown (10YR 5/2) mottles; weak, medium, platy structure; friable; strongly acid; clear, smooth boundary.

B1—16 to 19 inches, yellowish brown (10YR 5/4) light silty clay loam; common, fine, faint, grayish brown (10YR 5/2) mottles; moderate and strong, fine and very fine, subangular blocky structure; firm; many discontinuous, pale brown (10YR 6/3) grains of silt on faces of peds; strongly acid; clear, smooth boundary.

B21t—19 to 24 inches, yellowish brown (10YR 5/6) silty clay loam; common, fine, faint, grayish brown (10YR 5/2) mottles and few, fine, distinct strong brown (7.5YR 5/6) mottles; moderate and strong, fine and medium, subangular blocky structure; firm; common discontinuous, brown (10YR 4/3) clay films on faces of peds; strongly acid; clear, smooth boundary.

B22t—24 to 35 inches, grayish brown (10YR 5/2) silty clay loam; many, coarse, faint, yellowish brown (10YR 5/4 and 5/6) mottles and few, fine, distinct, dark brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; common discontinuous, dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual, smooth boundary.

Bx—35 to 47 inches, pale brown (10YR 6/3) light silty clay loam; many, coarse, faint, grayish brown (10YR 5/2) mottles and many, fine and medium, faint, yellowish brown (10YR 5/6) mottles; weak, medium and coarse, subangular blocky structure; firm; somewhat compact and brittle; common, coarse, dark brown (10YR 3/3) iron-manganese stains on faces of peds; grayish-brown mottles are arranged in a polygonal network of gray streaks; very strongly acid; gradual, smooth boundary.

C—47 to 60 inches, yellowish brown (10YR 5/4 and 5/8) silt loam; common, medium, faint, grayish brown (10YR 5/2) mottles; massive; friable; black (N 2/0) iron-manganese stains in root channels; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. Accumulations of iron and manganese are in all horizons, ranging from few to many. The Ap horizon is dark grayish brown, brown, or grayish brown. Reaction of the soil material below the Ap horizon ranges from medium acid to very strongly acid.

Stoy soils formed in the same kind of material as Hosmer and Weir soils. Stoy soils are more poorly drained than Hosmer soils and are better drained than Weir soils. Unlike Weir soils, Stoy soils have a fragipan.

164A—Stoy silt loam, 0 to 2 percent slopes. This soil is on the more narrow ridgetops and on slightly raised areas in the flat till plain. It has the profile described as representative of the series.

This soil is suited to all crops commonly grown in the county. Most areas are cultivated. Some small areas closely associated with steeper soils are used for pasture or trees. Runoff is slow, and there is little erosion. In places this soil needs additional drainage. This soil

is easily tilled. Capability unit IIw–3; woodland suitability group 3o1.

164B—Stoy silt loam, 2 to 5 percent slopes. This soil is on ridgetops, generally near steep bluffs and near the heads of drainageways. This soil has a profile similar to the one described as representative of the series, but the combined surface and subsurface layers are thinner than the ones in the representative profile. Included in mapping are a few small areas of soils that have slopes of 5 to 7 percent.

Most areas of this soil are used for cultivated crops, mainly corn, soybeans, wheat, hay, and rotation meadow. Some areas are in permanent pasture and a few areas remain in trees. Runoff is medium. Erosion and maintenance of fertility are the main concerns of management. Additional surface drainage is needed in some areas. This soil is easily tilled. Capability unit IIe–3; woodland suitability group 3o1.

Tice Series

The Tice series consists of deep, nearly level, somewhat poorly drained soils on bottom land, mainly in the Wabash River flood plain. These soils formed in water-laid sediment. The native vegetation was mainly mixed trees and grasses.

In a representative profile the surface layer is very dark grayish-brown silty clay loam about 15 inches thick. The subsoil is about 45 inches thick. It is dark grayish-brown silty clay loam mottled with yellowish brown.

The content of organic matter is moderate. Available water capacity is very high, and natural fertility is medium to high. The soils are moderately permeable. They are subject to flooding.

Most of the acreage is used for crops, but a few areas remain in woodland.

Representative profile of Tice silty clay loam in a cultivated field, about 300 feet south and 30 feet east of the northwest corner of SW¼ sec. 24, T. 9 N., R. 11 W.:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) silty clay loam; weak and moderate, fine, granular structure; friable; upper 1 inch of this layer is recent wash and contains more sand than the rest of the layer; mildly alkaline; abrupt, smooth boundary.

A12—8 to 15 inches, very dark grayish brown (10YR 3/2) silty clay loam; moderate, fine, granular structure; firm; mildly alkaline; gradual, smooth boundary.

B1—15 to 25 inches, dark grayish brown (10YR 4/2) silty clay loam; common, coarse, faint, very dark grayish brown (10YR 3/2) mottles and common, fine, faint, dark brown (10YR 4/3) mottles; moderate, fine, granular structure; firm; neutral; gradual, smooth boundary.

B21—25 to 42 inches, dark grayish brown (10YR 4/2) silty clay loam; common, fine, faint, dark brown (10YR 4/3) mottles and few, fine, distinct, dark yellowish brown (10YR 4/4) mottles; moderate, fine, subangular blocky structure parting to moderate, fine, granular; firm; neutral; gradual, smooth boundary.

B22—42 to 58 inches, dark grayish brown (10YR 4/2) silty clay loam; common, fine, distinct, dark yellowish brown (10YR 4/4) and brown (10YR 4/3) mottles; moderate and strong, fine, subangular blocky structure; firm; few dark gray (10YR 4/1) coatings on ped exteriors; neutral; gradual, smooth boundary.

B3g—58 to 60 inches, very dark gray (10YR 3/1) silty clay loam; common, fine, distinct, brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; moderate, fine and medium, subangular blocky structure; firm; neutral.

The solum ranges from 30 to more than 60 inches in thickness. The Ap horizon is medium silty clay loam or heavy silt loam. The combined Ap and A12 horizons range from 10 to 20 inches in thickness. The Ap and A12 horizons are very dark grayish brown, very dark brown, very dark gray, or black. Soil material below the Ap horizon ranges from slightly acid to mildly alkaline.

Tice soils formed in the same kind of material as Armiesburg and Petrolia soils. Tice soils are more poorly drained than Armiesburg soils and are darker colored than Petrolia soils.

284—Tice silty clay loam (0 to 2 percent slopes). This nearly level soil is on bottom land. Areas are long and somewhat continuous. Included in mapping are small areas of soils that are poorly drained. Also included are small spots of sandy soils.

This soil is used intensively for crops, especially summer annuals. Runoff is slow. Flooding by stream overflow limits the use of this soil. Most flooding occurs early in spring. Providing additional surface drainage is a minor concern of management in places. Capability unit I–1; woodland suitability group 2o4.

Weir Series

The Weir series consists of deep, nearly level, poorly drained soils in flat areas of uplands. These soils formed in loess. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsurface layer is light brownish-gray silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 29 inches is light brownish-gray silty clay loam, and the 8 inches below this is light brownish-gray heavy silt loam.

The content of organic matter is low. Available water capacity is high, and natural fertility is low. The soils are very slowly permeable.

Most of the acreage is used for crops or pasture, but a few areas are used for woodland.

Representative profile of Weir silt loam in a cultivated field, about 840 feet south and 75 feet east of the northwest corner of sec. 14, T. 11 N., R. 11 W.:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) when dry; weak, fine, granular structure; friable; many roots; few fine accumulations of iron and manganese; neutral; abrupt, smooth boundary.

A21g—10 to 18 inches, light brownish gray (2.5Y 6/2) silt loam, white (10YR 8/2) when dry; many, fine and medium, distinct, yellowish brown (10YR 5/6) mottles; weak, fine, granular structure; friable; common roots; very few accumulations of iron and manganese; very strongly acid; clear, irregular boundary.

A22g—18 to 23 inches, light brownish gray (2.5Y 6/2) silt loam; many, fine and medium, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, granular structure; friable; common roots; few fine accumulations of iron and manganese; extremely acid; clear, irregular boundary.

B21tg—23 to 30 inches, light brownish gray (2.5Y 6/2)

silty clay loam; many, fine and medium, distinct, yellowish brown (10YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm; few roots; continuous light brownish gray (2.5Y 6/2) clay films on faces of peds; few fine accumulations of iron and manganese; extremely acid; gradual, smooth boundary.

B22tg—30 to 38 inches, light brownish gray (2.5Y 6/2) silty clay loam; many, fine and medium, distinct, yellowish brown (10YR 5/6) mottles; moderate, coarse, prismatic structure parting to strong, coarse, subangular blocky; firm; few roots; continuous on vertical and discontinuous on horizontal light brownish gray (2.5Y 6/2) clay films on faces of peds; very few fine accumulations of iron and manganese; extremely acid; gradual, smooth boundary.

B23tg—38 to 44 inches, light brownish gray (2.5Y 6/2) silty clay loam; common, fine, distinct, yellowish brown (10YR 5/6) mottles and common, fine, faint, light olive brown (2.5Y 5/4) mottles; moderate, coarse, prismatic structure parting to moderate, coarse, subangular blocky; firm; few roots; continuous, thick, light brownish gray (12.5Y 6/2) clay films on faces of peds; very few fine accumulations of iron and manganese; extremely acid; gradual, smooth boundary.

B24tg—44 to 48 inches, light brownish gray (2.5Y 6/2) medium and heavy silty clay loam; many, fine, faint, light olive brown (2.5Y 5/4) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; weak, coarse, prismatic structure parting to moderate, coarse, angular blocky; firm; few roots; continuous, thick, light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine accumulations of iron and manganese; extremely acid; gradual, smooth boundary.

B31tg—48 to 52 inches, light brownish gray (2.5Y 6/2) light silty clay loam; many, fine, faint, light olive brown (2.5Y 5/4) mottles and common, fine, distinct, yellowish brown (10YR 5/6) mottles; weak, coarse, prismatic structure parting to moderate, coarse, subangular blocky; firm; few roots; thin, discontinuous, light brownish gray (2.5Y 6/2) clay films on faces of peds; common medium accumulations of iron and manganese; extremely acid; clear, wavy boundary.

B32g—52 to 60 inches, light brownish gray (2.5Y 6/2) heavy silt loam; many, fine and medium, distinct, yellowish brown (10YR 5/6) mottles; weak, coarse, prismatic structure parting to strong, coarse, angular blocky; very firm; few roots; many medium and coarse accumulations of iron and manganese; very strongly acid.

The solum ranges from 50 to more than 60 inches in thickness, but it generally is more than 60 inches thick. Crayfish have been active in many areas and krotovinas filled with silty material are present as a result. The Ap horizon is brown, dark grayish brown, grayish brown, or dark gray. The A21 and A22 horizons are light brownish gray, grayish brown, or light gray. The B horizons are gray, light gray, light brownish gray, dark gray, or olive gray. The B2 horizons are extremely acid to strongly acid. The B3 horizons are extremely acid to neutral.

Weir soils are siltier than the texture limit given in the defined range of the series, but this difference does not alter their usefulness or behavior.

Weir soils are more poorly drained than the associated Stoy soils. They have a thinner A horizon than the associated Racoon soils.

165—Weir silt loam (0 to 2 percent slopes). This soil is on flat uplands. Areas are irregular in shape, and in many places they are quite large. Included in mapping are small areas of Stoy and Racoon soils.

This soil is suited to crops, pasture, or trees. Runoff is slow, or the surface is ponded. Wetness and fertility are the main concerns of management. Surface crusting is a concern if seedbeds are overworked. This soil is wet in spring, fall, and winter. Surface drainage is generally needed for optimum growth of crops. Capability unit IIIw–1; woodland suitability group 4w2.

Wynoose Series

The Wynoose series consists of deep, nearly level, poorly drained soils in flat areas on uplands. These soils formed in loess and Illinoian glacial drift. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is grayish-brown and light-gray silt loam mottled with yellowish brown. It is about 11 inches thick. The subsoil extends to a depth of 48 inches or more. The upper part is gray silty clay loam, the middle part is gray and grayish-brown silty clay to heavy silty clay loam mottled with yellowish brown, and the lower part is gray silty clay loam mottled with yellowish brown. The underlying material is grayish-brown and yellowish-brown light silty clay loam.

The content of organic matter is low. Available water capacity is moderate to high. Natural fertility is low, and the content of phosphorus is very low. The soils are very slowly permeable.

Most of the acreage is used for crops or pasture, but some areas are idle or are wooded.

Representative profile of Wynoose silt loam in a cultivated field, about 40 feet south and 290 feet east of the northwest corner of SW¼NW¼ sec. 2 T. 9 N., R. 14 W.;

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; common concretions of iron and manganese; slightly acid; abrupt, smooth boundary.

A21—7 to 12 inches, grayish brown (10YR 5/2) silt loam; common, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles and common, medium, faint, light brownish gray (10YR 6/2) mottles; moderate and strong, thin, platy structure; friable; many fine stains and accumulations of iron and manganese; very strongly acid; clear, smooth boundary.

A22—12 to 18 inches, light gray (10YR 7/1) silt loam; common, fine, faint, light brownish gray (10YR 6/2) mottles and common, fine and medium, prominent, yellowish brown (10YR 5/4 and 5/6) mottles; moderate, medium, platy structure; friable; many fine stains and accumulations of iron and manganese; very strongly acid; abrupt, smooth boundary.

AB—18 to 21 inches, silty clay loam that has light gray (10YR 7/1 and 7/2) ped exteriors and gray (10YR 5/1) ped interiors; common, fine, prominent, strong brown (7.5YR 5/6) mottles; strong, fine, prismatic structure parting to strong, fine, angular blocky; firm; few discontinuous, dark grayish brown (10YR 4/2) clay films on faces of peds; common fine accumulations of iron and manganese; extremely acid; clear, smooth boundary.

B2t—21 to 34 inches, gray (10YR 5/1) silty clay; common, fine and medium, prominent, strong brown (7.5YR 5/6) mottles; moderate, fine and medium, prismatic structure parting to moderate, medium, angular blocky; very firm; common stains and accumulations of iron and manganese; extremely acid; gradual, smooth boundary.

B31t—34 to 41 inches, grayish brown (10YR 5/2) silty clay loam; common, fine and medium, distinct, yellowish brown (10YR 5/4 and 5/6) mottles and few, fine, faint, gray (10YR 5/1) mottles; moderate, medium, subangular blocky structure; firm;

common stains and concretions of iron and manganese; extremely acid; clear, wavy boundary.

IIB32t—41 to 48 inches, gray (10YR 5/1) silty clay loam that has noticeable amounts of sand; few, fine, faint, dark gray (10YR 4/1) mottles and many, fine and medium, prominent, yellowish brown (10YR 5/6 and 5/8) mottles; weak, coarse, subangular blocky structure; firm; common dark stains and few fine accumulations of iron and manganese; very strongly acid; gradual, wavy boundary.

IIC—48 to 60 inches, mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/4 and 5/8) light silty clay loam that has noticeable amounts of sand; massive; firm; common dark iron-manganese stains and few accumulations of iron and manganese; strongly acid.

The solum ranges from 36 to more than 60 inches in thickness. The combined Ap and A2 horizons range from 12 to 24 inches in thickness. The Ap horizon is brown, dark grayish brown, or grayish brown. The A21 and A22 horizons are granular or platy. Reaction in the soil material below the Ap horizon ranges from strongly acid to extremely acid.

Wynoose soils formed in the same kind of material as Cisne, Bluford, and Ava soils. Wynoose soils have a lighter colored Ap horizon than Cisne soils. Wynoose soils are more poorly drained than Bluford and Ava soils, and unlike these soils, Wynoose soils have no fragipan.

12—Wynoose silt loam (0 to 2 percent slopes). Areas of this nearly level soil generally are of various sizes and are irregularly shaped. They are between areas of flat prairie soils and more sloping soils such as Bluford and Blair. Where the flat area between drainageways is fairly narrow, this soil occupies the entire flat area. In places this soil extends as much as half a mile into the flat areas away from drainageways.

This soil is suited to crops or pasture. Wetness and maintenance of fertility are the main concerns of management. Tilth is a minor concern. The surface crusts when seedbeds are overworked. If this soil is worked when it is too wet, it becomes very cloddy when dry. It generally becomes wet early in fall and remains wet and cool until late in spring. Capability unit IIIw–1; woodland suitability group 4w2.

Xenia Series

The Xenia series consists of deep, gently sloping and sloping, moderately well drained soils on ridgetops and sides on the Westfield moraine of Wisconsin glaciation. These soils formed in loess and Wisconsin-age glacial till. The native vegetation was mainly hardwood trees.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsoil is about 43 inches thick. The upper part is brown and dark yellowish-brown silty clay loam, and the lower part is dark yellowish-brown, yellowish-brown, and brown clay loam mottled with grayish brown. The underlying material is pale-brown and brown loam mottled with grayish brown and yellowish brown.

The content of organic matter and phosphorus are low, and the content of potassium is medium to high in these soils. Available water capacity is high. The soils are moderately slowly permeable. Most of the acreage is used for crops or pasture.

Representative profile of Xenia silt loam, 2 to 7 percent slopes, in a cultivated field, 50 feet south and 180 feet east of the northwest corner of NE¼NW¼ sec. 22, T. 12 N., R. 14 W.:

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

B1—9 to 12 inches, brown (10YR 4/3) light silty clay loam; moderate, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary.

B21t—12 to 26 inches, dark yellowish brown (10YR 4/4) silty clay loam; few, fine, distinct, yellowish brown (10YR 5/4 and 5/6) mottles; strong, fine and medium, subangular blocky structure; firm; common, thin, discontinuous, brown (10YR 4/3) clay films on faces of peds; few, fine, faint, grayish brown (10YR 5/2) mottles in lower 8 inches of this layer; strongly acid; clear, smooth boundary.

IIB22t—26 to 35 inches, dark yellowish brown (10YR 4/4) clay loam; common, fine, distinct, strong brown (7.5YR 5/6 and 5/8) mottles and few, fine, faint, grayish brown (10YR 5/2) mottles; moderate, medium, subangular blocky structure; firm; common, thin, discontinuous, brown (10YR 4/3) clay films on faces of peds; many, fine, black (N 2/0) flecks of iron; few dark brown (10YR 3/3) clay films in root channels; strongly acid; gradual, smooth boundary.

IIB31t—35 to 47 inches, yellowish brown (10YR 5/4 and 5/8) clay loam; common, fine, distinct, strong brown (7.5YR 5/6 and 5/8) mottles and common, fine, faint, grayish brown (10YR 5/2) mottles; weak and moderate, medium, subangular blocky structure; firm; few, thin, discontinuous, brown (10YR 4/3) clay films on faces of peds; few very dark grayish brown (10YR 3/2) clay films in root channels; medium acid; gradual, smooth boundary.

IIB32—47 to 52 inches, brown (10YR 5/3) clay loam; common, fine, faint, grayish brown (10YR 5/2) and yellowish brown (10YR 5/6 and 5/8) mottles and few, fine, prominent, strong brown (7.5YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; few dark grayish brown (10YR 4/2) clay films in root channels; slightly acid; gradual, wavy boundary.

IIC—52 to 60 inches, brown (10YR 5/3) and pale brown (10YR 6/3) light clay loam grading to loam; common, fine, faint, yellowish brown (10YR 5/4 and 5/6) and grayish brown (10YR 5/2) mottles; massive; friable; moderately alkaline.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon is dark grayish brown or grayish brown. The lower part of the B horizon is clay loam or heavy clay loam or heavy loam. It is dark yellowish brown and brown mottled with yellowish brown and grayish brown in the lower part. The lower part of the IIB3 horizon ranges from slightly acid to mildly alkaline.

Xenia soils contain less sand in the upper part of the solum and formed in thicker loess than the associated Miami soils.

291B—Xenia silt loam, 2 to 7 percent slopes. This soil is on many of the broader ridgetops of the moraine and on the more gently sloping parts of the face of the moraine. In a few places areas of it are on lower parts of foot slopes below more rolling slopes.

Included with this soil in mapping are small areas of soils that have a thin layer of outwash material between the loess and the till and a very small acreage of eroded Xenia soils that have gentle slopes. Also included are small areas of well-drained soils on ridgetops; small, circular areas of soils that are surrounded by more sloping soils; and small areas of soils that have a grayer subsoil than this soil.

This soil is suited to crops, pasture, or trees. Runoff is medium. Controlling erosion is the main concern

of management. Capability unit IIe–1; woodland suitability group 1o1.

Use and Management of the Soils

In this section the system of capability grouping used by the Soil Conservation Service is explained, and the management of the soils of Clark County by capability units is discussed. Estimated yields of principal crops are also given in this section, and use of the soils for woodland and for wildlife habitat are discussed. Properties and features affecting engineering uses are presented in the text and listed in the tables. Also presented are limitations that affect the use of the soils for recreation.

Use and Management of the Soils for Crops

About 74 percent of Clark County is cultivated (*18*). Corn and soybeans are the main crops. Winter wheat is another important crop.

The main considerations in managing cultivated soils in the county are controlling water erosion, providing drainage, and maintaining fertility.

Among the measures that help to control erosion are use of cover crops; contour farming practices; use of diversions, terraces, and waterways; minimum and timely tillage practices; and the return of crop residue to the soil. Generally a combination of several measures is used.

Among the measures that help to provide drainage are the use of shallow surface drains, outlet ditches, and, where soils are suitable, the use of tile drains.

Measures that help to maintain fertility include application of lime, fertilizer, green manure, and barnyard manure, and the inclusion in the cropping system of cover crops, grasses, and legumes. Controlling erosion also helps to conserve fertility.

Reduction of salinity and additions of organic matter may be needed to offset the unfavorable soil characteristics of the Huey soils.

Capability Grouping

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 so 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 horticultural crops or other crops that require special management.

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

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

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

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

Class III soils have severe limitations that reduce the choice of plants, 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 not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat. (None in Clark County.)

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 that restrict their use largely to pasture or range, woodland, or wildlife habitat. (None in Clark County.)

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, water supply, or to esthetic purposes. (None in Clark 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 hazard 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 some parts of the United States (but not in Clark County,) shows that the main limitation is a 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, although they have other limitations that restrict their use largely to pasture, 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–3 or IIIe–2. 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, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Clark County are described, and suggestions for the use and management of the soils are given. Soils used for cultivated crops or pasture generally need lime and fertilizer. The amount to apply on a given soil should be determined by soil tests. To find the names of all the soils in any capability unit, refer to the Guide to Mapping Units at the back of this survey.

CAPABILITY UNIT I–1

This unit consists of deep, nearly level soils on floodplains. These soils are somewhat poorly drained to well drained and have a surface layer and subsoil of silt loam and silty clay loam.

The content of organic matter is low to moderate in soils of this unit, and natural fertility is medium to high. Available water capacity is high and very high. Permeability is moderate.

These soils are very well suited to corn, soybeans, and grass. Crop-residue management and planting green manure crops help to maintain the content of organic matter, fertility, and tilth. These soils have no major hazards when used intensively for crops. Flooding takes place occasionally in winter and spring. Soils that have a surface layer of silty clay loam become cloddy if tilled when wet.

CAPABILITY UNIT I–2

This unit consists of deep, nearly level soils on outwash plains, terraces, and uplands. These soils are somewhat poorly drained to well drained. They have a surface layer of silt loam and a subsoil of silty clay loam.

The content of organic matter is mainly moderate to low in soils of this unit, but in some small areas it is high. Natural fertility is medium to high. Available water capacity is high to very high. Permeability is moderate.

These soils are very well suited to all crops commonly grown in the county. They have no major problems when used for crops. Some areas may need supplemental drainage. Tile functions adequately.

CAPABILITY UNIT IIe–1

This unit consists of deep, gently sloping to moderately sloping soils on outwash plains, terraces, and uplands. These soils are well drained and moderately well drained. They generally have a surface layer of silt loam and a subsoil of silty clay loam and clay loam, but one of the soils in this unit has a surface layer of fine sandy loam and a subsoil of sandy loam and loamy sand. The moderately sloping soil is eroded.

The content of organic matter is low in soils of this unit, and natural fertility is low to medium. Available water capacity is moderate to very high. Permeability is moderate to moderately slow except in the soil that has a surface layer of fine sandy loam, and it has moderately rapid permeability. The hazard of erosion is slight.

These soils are well suited to the crops commonly grown in the county. Management practices that maintain fertility and content of organic matter and that control erosion are needed. Erosion can be controlled by returning crop residue to the soil and using minimum tillage practices.

CAPABILITY UNIT IIe–2

This unit consists of deep, gently sloping soils on uplands. These soils are moderately well drained. They have a surface layer of silt loam and a subsoil of silty clay loam that has a dense, brittle layer at a depth of about 30 inches. This layer restricts water movement and growth of roots to a slight degree.

The content of organic matter is low in the soils of this unit, and natural fertility is low. Available water capacity is moderate. Permeability is moderate to moderately slow in the upper part of the profile and slow to very slow in the lower part. The hazard of erosion is slight. In dry years growth of plants is limited somewhat by lack of available water.

These soils are well suited to the crops commonly grown in the county. Erosion can be controlled and moisture conserved by returning crop residue to the soil and by including practices of minimum tillage as a part of the cropping system. Grasses and legumes in the cropping system improve organic-matter content.

CAPABILITY UNIT IIe–3

This unit consists of deep, gently sloping soils on uplands. These somewhat poorly drained soils have a surface layer of silt loam and a subsoil of silty clay loam. The lower part of the subsoil is clay loam in a few places.

The content of organic matter and natural fertility are low to medium. Available water capacity is high. Permeability is slow. The hazard of erosion is slight.

These soils are well suited to crops commonly grown in the county. Erosion can be controlled by returning crop residue to the soil and by using minimum tillage practices as a part of the cropping system. Grasses and legumes are needed in the cropping system. Terracing and contouring (fig. 14) where slopes are suitable can be used to control erosion. Supplemental drainage is needed in some places for optimum crop growth. Most areas require the use of open drains.

CAPABILITY UNIT IIw–1

This unit consists of deep, nearly level soils on outwash plains and uplands. Soils on uplands and outwash plains are poorly drained to very poorly drained. The soils in this unit have a surface layer of silt loam and a subsoil of silty clay loam, except for one, which has a surface layer of silty clay loam.

The content of organic matter is moderate to high. Natural fertility is generally medium to high, but it is low to medium in some of the soils. Available water capacity is high to very high. Permeability is generally moderately slow to slow, but it is moderate in some of the soils.

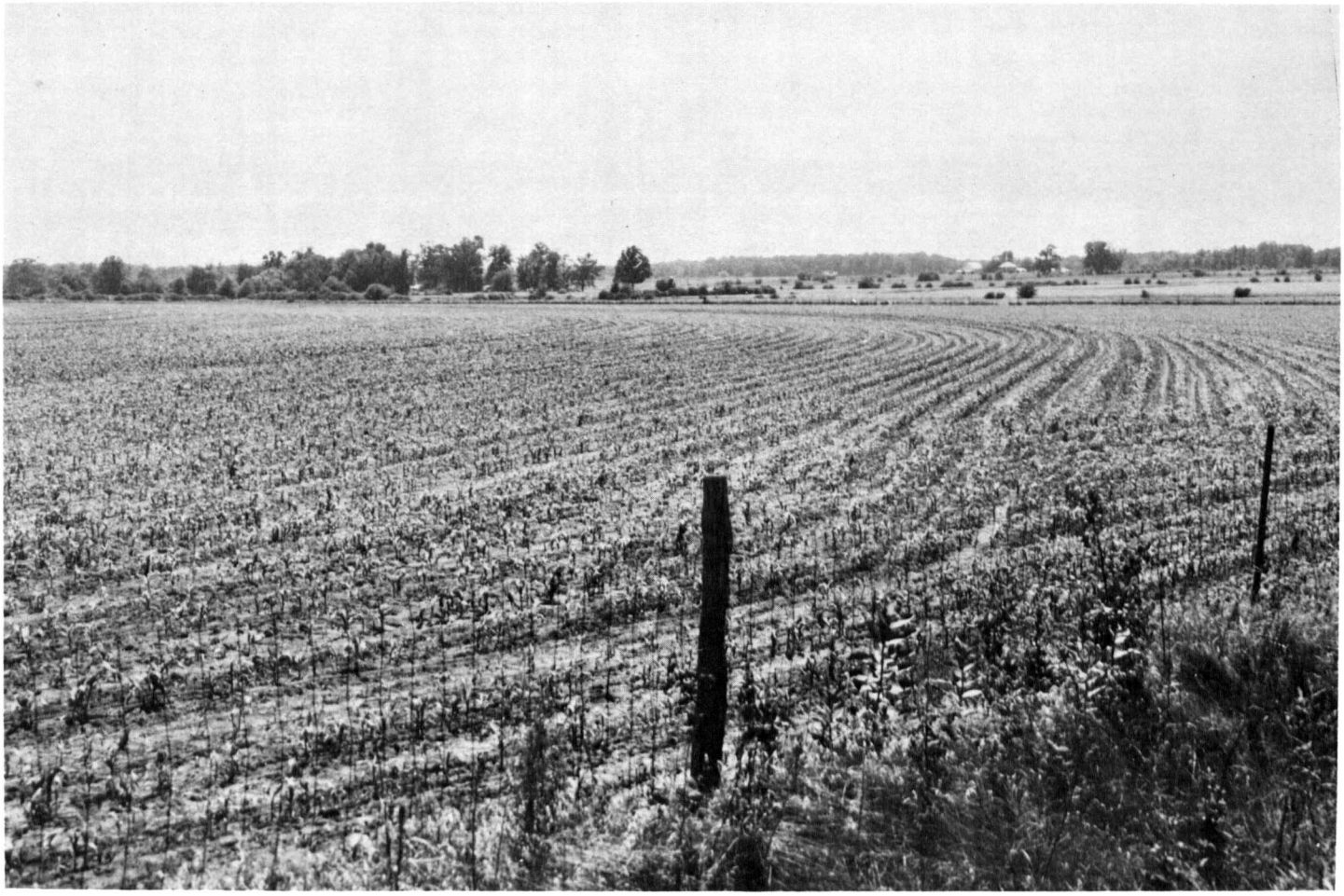

Figure 14.—**Contouring on gently sloping Stoy silt loam helps to control erosion.**

These soils are well suited to corn and soybeans if they are drained. The major limitation to use is wetness. Maintaining tilth is also a concern. Drainage can be provided by shallow surface ditches (fig. 15). Tile drainage is suitable for some of the soils. Where the surface layer is silt loam, the soils are easy to till; where it is silty clay loam, the soil tends to become cloddy if tilled when wet.

CAPABILITY UNIT IIw–2

This unit consists of deep, nearly level soils on bottom land. These soils are poorly drained. They have a surface layer of silty clay loam to clay loam.

The content of organic matter is moderate in soils of this unit, and natural fertility is medium to high. Available water capacity is high. Permeability is moderately slow to moderate. Major hazards to use are flooding and wetness. Maintaining soil tilth is also a concern, since the soils tend to become cloddy if plowed when wet.

These soils are well suited to corn and soybeans. Most of the flooding takes place in winter and spring. Drainage ditches work better than other types of drainage systems, but tile can be used if outlets are available. Returning crop residue to the soil, minimum tillage practices, and planting green manure crops help to maintain content of organic matter and improve tilth.

CAPABILITY UNIT IIw–3

This unit consists of deep, nearly level soils on uplands and outwash plains. These soils are somewhat poorly drained. They have a surface layer of silt loam and a subsoil of silty clay loam.

Natural fertility is low to medium. The content of organic matter is generally low, but one of the soils in this unit has a moderate content of organic matter. Available water capacity is high, and permeability is moderately slow to slow. Wetness is a slight hazard if the soils are used for crops. Maintaining fertility and the content of organic matter is a minor concern.

These soils are suited to all crops commonly grown in the county. Practices such as returning crop residue to the soil and planting green manure crops help maintain the content of organic matter. Removal of excess water is needed for good crop growth. Surface drains can be used to remove excess water from large areas of nearly level soils and from small depressions. Tile can be used in some areas.

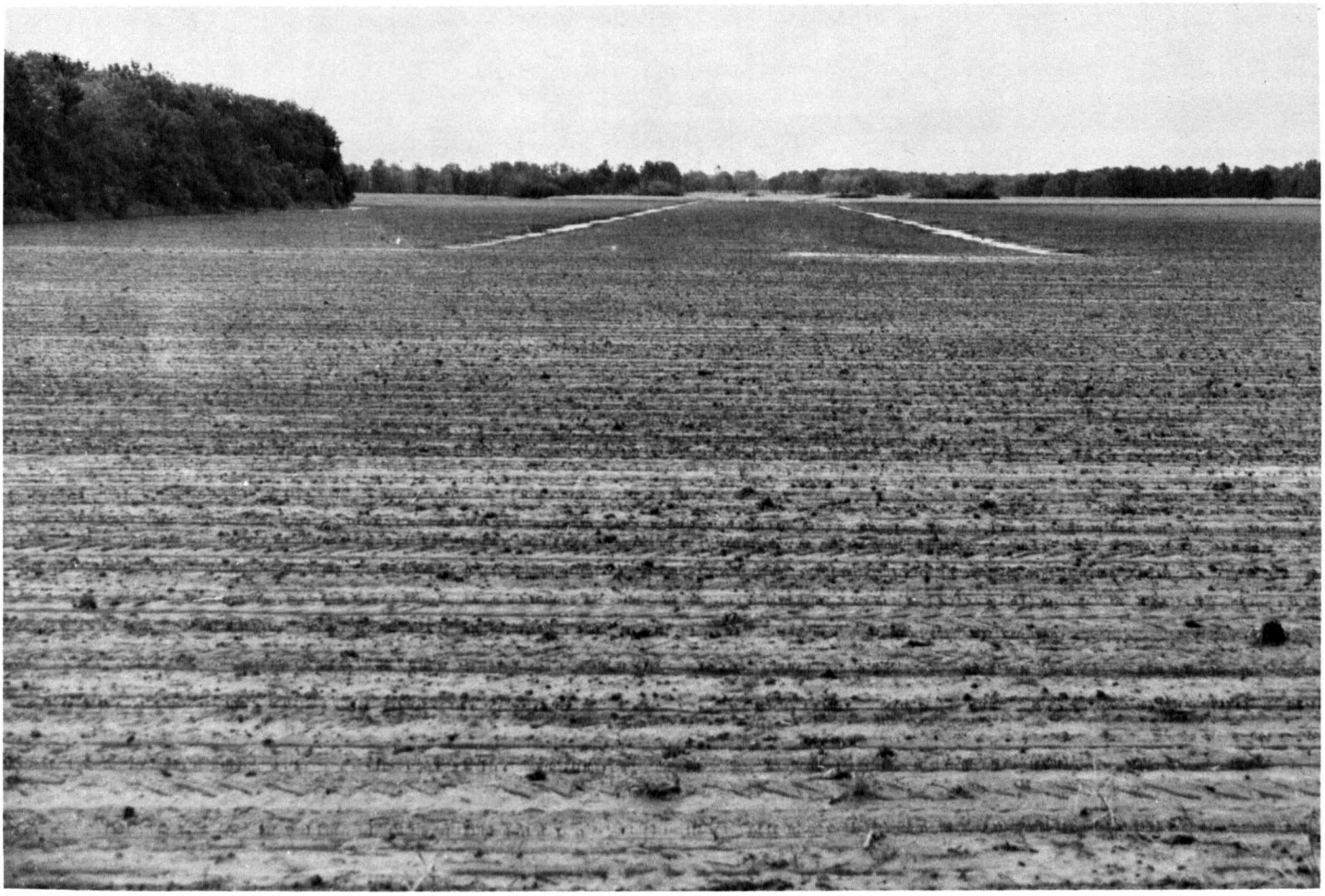

Figure 15.—Shallow surface ditches provide drainage for better crop growth on Cowden and Ebbert soils.

CAPABILITY UNIT IIw–4

This unit consists of deep, nearly level soils on bottom land. These soils are somewhat poorly drained. They have a surface layer of silt loam.

The content of organic matter is low in one soil of this unit and high in the other. Natural fertility is generally low to medium, but it is high in one of the soils. Available water capacity is high to very high. Permeability is moderate. Wetness is a slight hazard to use. Flooding is a minor hazard.

These soils are suited to corn, soybeans, or grasses. The size and accessibility of an area often determine its use. Drainage is needed for good crop growth. Flooding generally lasts for a short time on the smaller areas of bottom land. Flooding on the large areas of bottom land is mainly in winter and spring.

CAPABILITY UNIT IIs–1

Carmi sandy loam is the only soil in this unit. It is a nearly level soil on stream terraces in the southeastern part of the county. This soil is deep, and it has a subsoil of gravelly sandy loam.

Content of organic matter is moderate, and natural fertility is low. Available water capacity is low to moderate. Permeability is moderately rapid. Major hazards to use are limited moisture for crop growth and soil blowing (fig. 16).

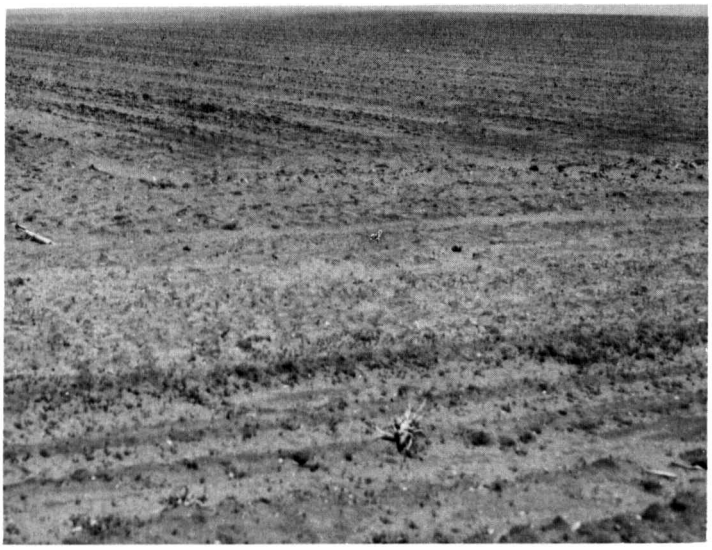

Figure 16.—Soil blowing is a hazard where the surface of this Carmi sandy loam has been left unprotected.

This soil is well suited to the crops commonly grown in the county. It is very well suited to winter wheat. Minimum tillage, planting green manure crops, and returning crop residue to the soil help to maintain the content of organic matter and conserve moisture. If irrigated, row crops are less likely to suffer moisture shortage than other crops. Winter cover crops and windbreaks reduce the hazard of soil blowing.

CAPABILITY UNIT IIs–2

Stonelick fine sandy loam is the only soil in this unit. It is a well-drained soil on nearly level bottom land. The underlying material is layers of fine sandy loam, loamy sand, fine sandy loam, coarse silt loam, and sand.

The content of organic matter is low, and natural fertility is low to medium. Available water capacity is low to moderate. Permeability is moderately rapid. Major hazards to use are flooding and droughtiness. Streambank erosion and channel scouring are also hazards.

This soil is suited to row crops, hay, or pasture. Flooding generally takes place in winter and spring. The narrow areas of bottom land flood for short periods several times during the year. During some of the periods when streams are high, deep-rooted crops in bottom land receive much-needed moisture from the high water table. Accessibility often determines whether areas of this soil are cropped. Vegetation should not be removed from areas next to streams, because this accelerates streambank erosion.

CAPABILITY UNIT IIIe–1

This unit consists of deep, moderately sloping and strongly sloping, eroded soils on uplands and terraces. These soils are well drained and moderately well drained. They have a surface layer of loam, silt loam, fine sandy loam, or silty clay loam and a subsoil of sandy loam, clay loam, or silty clay loam.

The content of organic matter is low in soils of this unit, and natural fertility is low to medium. Available water capacity is moderate to high. Permeability is moderate to moderately rapid. Erosion is a moderate hazard on these soils. Maintenance of content of organic matter and fertility are concerns. Maintaining soil tilth is a concern in areas of severely eroded soils.

These soils are moderately well suited to crops commonly grown in the county. They are well suited to pasture or hay. Soybeans are somewhat hazardous to the soil, because they do not leave enough residue on the surface after harvest. Minimum tillage, growing winter cover crops, and including grasses and legumes in the cropping system help to control erosion. Slope length and shape generally make contouring difficult.

CAPABILITY UNIT IIIe–2

This unit consists of deep, gently sloping to strongly sloping soils on uplands and terraces. These soils are moderately well drained to well drained. They have a surface layer of silt loam. Some of the soils have a dense, brittle fragipan at a depth of about 2 feet and are eroded. The soils on the terraces have a subsoil of silty clay.

The content of organic matter and the content of natural fertility are low. Permeability is moderately slow to very slow. Available water capacity is moderate to high. Erosion is a moderate hazard to use. Seeps are common in the spring in areas of strongly sloping soils. Managing these soils to maintain or improve the content of organic matter and fertility is important.

These soils are moderately well suited to crops grown in the county. Row crop growth is limited in dry years. Cropping systems that leave residue on the surface and include grasses and legumes help to control erosion. Some soils in this unit are suitable for contouring or terracing.

CAPABILITY UNIT IIIe–3

This unit consists of deep, moderately sloping soils on uplands. These soils are somewhat poorly drained. They have a surface layer of silt loam and a subsoil of silty clay loam. They are eroded.

The content of organic matter is low in soils of this unit, and natural fertility is low. Available water capacity is moderate to high. Permeability is moderately slow to very slow. Erosion is the main hazard to use. The soils are wet in spring and often have seepy areas late into the planting season. Management practices needed are those that maintain the content of organic matter and fertility and control erosion.

These soils are moderately well suited to corn, soybeans, and wheat. Wetness in the spring tends to limit the growth of wheat. Soybeans accelerate erosion because of small amounts of residue left on the surface after harvest. Tilth and organic-matter content can be improved by using barnyard manure, planting green manure, or growing grass and legumes.

CAPABILITY UNIT IIIe–4

This unit consists of deep, nearly level to sloping soils on terraces and uplands. These soils are well drained. They have a surface layer of sandy loam and a subsoil of sandy loam to gravelly sandy loam.

The content of organic matter is moderate to low in soils of this unit, and natural fertility is low. Available water capacity is moderate to low. Permeability is moderately rapid. Soil blowing and water erosion are the main hazards to use. Droughtiness is also a hazard.

These soils are suited to the crops grown in the county, but growth is limited by lack of moisture. The soils are suited to irrigation. They are well suited to winter wheat. Practices such as growing winter cover crops, planting windbreaks, and leaving crop residue on the surface help to control erosion. Planting green manure crops and returning crop residue to the soil help to maintain the content of organic matter. Specialty crops such as melons and strawberries can be grown if the soils are irrigated.

CAPABILITY UNIT IIIw–1

This unit consists of deep, nearly level soils on uplands and outwash plains. These soils are poorly drained. They have a surface layer of silt loam and a subsoil of silty clay loam to silty clay.

The content of organic matter is moderate to low in the soils of this unit, and natural fertility is low to medium. Available water capacity is moderate to high. Permeability is slow to very slow. Wetness and

low fertility are the main limitations to use. Maintaining the content of organic matter and reducing surface crusting are also concerns.

These soils are suited to the crops grown in the county. Grasses and plants that tolerate wetness should be used for hay or pasture (fig. 17). Drainage is needed for optimum crop growth. Where soils are managed to improve fertility, plant roots can penetrate the subsurface layer and subsoil and draw upon a much larger volume of soil for nutrients and water (*7*). Using barnyard manure, planting green manure crops, and returning crop residue to the soil help to increase the content of organic matter.

CAPABILITY UNIT IIIw–2

Darwin silty clay is the only soil in this unit. It is a deep, nearly level soil on broad bottom land mainly in the southeastern part of the county. It is poorly drained to very poorly drained. This soil has a surface layer and subsoil of clay to silty clay.

The content of organic matter is moderate, and natural fertility is medium. Available water capacity is high. Permeability is very slow. This soil is flooded frequently (fig. 18). Wetness and weed control are concerns.

This soil is suited to corn and soybeans. Protection from overflow and drainage are needed for optimum crop growth. The surface layer tends to become cloddy if the soil is plowed when wet.

CAPABILITY UNIT IIIs–1

This unit consists of deep and shallow, nearly level and gently sloping soils on terraces. These soils are well drained and somewhat excessively drained. They have a surface layer of loamy sand to silt loam. The shallow soils are underlain by limestone.

The content of organic matter is moderate to low in soils of this unit. Natural fertility is low in the deep soils and moderate to high in the shallow soils. Available water capacity is moderate to low. Permeability is moderate to rapid. Droughtiness is the main hazard to use. Soil blowing is a hazard on the loamy sand and sandy loam soils in this unit.

These soils are suited to crops grown in the county, but crop growth is limited by lack of moisture. Returning crop residue to the soil and growing green manure crops help to reduce erosion and maintain the content of organic matter. The deep soils are suitable for irrigation. Specialty crops such as melons, strawberries, or

Figure 17.—**Nearly level Weir soils such as these are suitable for pasture.**

Figure 18.—**Flooding and wetness limit use of these Darwin soils.**

other truck crops can be grown in irrigated areas. Melons grow without irrigation.

CAPABILITY UNIT IVe–1

This unit consists of deep, strongly sloping and moderately steep soils on uplands and terraces. These soils are moderately well drained to well drained. The strongly sloping soils are severely eroded, and the moderately sloping soils are eroded.

The content of organic matter is low in soils of this unit, and natural fertility is low to medium. Available water capacity is high. Permeability is moderate. Erosion is the main hazard to use. Maintaining the content of organic matter and tilth are concerns in areas of severely eroded soils.

These soils are suited to crops grown in the county. Soybeans generally do not respond to management. Management practices that control erosion, maintain fertility, and improve soil tilth are needed. Cropping systems that include grasses and legumes are useful in controlling erosion. Slopes are generally short and not well adapted to terracing.

CAPABILITY UNIT IVe–2

This unit consists of deep, moderately sloping and strongly sloping soils on uplands and terraces. These soils are somewhat poorly drained to moderately well drained. The moderately sloping soils are severely eroded, and the strongly sloping soils are eroded. Slopes are short and irregular.

The content of organic matter and natural fertility are low in soils of this unit. Available water capacity is moderate to high. Permeability is moderately slow to very slow. Erosion is the major hazard to use of soils in this unit. Soil tilth, seepy areas, and maintenance of fertility are also concerns.

These soils are suited to corn, wheat, or grasses. Soybeans are generally limited in growth. Practices are needed that maintain the content of organic matter and fertility, improve soil tilth, and control erosion.

CAPABILITY UNIT IVw–1

Huey silt loam is the only soil in this unit. It is a deep, poorly drained, nearly level to gently sloping soil on uplands. The surface layer is silt loam, and the subsoil is silty clay loam. The subsoil has a high content of sodium.

The content of organic material and natural fertility are low in soils of this unit. Available water capacity is low. Permeability is very slow. The major concerns in management are wetness, maintenance of fertility, droughtiness, and poor soil tilth caused by high sodium content. This sodium is toxic to many plants. Erosion is a hazard where slopes are gentle.

This soil is better suited to water-tolerant grasses than to other crops. Minimum tillage, high fertility, and large applications of organic matter all help to reduce the hazards to use. Although corn yields can be increased by mixing gypsum into the subsoil to counteract the high sodium content, the cost of this treatment is generally not practical under current economic conditions (*6*). Most areas of these soils are small and are managed along with the surrounding soils.

CAPABILITY UNIT VIe–1

This unit consists of deep, moderately steep to steep soils on uplands. These well-drained soils are eroded and severely eroded. The surface layer is loam, clay loam, or silty clay loam, and the subsoil is clay loam and silty clay loam.

The content of organic matter and natural fertility are low in soils of this unit. Permeability is moderate. Available water capacity is high. Erosion is the major hazard to use.

These soils are suited to pasture or woodland. Erosion can be controlled by maintaining a cover of grasses and legumes or trees. The severely eroded soils may be difficult to establish in vegetation because of the many gullies. Where slopes are too steep to permit use of farm machinery, the soils are better suited to trees than to other uses.

CAPABILITY UNIT VIe–2

Lamont fine sandy loam, 12 to 25 percent slopes, eroded, is the only soil in this unit. This well drained soil is on rolling upland areas in the southwestern part of the county. The subsoil is light sandy loam.

The content of organic matter and natural fertility are low in soils of this unit. Available water capacity is low. Permeability is moderately rapid. Soil blowing, water erosion, and droughtiness are the main hazards to use.

This soil is better suited to pasture or woodland than to other uses. Some hay is grown in areas where the soil is less sloping. Droughtiness limits growth of pasture and hay crops. Grazing needs to be limited to seasons of adequate moisture. Occasional small grain crops can be used to establish hay or pasture.

Estimated Yields

Table 2 shows estimated yields of the main crops grown in Clark County under a high level of management. These estimates are based on yields for the

TABLE 2.—*Estimated average yields per acre of principal crops*

[Yields are those to be expected under a high level of management. Absence of a yield figure indicates that the soil is not well suited to the crop or is not commonly grown]

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUM* [2]
Ade loamy sand, 1 to 6 percent slopes	70	25	32	2.8	4.7
Alford silt loam, 2 to 7 percent slopes	110	38	48	4.8	8.0
Alford silt loam, 7 to 12 percent slopes, eroded	100	35	42	4.5	7.5
Alvin fine sandy loam, 1 to 4 percent slopes	80	30	38	3.5	5.8
Alvin fine sandy loam, 4 to 7 percent slopes, eroded	75	28	35	3.2	5.3
Alvin fine sandy loam, 7 to 12 percent slopes, eroded	70	25	35	3.2	5.3
Ambraw clay loam	110	35	40	4.5	7.5
Armiesburg silty clay loam	130	45	55	5.5	9.1
Ava silt loam, 2 to 4 percent slopes	90	30	40	3.8	6.0
Ava silt loam, 4 to 7 percent slopes, eroded	80	28	35	3.5	5.7
Ava silt loam, 7 to 12 percent slopes, eroded	75	25	35	3.2	5.2
Blair-Atlas silt loams, 4 to 10 percent slopes, eroded	65	23	34	3.0	5.0
Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded	55	----	25	2.5	4.1
Bluford silt loam, 0 to 2 percent slopes	95	32	42	3.8	6.3
Bluford silt loam, 2 to 4 percent slopes	90	30	40	3.5	5.8
Brenton silt loam	140	48	58	5.8	9.7
Brooklyn silt loam	100	35	40	3.5	5.8
Camden silt loam, 0 to 2 percent slopes	110	38	48	5.0	8.3
Camden silt loam, 2 to 7 percent slopes	100	35	42	4.5	7.5
Camden silt loam, 7 to 15 percent slopes, eroded	95	32	40	4.2	7.0
Carmi sandy loam	95	32	48	4.1	6.9
Channahon silt loam	65	22	32	2.5	4.1
Chauncey silt loam	105	38	48	4.5	7.5
Cisne silt loam	105	38	48	4.2	7.0
Colp silt loam, 1 to 7 percent slopes	68	26	34	3.0	5.0
Colp silt loam, 7 to 12 percent slopes, eroded	60	22	28	2.8	4.8
Cowden silt loam	110	38	48	4.5	7.5
Darwin silty clay	90	32	38	3.0	4.5
Disco sandy loam, 1 to 4 percent slopes	80	28	38	3.2	5.3
Drummer silty clay loam	130	45	55	4.8	8.0
Ebbert silt loam	113	38	47	4.5	7.5
Genesee silt loam	115	40	50	4.8	8.0
Hickory loam, 7 to 12 percent slopes, eroded	85	30	38	3.8	3.1
Hickory clay loam, 7 to 12 percent slopes, severely eroded	83	28	35	3.5	3.0
Hickory loam, 12 to 18 percent slopes, eroded	80	----	----	3.5	3.0
Hickory clay loam, 12 to 18 percent slopes, severely eroded	-----	----	----	3.5	3.0
Hickory loam, 18 to 60 percent slopes, eroded	-----	----	----	3.0	2.8
Hosmer silt loam, 2 to 4 percent slopes	80	30	35	3.8	6.3
Hoyleton silt loam, 0 to 2 percent slopes	105	40	50	4.5	7.5
Hoyleton silt loam, 2 to 4 percent slopes	100	35	45	4.2	7.0
Hoyleton silt loam, 4 to 7 percent slopes, eroded	90	30	40	3.8	6.3
Huey silt loam	55	20	30	2.2	3.7
Iva silt loam, 0 to 2 percent slopes	120	42	52	5.0	8.3
Jules silt loam	110	38	45	4.8	8.0
Lamont fine sandy loam, 1 to 6 percent slopes	70	25	35	3.0	5.0
Lamont fine sandy loam, 12 to 25 percent slopes, eroded	-----	----	28	2.2	3.6
Lawson silt loam	130	45	55	5.5	9.1
Miami silt loam, 4 to 7 percent slopes, eroded	90	32	40	4.0	6.7
Miami clay loam, 4 to 7 percent slopes, severely eroded	85	30	38	3.8	6.3
Miami silt loam, 7 to 15 percent slopes, eroded	85	30	38	3.8	6.3
Miami clay loam, 7 to 15 percent slopes, severely eroded	80	----	35	3.5	5.8
Millbrook silt loam	125	45	55	5.2	8.7
Muren silt loam, 1 to 6 percent slopes	110	38	48	4.8	8.0
Newberry silt loam	110	38	48	4.2	7.0
Oconee silt loam, 0 to 2 percent slopes	108	40	50	4.6	7.0
Oconee silt loam, 2 to 4 percent slopes	105	38	48	4.5	6.8
Petrolia silty clay loam	115	40	50	4.8	8.0
Racoon silt loam	94	32	42	3.5	5.8
Sexton silt loam	100	35	45	4.0	6.6
Shiloh silty clay loam	117	40	47	4.4	7.0
Shoals silt loam	130	46	52	4.3	8.6
Starks silt loam	112	36	48	4.6	7.2
Stockland sandy loam, 0 to 4 percent slopes	70	26	38	3.5	5.4
Stockland sandy loam, 4 to 7 percent slopes	65	23	34	3.1	5.0
Stonelick fine sandy loam	80	25	35	3.5	5.4
Stoy silt loam, 0 to 2 percent slopes	100	35	45	4.2	7.0
Stoy silt loam, 2 to 5 percent slopes	100	35	45	4.2	7.0
Tice silty clay loam	128	41	52	5.1	8.0

TABLE 2.—*Estimated average yields per acre of principal crops*—Continued

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Pasture
	Bu	*Bu*	*Bu*	*Tons*	*AUM* [2]
Weir silt loam	90	32	42	3.5	5.8
Wynoose silt loam	85	28	38	3.5	5.8
Xenia silt loam, 2 to 7 percent slopes	110	38	48	4.8	8.0

[1] Hay and pasture yields are estimated for mixed stands of grasses and legumes that are adapted to the soil.
[2] AUM stands for animal-unit-months per acre. (An animal-unit-month is the amount of forage required to maintain one animal unit—one cow, one horse, one mule, five sheep, or five goats—for a period of 30 days.)

period 1939 to 1968, on soil tests, and on the experience and records of farmers, agronomists, conservationists, and farm advisers (*13*). The estimates are adjusted to reflect the trend toward higher yields during the period 1968 to 1973.

Management was determined on the basis of farming techniques, crop varieties, and fertilizers commonly used in 1973. Differences in weather from year to year can cause annual yields to range 20 percent above or below the long-term estimates shown in the table (*21*). Hay and pasture yields are estimated for varieties of grasses and legumes adapted to the soil.

Under high-level management, adequate drainage, flood control, and erosion control are provided, and the proper number of plants is grown. High-quality seed is used at this level of management, and tillage is kept to a minimum and is done when soil moisture is favorable. Weeds, plant diseases, and harmful insects are controlled under high-level management; favorable soil reaction and near-optimum levels of nitrogen, phosphorus, and potassium are maintained; and efficient use is made of available crop residue, barnyard manure, and green manure crops. Also, crops are harvested with the smallest possible loss, the combination of practices used is efficient, and all operations are timely.

The estimates in table 2 serve as a guide for expected yields under management conditions as stated. They are useful in showing the relative productivity of individual soils of the county.

Figure 19.—**Trees that have regenerated in areas of Hosmer soils where inaccessibility or erosion have made cropping undesirable.**

Use of the Soils for Woodland [2]

In 1962 about 34,633 acres in Clark County were in woodland (*18*). Oak, hickory, and associated hardwoods are the main species in the county. Most of the county was once wooded, but large areas were cleared for cropland. The remaining stands are mainly on soils that are unsuitable for cultivation. These soils are steep, wet, or inaccessible. Some idle cropland or pasture areas, when allowed to regenerate, support woodland growth (fig. 19). These areas generally need woodland management. Slightly less than half of the woodland is in pasture (*18*). These areas generally are on uplands and terraces.

The soils of Clark County have been placed in woodland suitability groups to assist owners in planning the use of their soils for wood crops. Each crop consists of soils that are suited to the same kinds of trees, need approximately the same kind of management, and have about the same potential productivity.

Each woodland suitability group is identified by a three-part symbol, such as 1o4, 2w3, or 3s2. The first part of the symbol, always an Arabic number, indicates relative potential productivity of the soils in the group: 1 = very high; 2 = high; 3 = moderately high; 4 = moderate; and 5 = low. These ratings are based on field determinations of average site index. Site index is the height, in feet, that the dominant trees of a given species, on a specified kind of soil, reach in a natural, unmanaged stand in a stated number of years. For all merchantable hardwoods and softwoods in this county except cottonwood, the site index is the height reached in 50 years. The site index for cottonwood is the height reached in 30 years.

The five foregoing ratings are based on field determinations of average site index of an indicator forest type or species. Site indexes are grouped into site

[2] WILLIAM M. CLARK, woodland conservationist, Soil Conservation Service, assisted in preparation of this section.

quality classes, and the classes are used to arrive at approximate expected yields per acre in cords and board feet. On the basis of research studies, site index can be converted into approximate expected growth and yield per acre in cords and board feet. For this survey, conversions of average site index for cottonwood into volumetric growth and yield are based on the methods prescribed by W. M. Broadfoot (*3*), and similar considerations for oak are based on methods prescribed by G. L. Schnur (*14*).

The second part of the symbol identifying a woodland suitability group is a small letter. This letter indicates an important soil property that imposes a slight to severe hazard or limitation on management of the soils of the group for wood crops. The letter *o* shows that the soils have few limitations that restrict their use for trees; the letter *r* shows that the main limitation is steep slopes; and the letter *s* shows that the soils are sandy and dry, have little or no difference in texture between the surface layer and subsoil, have low available water capacity, and generally have a low supply of plant nutrients. The letter *t* shows that, within the rooting zone, excessive alkalinity, acidity, sodium salts, or other toxic substances that limit or impede development of trees are present; and the letter *w* shows that water in or on the soil, either seasonally or year round, is the main limitation.

The third part of the symbol, an Arabic numeral from 1 to 6, categorizes groups of soils according to location and kind and degree of management required. The significance of each numeral is as follows:

The numeral *1* indicates upland and terrace soils with all items that affect management generally rated slight.

The numeral *2* indicates upland and terrace soils with one or more items related to management generally rated moderate.

The numeral *3* indicates upland and terrace soils with one or more items related to management rated severe.

The numeral *4* indicates bottom-land soils with all items that affect management generally rated slight.

The numeral *5* indicates bottom-land soils with one or more items related to management rated moderate.

The numeral *6* indicates bottom-land soils with one or more items related to management rated severe.

The hazards or limitations that affect management of soils for woodland are windthrow hazard, hazard of erosion, equipment limitations, seedling mortality, and plant competition.

Windthrow hazard measures the effect of the soils on root development and the ability of the soil to hold trees firmly. The hazard is *slight* if effective rooting is to a depth of more than 20 inches and the tree withstands most wind, *moderate* if effective rooting is to a depth of 10 to 20 inches and some trees are blown down during periods of excessive soil wetness and strong wind, and *severe* if effective rooting is to a depth of 10 inches or less and trees cannot stand alone in a strong wind.

Hazard of erosion refers to the potential hazard of soil loss in woodland. The hazard is *slight* if expected soil loss is small, *moderate* if some soil loss is expected and care is needed during logging and construction to reduce soil loss, and *severe* if special methods of operation are necessary to prevent excessive soil loss. In Clark County only the steep soils are subject to severe erosion.

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting the trees. In Clark County, soil characteristics that have the most limiting effect are drainage, depth to the water table, slope, and texture of the surface layer. *Slight* means there is no restriction in the kind of equipment or in the time of year that equipment is used, *moderate* means that use of equipment is restricted for less than 3 months of the year (fig. 20), and *severe* means that special equipment is needed and its use is restricted for more than 3 months of the year.

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

Plant competition is rated on the basis of the de-

***Figure 20.*—Equipment limitations are moderate because of slope in this young tree stand on moderately steep Hickory soils.**

gree to which unwanted plants invade openings in the tree canopy. Considered in the ratings are available water capacity, fertility, drainage, and degree of erosion. A rating of *slight* means that competition from other plants is not a concern; *moderate,* that plant competition delays development of fully stocked stands of desirable trees; and *severe,* that plant competition prevents establishment of a desirable stand unless intensive site preparation and such practices as weeding are used to control undesirable plants.

In table 3 the soils are placed in woodland suitability groups, management limitations that are based on soils are given, and some of the preferred species of trees and their average site indexes are shown.

Also listed in table 3 are species to favor in existing stands. Trees are listed for planting under various site conditions as well as those best suited for windbreaks. Adapted shrubs are also listed for windbreak planting.

Use of the Soils for Wildlife Habitat [3]

Food, cover, and water are plentiful in Clark County, but not always in combinations suitable for wildlife habitat (*22*). The three main kinds of wildlife in the county are open land, woodland, and wetland.

Few direct relationships obtain between the kinds of soil and wildlife species. Thus, table 4 shows relationships between kinds of soil and kinds of plant and water developments that make up wildlife habitat. Each soil is rated for its suitability for the improvement, maintenance, or creation of specific elements of wildlife habitat. A combination of the ratings for the applicable habitat elements approximates the suitbility of a soil for producing a desirable habitat for a given kind of wildlife.

The levels of suitability are expressed by an adjective rating as follows:

Good: Habitats are easily improved, maintained, or created. Few or no soil limitations for habitat management exist, and satisfactory results can be expected.

Fair: Habitats can be improved, maintained, or created on these soils, but moderate soil limitations affect habitat management or development. A moderate intensity of management and fairly frequent attention may be required to ensure satisfactory results.

Poor: Habitats can be improved, maintained, or created on these soils, but the soil limitations are severe. Habitat management may be difficult and expensive and may require intensive effort. Results are questionable.

Very poor: Under the prevailing soil conditions, it is impractical to attempt to improve, maintain, or create habitats. Satisfactory results are improbable.

Seven elements of wildlife habitat and the kinds of wildlife shown in table 4 are defined in the following paragraphs.

Grain and seed crops.—These are domestic grains or seed-producing annual plants such as corn, sorghum, wheat, oats, soybeans, buckwheat, cowpeas, and sunflowers.

Grasses and legumes.—These are domestic perennial grasses and herbaceous legumes that include such crops as brome, fescue, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoil, alfalfa, sericea, and Korean lespedezas.

Wild herbaceous plants.—These are native or introduced perennial grasses and forbs or weeds that provide food and cover mainly for upland wildlife. These plants include bluestem, indiangrass, wheatgrass, wildrye, oatgrass, pokeweed, strawberries, lespedeza, beggarweed, wild beans, nightshade, and goldenrod.

Hardwood plants.—These are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs (browse), or foliage used extensively as food by wildlife. These plants, commonly established by natural processes but also planted, include oak, beech, cherry, hawthorn, dogwood, viburnum, holly, maple, birch, poplar, grape, honeysuckle, blueberry, brier, greenbrier, and rose.

Coniferous plants.—These are cone-bearing trees and shrubs, used mainly by wildlife as cover. Coniferous plants, however, also produce food in the form of browse, seeds, and fruit that is used by some species of wildlife. These plants, established naturally or by planting, include pine, spruce, white cedar, redcedar, hemlock, balsam fir, juniper, and yew.

Wetland plants.—These are annual and perennial wild herbaceous plants that grow in moist or wet sites, excluding submerged or floating aquatic plants. These plants, used mainly by wetland wildlife for food and cover, include smartweed, wild millet, rushes, sedges, reeds, wildrice, rice cut-grass, mannagrass, bluejoint, cordgrass, cattail, pondweed, wild celery, and spatterdock.

Shallow-water areas.—These are impoundments or excavations generally not more than 5 feet deep. Examples are low dikes and levees, shallow dugouts, level ditches, and installations for controlling the water level on marshy streams or channels.

Openland wildlife.—Included are quail, mourning dove, meadowlark, cottontail rabbit, red fox, and other birds and mammals that normally live on cropland, pasture, hayland, and other areas overgrown with grasses, herbs, and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are seed and grain crops, grasses and legumes, wild herbaceous upland plants, and hardwood woodland plants.

Woodland wildlife.—Included are squirrel, whitetail deer, raccoon, woodcock, woodpecker, nuthatches, and other birds and mammals that frequent wooded areas of hardwood and coniferous trees and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous upland plants, hardwood woodland plants, and coniferous woodland plants.

Wetland wildlife.—Included are various kinds of waterfowl; birds such as the kingfisher and red-winged blackbird that normally live in wet areas such as ponds, marshes, and swamps; and muskrats and other mammals that normally live in these areas. Wildlife habitat elements used to rate the soils for this kind of wildlife are grain and seed crops, wetland food and cover plants, shallow-water developments, and excavated ponds.

[3] REX HAMILTON, wildlife biologist, Soil Conservation Service, assisted in the development of this section.

TABLE 3.—*Suitability of the*

[Dashes indicate that the soils do not occur under the

Woodland suitability group and mapping units	Potential productivity			Management limitations—				
	Species	Site index [1]	Annual growth per acre [2]	Erosion hazard	Equipment limitations	Seedling mortality	Plant competition	Windthrow hazard
			Board feet					
Group 1o1: Well drained and moderately well drained soils that have 0 to 15 percent slopes. These soils are on uplands and terraces. They have a surface layer of silt loam, clay loam, or loam and a subsoil of silty clay loam to clay loam. Permeability is moderate to moderately slow, and available water capacity is generally high or very high. 8D2, 8D3, 134A, 134B, 134D2, 291B, 308B, 308D2, 453B.	Upland oaks.[3] Yellow-poplar.	>85 >95	350–450 550–650	Slight	Slight	Slight	Moderate.	Slight
Group 1o4: Well drained and moderately well drained soils that have 0 to 2 percent slopes. These soils are on bottom lands. They have a surface layer of silty clay loam or fine sandy loam, and the material below the surface layer ranges from silty clay loam to fine sandy loam. Permeability is moderate, and available water capacity is high to moderate. 28, 431, 597.	Eastern cottonwood.	>105	550–650	Slight	Slight	Slight	Moderate.	Slight
Group 1r2: Well drained and moderately well drained soils that have 12 to 60 percent slopes. These soils are on uplands. They have a surface layer of loam to silty clay loam and a subsoil of silty clay loam to clay loam. Permeability is moderate, and available water capacity is high. 8E2, 8E3, 8F2.	Upland oaks.[3] Yellow-poplar.	>85 >95	350–450 550–650	Moderate.	Moderate.	Slight	Moderate.	Slight
Group 2o1: Well drained and moderately well drained soils that have 0 to 15 percent slopes and somewhat poorly drained soils that have 0 to 4 percent slopes. These soils are on uplands and terraces. They have a surface layer of silt loam to fine sandy loam and a subsoil of sandy loam to silty clay loam. Permeability is moderately rapid to slow, and available water capacity is moderate to very high. 14B, 14C2, 14D2, 27C2, 27C3, 27D2, 27D3, 131B, 131C2, 131D2, 132, 149, 214B, 219.	Upland oaks.[3]	75–85	250–350	Slight	Slight	Slight	Moderate to severe.	Slight
Group 2o4: Well-drained to somewhat poorly drained soils that have 0 to 2 percent slopes. These soils are on bottom lands. They have a surface layer of silty clay loam to fine sandy loam, and the material below the surface layer is silt loam, sandy loam, loamy sand, loam, or silty clay loam. Permeability is moderate to moderately rapid, and available water capacity is very high to low. 284, 424, 451, 665.	Pin oak Eastern cottonwood.	85–95 95–105	350–450 450–550	Slight	Slight	Slight	Severe	Slight

soils for woodland

site conditions listed. The symbol > means more than]

Species to favor in existing stands	Species suitable for planting—					
	On north- and east-facing (cool) sites where erosion is—		On south- and west-facing (hot) sites where erosion is—		In windbreaks	
	None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Black walnut, white oak, red oak, green ash.	White oak, black walnut, red oak, green ash, eastern cottonwood, American sycamore, yellow-poplar, eastern white pine, Scotch pine, red pine.	Red pine, Scotch pine, eastern white pine, black locust.	Green ash, black walnut, yellow-poplar, red pine, eastern white pine.	Red pine, Scotch pine, black locust.	Norway spruce, Douglas-fir, white spruce, eastern white pine, red pine.	Silky dogwood Amur maple, gray dogwood, Russian-olive, autumn olive, Vanhoutte spirea, lilac, forsythia.
Black walnut, eastern cottonwood, green ash, American sycamore.	Black walnut, eastern cottonwood, American sycamore, red maple, green ash, sweetgum, yellow-poplar.	----------	----------	----------	Douglas-fir, Norway spruce, white spruce, eastern white pine, red pine.	Silky dogwood, Amur maple, gray dogwood, Russian-olive, autumn olive, Vanhoutte spirea, lilac, forsythia.
Black walnut, white oak, green ash, northern red oak.	Black walnut, American sycamore, yellow-poplar, white oak, northern red oak, green ash, eastern white pine, red pine, Scotch pine.	Red pine, Scotch pine, eastern white pine, black locust.	Black walnut, yellow-poplar, green ash, eastern white pine, red pine.	Red pine, Scotch pine, black locust.	Norway spruce, eastern white pine, red pine, white spruce, Douglas-fir.	Silky dogwood, Amur maple, gray dogwood, Russian-olive, autumn olive, flowering dogwood, Vanhoutte spirea, lilac, forsythia.
Black walnut, green ash, white oak, northern red oak.	Black walnut, white oak, northern red oak, green ash, yellow-poplar, eastern white pine, red pine, Scotch pine.	Red pine, eastern white pine, Scotch pine.	Eastern white pine, red pine, Scotch pine, yellow-poplar, green ash, black walnut.	Red pine, Scotch pine, black locust, eastern redcedar.	Norway spruce, white spruce, Douglas-fir, eastern white pine, red pine.	Silky dogwood, Amur maple, gray dogwood, Russian-olive, autumn olive, Vanhoutte spirea, lilac, forsythia.
Pin oak, green ash, eastern cottonwood, American sycamore, red maple.	Eastern cottonwood, American sycamore, green ash, red maple, pin oak.	----------	----------	----------	Eastern white pine, white spruce, Norway spruce.	Silky dogwood, Amur maple, flowering dogwood, forsythia.

TABLE 3.—*Suitability of the*

Woodland suitability group and mapping units	Potential productivity			Management limitations—				
	Species	Site index [1]	Annual growth per acre [2]	Erosion hazard	Equipment limitations	Seedling mortality	Plant competition	Windthrow hazard
			Board feet					
Group 2w3: Poorly drained soils that have less than 2 percent slopes. These soils are on uplands and terraces. They have a surface layer of silt loam or silty clay loam and a subsoil of silty clay loam or clay loam. Permeability is moderate, and available water capacity is very high. [4]152.								
Group 2w5: Poorly drained soils that have less than 2 percent slopes. These soils are on bottom lands. They have a surface layer and underlying material of silt loam, clay loam, silty clay loam, or silty clay. Permeability is moderate, moderately slow, and slow, and available water capacity is moderate to high. The soils are subject to frequent flooding. 288, 302.	Pin oak Eastern cottonwood.	85–95 95–105	350–450 450–550	Slight	Moderate.	Moderate.	Slight	Slight
Group 3d2: Well-drained soils that have 0 to 12 percent slopes. These soils are on terraces. They have a surface layer of silty clay loam and a subsoil of clay loam. The soils have bedrock at a depth of 10 to 20 inches. Permeability is moderate, and available water capacity is low. 315.	Upland oaks.[3]	65–75	150–250	Moderate.	Slight	Moderate.	Slight	Slight
Group 3o1: Somewhat poorly drained to well-drained soils that have 0 to 12 percent slopes. These soils are on uplands and terraces. They have a surface layer of silt loam to loam and a subsoil of clay loam to silty clay. Permeability is slow to moderately slow, and available water capacity is moderate to high. [4]3A, [4]3B, [4]3C2, 13A, 13B, [4]113A, [4]113B, 122B, 122D2, 164A, 164B, 454A, 927C2, 927C3.	Upland oaks.[3]	65–75	150–250	Slight	Slight	Slight	Slight	Slight
Group 3s2: Well-drained and somewhat excessively drained soils that have 0 to 7 percent slopes. These soils are on uplands and terraces. They have a surface layer of loamy sand, sandy loam, or loam and a subsoil of loamy sand, sand, or sandy loam. Some of the soils have a gravelly subsoil. Permeability is moderately rapid to rapid, and available water capacity is low to moderate. Soil blowing is a hazard. 98B, 155B, 155C, 175B, 266B, 286.	Upland oaks.[3]	65–75	150–250	Slight	Moderate.	Moderate.	Severe	Slight
Group 3s3: Well-drained soils that have 12 to 25 percent slopes. These soils are on uplands and terraces. They have a surface layer of fine sandy loam and a subsoil of loam to sandy loam. Permeability is moderately rapid, and available water capacity is moderate to low. Soil blowing is a hazard. 175E2.	Upland oaks.[3]	65–75	150–250	Moderate.	Moderate to severe.	Severe	Slight	Slight

soils for woodland—Continued

Species to favor in existing stands	Species suitable for planting—					
	On north- and east-facing (cool) sites where erosion is—		On south- and west-facing (hot) sites where erosion is—		In windbreaks	
	None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
(1)	Pin oak, green ash.	----------	----------	----------	Black spruce	Amur maple, silky dogwood, flowering dogwood, forsythia, American cranberry bush.
Eastern cottonwood, green ash, pin oak, American sycamore, red maple.	Eastern cottonwood, American sycamore, green ash, pin oak.	----------	----------	----------	Oriental arborvitae.	Amur maple, American cranberry bush, forsythia.
White oak, northern red oak.	Eastern white pine, white oak, Scotch pine, green ash.	----------	----------	----------	Eastern white pine.	Russian-olive, autumn olive, Vanhoutte spirea.
White oak, northern red oak, black oak.	Scotch pine, red pine, eastern white pine, white oak, green ash.	Scotch pine, eastern white pine, red pine.	Scotch pine, eastern white pine, red pine.	Scotch pine, red pine, eastern redcedar.	Eastern white pine, red pine, Norway spruce, Douglas-fir, Oriental arborvitae.	Gray dogwood, autumn olive, Vanhoutte spirea, Russian-olive.
Black oak, white oak, northern red oak.	Eastern white pine, red pine, Scotch pine.	----------	----------	----------	Eastern white pine, red pine, Norway spruce, Douglas-fir, Oriental arborvitae.	Gray dogwood, autumn olive, Russian-olive, Vanhoutte spirea.
Northern red, oak, white oak.	Eastern white pine, red pine, Scotch pine.	----------	Scotch pine, eastern white pine, red pine.	----------	Eastern white pine, Norway spruce, red pine, Douglas-fir, Oriental arborvitae.	Gray dogwood, autumn olive, Russian-olive, Vanhoutte spirea.

TABLE 3.—*Suitability of the*

Woodland suitability group and mapping units	Potential productivity			Management limitations—				
	Species	Site index [1]	Annual growth per acre [2]	Erosion hazard	Equipment limitations	Seedling mortality	Plant competition	Windthrow hazard
			Board feet					
Group 3w2: Poorly drained and very poorly drained soils that have less than 2 percent slopes. These soils are on terraces and uplands. They have a surface layer of silt loam to silty clay loam and a subsoil of silty clay loam, clay loam, or loam. Permeability is slow to moderately slow, and available water capacity is high to very high. [4]48, 109, [4]112, 136, [4]138, 208, 218, [4]287.	Pin oak	75–85	200–300	Slight	Moderate.	Moderate.	Severe	Slight
Group 3w6: Poorly drained and very poorly drained soils that have less than 2 percent slopes. These soils are on bottom lands. They have a surface layer of silty clay, and the material below the surface layer is silty clay or clay. Permeability is very slow, and available water capacity is moderate to high. 71.	Pin oak	75–85	200–300	Slight	Moderate.	Severe	Severe	Slight
Group 4t3: Poorly drained soils that have less than 3 percent slopes. These soils are on uplands. They have a surface layer of silt loam and a subsoil of silty clay loam. Permeability is very slow, and available water capacity is low. Rooting is restricted by a high content of sodium and poor physical properties of the soils. 120.	Upland oaks. [3]	55–65	100–150	Slight	Moderate.	Severe	Severe	Slight
Group 4w2: Poorly drained soils that have less than 2 percent slopes. These soils are on uplands. They have a surface layer of silt loam and a subsoil of silty clay loam to silty clay. Permeability is very slow, and available water capacity is moderate to high. [4]2, 12, 165.	Pin oak	65–75	150–200	Slight	Moderate.	Moderate.	Severe	Slight

[1] Refer to text for explanation of site index.
[2] Doyle rule (*13*).

TABLE 4.—*Suitability of the*

Soil	Potential suitability for—		
	Elements of wildlife habitat		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants
Ade loamy sand, 1 to 6 percent slopes	Poor	Fair	Fair
Alford silt loam, 2 to 7 percent slopes	Good	Good	Good
Alford silt loam, 7 to 12 percent slopes, eroded	Fair	Good	Good
Alvin fine sandy loam, 1 to 4 percent slopes	Good	Good	Good
Alvin fine sandy loam, 4 to 7 percent slopes, eroded	Fair	Good	Good
Alvin fine sandy loam, 7 to 12 percent slopes, eroded	Fair	Good	Good
Ambraw clay loam	Poor	Fair	Fair
Armiesburg silty clay loam	Poor	Fair	Good
Ava silt loam, 2 to 4 percent slopes	Good	Good	Good
Ava silt loam, 4 to 7 percent slopes, eroded	Good	Good	Good

soils for woodland—Continued

Species to favor in existing stands	Species suitable for planting—					
	On north- and east-facing (cool) sites where erosion is—		On south- and west-facing (hot) sites where erosion is—		In windbreaks	
	None to moderate	Severe	None to moderate	Severe	Trees	Shrubs
Pin oak, green ash, white oak, red maple, swamp white oak.	Pin oak, green ash, red maple.	----------	----------	----------	Oriental arborvitae.	Gray dogwood, Amur maple, forsythia.
Pin oak, American sycamore, green ash, swamp white oak, red maple, eastern cottonwood.	Pin oak, green ash, American sycamore, eastern cottonwood.	----------	----------	----------	Oriental arborvitae.	Gray dogwood, Amur maple, forsythia.
White oak, northern red oak, green ash.	Green ash, eastern redcedar.	----------	----------	----------	Eastern redcedar.	Autumn olive.
Pin oak, white oak, black oak, green ash.	Pin oak, red maple, green ash.	----------	----------	----------	Oriental arborvitae.	Gray dogwood, forsythia, Amur maple, American cranberry bush.

[3] Includes white, Northern red, black, and scarlet oaks.
[4] These soils have no natural woodland, but they are adapted to species listed for this woodland suitability group.

soils for wildlife habitat

Potential suitability for—Continued						
Elements of wildlife habitat—Continued				Kinds of wildlife		
Hardwood plants	Coniferous plants	Wetland plants	Shallow-water areas	Open land	Woodland	Wetland
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Poor	Fair	Good	Poor.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Poor	Poor	Good	Good	Poor.

TABLE 4.—*Suitability of the*

Soil	Potential suitability for— Elements of wildlife habitat		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants
Ava silt loam, 7 to 12 percent slopes, eroded	Fair	Good	Good
Blair-Atlas silt loams, 4 to 10 percent slopes, eroded	Fair	Good	Good
Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded	Fair	Good	Good
Bluford silt loam, 0 to 2 percent slopes	Fair	Good	Good
Bluford silt loam, 2 to 4 percent slopes	Fair	Good	Good
Brenton silt loam	Fair	Good	Good
Brooklyn silt loam	Poor	Fair	Fair
Camden silt loam, 0 to 2 percent slopes	Good	Good	Good
Camden silt loam, 2 to 7 percent slopes	Good	Good	Good
Camden silt loam, 7 to 15 percent slopes, eroded	Fair	Good	Good
Carmi sandy loam	Good	Good	Good
Channahon silt loam	Poor	Poor	Fair
Chauncey silt loam	Fair	Fair	Fair
Cisne silt loam	Fair	Fair	Fair
Colp silt loam, 1 to 7 percent slopes	Good	Good	Good
Colp silt loam, 7 to 12 percent slopes, eroded	Fair	Good	Good
Cowden silt loam	Fair	Fair	Fair
Darwin silty clay	Poor	Fair	Fair
Disco sandy loam, 1 to 4 percent slopes	Good	Good	Good
Drummer silty clay loam	Fair	Fair	Fair
Ebbert silt loam	Fair	Fair	Fair
Genesee silt loam	Fair	Good	Good
Hickory loam, 7 to 12 percent slopes, eroded	Fair	Good	Good
Hickory clay loam, 7 to 12 percent slopes, severely eroded	Fair	Good	Good
Hickory loam, 12 to 18 percent slopes, eroded	Poor	Fair	Good
Hickory clay loam, 12 to 18 percent slopes, severely eroded	Poor	Fair	Good
Hickory loam, 18 to 60 percent slopes, eroded	Very poor	Poor	Good
Hosmer silt loam, 2 to 4 percent slopes	Good	Good	Good
Hoyleton silt loam, 0 to 2 percent slopes	Fair	Good	Good
Hoyleton silt loam, 2 to 4 percent slopes	Fair	Good	Good
Hoyleton silt loam, 4 to 7 percent slopes, eroded	Fair	Good	Good
Huey silt loam	Poor	Fair	Poor
Iva silt loam, 0 to 2 percent slopes	Fair	Good	Good
Jules silt loam	Good	Good	Good
Lamont fine sandy loam, 1 to 6 percent slopes	Good	Good	Good
Lamont fine sandy loam, 12 to 25 percent slopes, eroded	Poor	Fair	Good
Lawson silt loam	Good	Good	Fair
Miami silt loam, 4 to 7 percent slopes, eroded	Good	Good	Good
Miami clay loam, 4 to 7 percent slopes, severely eroded	Fair	Good	Good
Miami silt loam, 7 to 15 percent slopes, eroded	Fair	Good	Good
Miami clay loam, 7 to 15 percent slopes, severely eroded	Fair	Good	Good
Millbrook silt loam	Good	Good	Good
Muren silt loam, 1 to 6 percent slopes	Good	Good	Good
Newberry silt loam	Fair	Fair	Fair
Oconee silt loam, 0 to 2 percent slopes	Fair	Good	Good
Oconee silt loam, 2 to 4 percent slopes	Fair	Good	Good
Petrolia silty clay loam	Fair	Fair	Fair
Racoon silt loam	Fair	Fair	Fair
Sexton silt loam	Fair	Fair	Fair
Shiloh silty clay loam	Fair	Fair	Fair
Shoals silt loam	Poor	Fair	Fair
Starks silt loam	Fair	Good	Good
Stockland sandy loam, 0 to 4 percent slopes	Fair	Good	Good
Stockland sandy loam, 4 to 7 percent slopes	Fair	Good	Good
Stonelick fine sandy loam	Fair	Good	Good
Stoy silt loam, 0 to 2 percent slopes	Fair	Good	Good
Stoy silt loam, 2 to 5 percent slopes	Fair	Good	Good
Tice silty clay loam	Good	Good	Good
Weir silt loam	Fair	Fair	Fair
Wynoose silt loam	Fair	Fair	Fair
Xenia silt loam, 2 to 7 percent slopes	Good	Good	Good

Engineering Uses of the Soils [4]

This section is useful to those who need information about soils used as structural material or as foundations 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.

[4] GEORGE E. REITZ, JR., agricultural engineer, Soil Conservation Service, assisted in preparation of this section.

soils for wildlife—Continued

Potential suitability for—Continued						
Elements of wildlife habitat—Continued				Kinds of wildlife		
Hardwood plants	Coniferous plants	Wetland plants	Shallow-water areas	Open land	Woodland	Wetland
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Fair	Poor	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Fair	Fair	Good	Fair	Fair	Fair	Fair.
Fair	Poor	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Fair	Good	Fair	Poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Very poor	Very poor	Poor	Good	Very poor.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Fair	Poor	Good	Good	Poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Poor	Poor	Good	Good	Poor	Poor	Good.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Fair	Good	Good	Poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Good	Good	Good	Good	Good.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Poor	Good	Good	Poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Fair	Fair	Good	Good	Fair	Fair	Good.
Fair	Poor	Good	Good	Fair	Fair	Good.
Good	Good	Fair	Fair	Fair	Good	Fair.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Fair	Fair	Good	Good	Fair	Fair	Good.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Poor	Good	Good	Poor.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction (pH). Also important are depth to the water table in the soil, depth to bedrock, and 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 to predict performance of structures on the same or similar kinds of soil in other locations.

Most of the information in this section is presented in tables 5, 6, and 7, which show, respectively, 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 6 and 7, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigation at sites selected for engineering works, especially works that involve heavy loads or require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed, because many delineated areas of a given 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 not known to all engineers. The Glossary defines many of these 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 the 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 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 5; the estimated classification, without group index numbers, is given in table 6 for all soils mapped in the survey area.

Engineering test data

Table 5 contains engineering test data for some of the major soil series in Clark County. These tests were made to help evaluate the soils for engineering use. 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 increases 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.

Tests to determine liquid limit and plastic limit measure the effect of water on the consistence of soil material, as explained for table 6.

Soil properties significant to engineering

Several estimated soil properties significant to engineering are given in table 6. These estimates are made by layers of representative soil profiles that have significantly different soil properties. 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. Depth to bedrock is not estimated in table 6, because most of the soils in the survey areas are deep enough that bedrock generally does not affect their use. In Channahon soils, however, limestone is at a depth of 10 to 20 inches. Explanations of some of the columns in table 6 are given in the following paragraphs.

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.

Soil texture (*USDA texture*) is described in table 6 in the standard terms used by the Department of Agriculture. These terms are based on the percentages of sand, silt, and clay in the fraction of the soil less

than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Liquid limit and plasticity index are water contents obtained by standard specified operations. As the water content of a clayey soil, from which the particles coarser than 0.42 millimeter have been removed, is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of water content within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 6, but in table 5 the data on liquid limit and plasticity index are based on tests of soil samples.

Permeability, as used here, is an estimate of the rate at which saturated soil would transmit water in a vertical direction under a unit head of pressure. It is estimated on the basis of those soil characteristics observed in the field, particularly structure, porosity, and texture. Lateral seepage or such transient soil features as plowpans and surface crusts are not considered.

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

Reaction refers to the acidity or alkalinity of a soil, expressed in pH values for a stated soil-solution mixture. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential refers to the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or the extent to which the soil swells when it gets wet. The extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils can damage building foundations, roads, and other structures. Soils that have a *high* shrink-swell potential are the most hazardous.

Corrositivy, as used in table 6, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of steel is related to soil properties such as drainage, texture, total acidity, and electrical conductivity of the soil material. Installations of 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. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate but also by soil texture and acidity. 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 such that protective measures for steel and more resistant concrete should be used to reduce damage.

Engineering interpretations of the soils

The estimated interpretations in table 7 are based on the engineering properties of soils shown in table 6, 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 Clark County. In table 7 ratings are used to summarize limitations and suitability of the soils for specified purposes; and those soil features not to be overlooked in planning, installation, and maintenance are given for ponds and reservoirs, embankments, drainage of cropland and pasture, irrigation, and terraces and diversions.

Soil limitations are indicated by the ratings *slight, moderate,* and *severe. Slight* means soil properties generally are favorable for the rated use; or, in other words, limitations are minor and are easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* means soil properties are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required. For some uses the rating of severe is divided to obtain ratings of severe and very severe. *Very severe* means one or more soil properties are so unfavorable for a particular use that overcoming the limitations is most difficult and costly and commonly not practical.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms *slight, moderate,* and *severe.*

In the following paragraphs are explanations of some of the columns in table 7.

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 between depths of 18 inches and 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties considered are those that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, slope, and, if the floor needs to be leveled, depth to bedrock. The soil properties that affect the embankment are the engineering

TABLE 5.—*Engineering*

[Tests made by the Illinois Department of Transportation, Bureau of Materials,

Soil name and location	Parent material	Report number	Depth	Moisture-density[1]	
				Maximum dry density	Optimum moisture
			In	*Lb/ft³*	*Pct*
Ava silt loam:					
417 feet south and 582 feet west of the northeast corner of SW¼SW¼ sec. 4, T. 10 N., R. 13 W. (Modal)	Loess and gritty material or drift.	67–14789	11–22	106	19
		67–14790	26–35	108	18
		67–14791	43–64	115	15
Carmi loam:					
40 feet south and 48 feet west of the northeast corner of SE¼ sec. 29, T. 9 N., R. 11 W. (Nonmodal: finer textured A horizon.)	Outwash sand and gravel.	S72–IL–12–7–1	9–24	109	17
		S72–IL–12–7–2	24–40	124	10
		S72–IL–12–7–3	40–50	134	9
Cisne silt loam:					
120 feet north and 560 feet east of the southwest corner of SE¼SW¼ sec. 34, T. 10 N., R. 14 W. (Modal)	Loess and gritty material or drift.	S72–IL–12–4–1	0–6	108	16
		S72–IL–12–4–2	9–14	110	17
		S72–IL–12–4–3	18–30	98	22
		S72–IL–12–4–4	56–75	113	16
Hickory loam:					
330 feet north and 250 feet west of the southeast corner of SE¼NW¼ sec. 28, T. 11 N., R. 12 W. (Modal)	Glacial till	S72–IL–12–6–1	3–8	120	12
		S72–IL–12–6–2	13–26	120	12
		S72–IL–12–6–3	42–60	128	10
Miami silt loam:					
175 feet north and 660 feet east of the southwest corner of SE¼NW¼ sec. 26, T. 12 N., R. 14 W. (Modal)	Thin loess and glacial till.	67–14786	0–7	111	15
		67–14787	20–32	110	17
		67–14788	38–56	125	11
Newberry silt loam:					
150 feet south and 50 feet west of the northeast corner of sec. 3, T. 9 N., R. 14 W. (Modal)	Loess and gritty material or drift.	S72–IL–12–5–1	0–8	108	18
		S72–IL–12–5–2	22–29	102	21
		S72–IL–12–5–3	50–65	110	17
Shoals silt loam:					
825 feet south and 45 feet east of the center of sec. 11, T. 9 N., R. 14 W. (Nonmodal: more poorly drained and finer textured.)	Alluvium	67–14784	7–13	108	18
		67–14785	23–38	112	16
Weir silt loam:					
840 feet south and 75 feet east of the northwest corner of sec. 14, T. 11 N., R. 11 W. (Modal)	Loess	S73–IL–12–14–2	10–18	109	17
		S73–IL–12–14–4	30–38	106	19
		S73–IL–12–14–8	52–60	107	18

[1] Based on AASHTO designation T 99, Method A (*1*).

[2] Mechanical analyses according to AASHTO designation T 88 (*1*). Results obtained by this procedure may differ somewhat from the results 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 material up to and including 3 inches in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from the calculation of grain-size fractions. The

TABLE 6.—*Estimated soil properties*

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

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
	Ft	*In*			
Ade: 98B	>5	0–19	Loamy sand	SM	A–2 or A–4
		19–42	Sand	SP or SM	A–2 or A–3
		42–60	Sand that has thin bands of loamy sand.	SP or SM	A–2 or A–3

test data

Springfield. Absence of data indicates that no determination was made]

Mechanical analysis[2]										Liquid limit[3]	Plasticity index[4]	Classification	
Percentage less than 3 inches passing sieve—							Percentage smaller than—					AASHTO[5]	Unified[6]
1½ in	¾ in	⅜ in	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.005 mm	0.002 mm				
										Pct			
-------	-------	-------	-------	-------	100	98	95	36	30	41	20	A-7-6(21)	CL
-------	-------	-------	-------	100	98	85	79	36	30	51	17	A-7-5(29)	MH
-------	-------	-------	100	99	95	70	64	29	25	38	26	A-6(16)	CL
-------	-------	-------	100	97	78	49	45	28	20	34	13	A-6(3)	SC
100	95	69	53	37	24	14	13	8	7	31	3	A-2-4(0)	SM
100	99	96	92	81	50	12	11	7	6	------	[7] NP	A-1-b(0)	SW-SM
-------	-------	-------	-------	100	97	85	76	16	7	29	8	A-4(6)	CL
-------	-------	-------	100	99	93	84	79	18	8	27	10	A-4(7)	CL
-------	-------	-------	100	99	97	90	86	39	31	58	35	A-7-6(35)	CH
-------	-------	-------	100	99	95	78	72	25	17	37	20	A-6(0)	CL
100	97	93	89	78	69	39	31	11	6	18	2	A-4(0)	SM
98	95	91	88	86	77	54	51	18	11	26	11	A-6(3)	CL
-------	100	97	94	88	79	50	40	17	11	19	6	A-4(0)	SM-SC
-------	-------	100	99	99	96	76	64	15	11	27	5	A-4(3)	CL-ML
-------	100	99	99	98	95	74	72	37	31	46	28	A-7-6(20)	CL
-------	100	99	97	97	89	60	51	22	20	25	11	A-6(4)	CL
-------	-------	-------	100	99	95	83	78	26	16	30	8	A-4(6)	CL
-------	-------	-------	100	98	96	90	87	43	35	57	33	A-7-6(33)	CH
-------	-------	-------	100	97	94	84	82	35	27	41	19	A-7-6(17)	CL
-------	-------	-------	-------	100	99	92	87	31	23	37	18	A-6(16)	CL
-------	-------	-------	-------	100	98	87	83	29	16	31	13	A-6(10)	CL
-------	-------	-------	-------	100	97	91	86	22	16	29	7	A-4(6)	CL-ML
-------	-------	-------	-------	100	97	88	88	32	26	41	20	A-7-6(19)	CL
-------	-------	-------	100	97	93	89	89	30	22	39	18	A-6(17)	CL

mechanical analyses data used in this table are not suitable for use in naming textural classes of soil.

[2] Based on AASHTO designation T 89 (*1*).

[4] Based on AASHTO designation T 90-56 and AASHTO designation T 91-54 (*1*).

[5] Based on AASHTO designation M 145-49 (*1*).

[6] Based on the Unified Soil Classification System (*2*).

[7] NP=nonplastic.

significant to engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow that the soil is too variable to be rated or that no estimate was made. The symbol > means more than; the symbol < means

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
100	95–100	50–75	15–45	10–30	[1] NP–10	6.0–20.0	0.10–0.12	5.6–6.5	Low	Low	Moderate.
100	95–100	50–70	0–35	10–30	NP–6	6.0–20.0	0.06–0.08	6.1–6.5	Low	Low	Moderate.
100	95–100	50–75	0–35	10–30	NP–6	6.0–20.0	0.06–0.09	6.1–7.3	Low	Low	Low.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
	Ft	*In*			
Alford: 308B, 308D2	>5	0–15	Silt loam	CL	A–4 or A–6
		15–55	Silty clay loam	CL	A–6 or A–7
		55–60	Silt loam	CL	A–4 or A–6
Alvin: 131B, 131C2, 131D2	>5	0–10	Fine sandy loam	SM or ML	A–4
		10–37	Sandy loam	SM, ML, or CL	A–4 or A–6
		37–60	Loamy sand that has thin bands of sandy loam.	SP or SM	A–2 or A–3
Ambraw: 302	[2]0–2	0–14	Clay loam	CL	A–6 or A–7
		14–37	Clay loam	CL	A–6 or A–7
		37–60	Sandy clay loam that has strata of loam and clay loam.	CL	A–6
Armiesburg: 597	[2]>5	0–13	Silty clay loam	CL or CH	A–7
		13–60	Silty clay loam	CL or CH	A–7
Atlas Mapped only with Blair soils.	1–3	0–7	Silt loam	CL–ML or CL	A–4 or A–6
		7–41	Silty clay loam and silty clay	CH	A–7
		41–60	Clay	CL or CH	A–6 or A–7
Ava: 14B, 14C2, 14D2	2–4	0–11	Silt loam	CL	A–6
		11–22	Silty clay loam	CL	A–6 or A–7
		22–43	Silty clay loam	CL, MH	A–6, A–7
		43–60	Loam	CL–ML or CL	A–4 or A–6
*Blair: 927C2, 927C3 For Atlas parts, see Atlas series.	1–3	0–7	Silt loam	CL–ML or CL	A–4 or A–6
		7–60	Silty clay loam	CH or CL	A–6 or A–7
Bluford: 13A, 13B	1–3	0–22	Silt loam	CL	A–6
		22–48	Silty clay loam	CL	A–6 or A–7
		48–60	Silt loam	CL	A–4 or A–6
Brenton: 149	1–3	0–18	Silt loam	CL–ML or CL	A–4 or A–6
		18–37	Silty clay loam	CL	A–6 or A–7
		37–47	Clay loam	CL	A–6 or A–7
		47–60	Stratified loam and sandy loam	CL–ML, SM–SC, CL, or SC	A–2, A–4, or A–6
Brooklyn: 136	0–2	0–15	Silt loam	CL–ML or CL	A–4 or A–6
		15–44	Silty clay loam	CL or CH	A–7
		44–60	Stratified loam, sandy loam, and silt loam.	CL–ML, SM–SC, CL, or SC	A–4 or A–6
Camden: 134A, 134B, 134D2	>5	0–11	Silt loam	CL–ML or CL	A–4 or A–6
		11–30	Silty clay loam	CL	A–6 or A–7
		30–38	Loam	CL	A–6 or A–7
		38–60	Stratified loam and sandy loam	ML, CL, or SM	A–2, A–4, or A–6

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Pct		*In/hr*	*In/in of soil*	*pH*			
--------	100	90–100	70–90	25–35	8–15	0.6–2.0	0.22–0.24	5.1–6.0	Low	Moderate.	Moderate.
--------	100	90–100	80–95	35–50	15–30	0.6–2.0	0.18–0.20	4.5–6.0	Low	Moderate.	High.
--------	100	90–100	70–90	25–35	8–15	0.6–2.0	0.20–0.22	4.5–6.0	Low	Moderate.	High.
100	95–100	70–85	36–60	15–25	NP–4	2.0–6.0	0.16–0.18	6.1–7.3	Low	Low	Low.
100	95–100	60–70	40–65	15–38	NP–13	2.0–6.0	0.12–0.14	4.5–7.3	Low	Low	High.
100	95–100	50–75	0–20	10–20	NP–4	2.0–20.0	0.08–0.12	5.1–7.3	Low	Low	High.
--------	100	90–100	70–80	35–45	10–18	0.6–2.0	0.17–0.19	6.1–7.3	Moderate.	High	Low.
--------	100	90–100	70–80	35–48	10–20	0.6–2.0	0.15–0.19	5.6–7.3	Moderate.	High	Moderate.
--------	100	80–90	36–55	30–40	10–17	0.6–2.0	0.14–0.19	6.1–7.3	Moderate.	High	Low.
--------	100	95–100	85–95	38–54	20–30	0.6–2.0	0.21–0.23	6.6–7.3	Moderate.	Moderate.	Low.
--------	100	95–100	85–95	33–54	20–30	0.6–2.0	0.18–0.20	6.6–7.3	Moderate.	Moderate.	Low.
--------	100	95–100	75–95	24–33	6–14	0.2–0.6	0.20–0.24	6.6–7.3	Moderate.	High	Low.
--------	100	95–100	80–95	52–70	37–52	<0.06	0.11–0.19	>5.0	High	Very high.	High.
100	95–100	95–100	75–95	35–55	25–43	<0.06	0.09–0.11	5.6–7.3	High	High	Moderate.
100	95–100	95–100	85–100	21–33	11–15	0.2–0.6	0.22–0.24	5.1–7.3	Moderate.	Moderate.	Moderate.
--------	100	98–100	95–100	31–44	15–24	0.2–0.6	0.18–0.20	5.1–5.5	Moderate.	Moderate.	High.
100	98–100	95–100	85–95	25–52	11–25	<0.06	[3] 0.09–0.10	4.5–5.5	Moderate.	Moderate.	High.
100	98–100	90–100	70–88	20–38	5–26	0.2–0.6	----------	5.1–6.5	Low	Moderate.	High.
100	90–100	90–100	85–95	20–32	5–11	0.6–2.0	0.20–0.24	5.1–6.0	Low	Moderate.	Moderate.
100	90–100	90–100	75–90	32–52	15–28	0.2–0.6	0.15–0.20	4.5–6.5	Moderate.	High	High.
100	95–100	95–100	85–100	21–33	11–15	0.2–0.6	0.20–0.22	4.5–5.5	Moderate.	High	High.
100	95–100	94–100	80–100	31–43	12–26	0.06–0.2	0.11–0.19	4.5–5.0	Moderate.	High	High.
100	95–100	90–100	70–95	25–40	8–24	0.06–0.2	0.20–0.22	4.5–5.0	Moderate.	High	High.
100	95–100	90–100	80–95	30–40	5–15	0.6–2.0	0.22–0.24	5.6–6.5	Low	Low	Moderate.
95–100	90–100	95–100	70–95	35–50	11–25	0.6–2.0	0.18–0.20	5.6–6.5	Moderate.	High	Moderate.
95–100	90–100	90–100	60–90	35–50	11–25	0.6–2.0	0.15–0.19	6.1–6.5	Moderate.	High	Low.
90–100	90–100	70–90	30–80	10–35	5–20	0.6–2.0	0.17–0.19	6.6–7.3	Low	High	Low.
--------	100	90–100	80–100	25–32	5–14	0.2–0.6	0.22–0.24	4.5–6.0	Moderate.	High	Moderate.
--------	100	95–100	85–100	45–60	20–30	0.06–0.2	0.18–0.20	4.5–6.0	High	Very high.	Moderate.
95–100	80–100	60–90	40–90	15–37	5–19	0.2–0.6	0.11–0.21	6.1–6.5	Low to moderate.	High	Low.
100	95–100	90–100	80–95	25–35	5–15	0.6–2.0	0.22–0.24	5.6–6.5	Low	Low	Moderate.
95–100	90–100	90–100	60–90	35–45	15–25	0.6–2.0	0.18–0.20	5.1–5.5	Moderate.	Low	Moderate.
95–100	90–100	90–100	60–90	35–45	15–25	0.6–2.0	0.17–0.19	5.6–6.0	Moderate.	Low	Moderate.
90–100	80–95	40–90	30–80	0–35	NP–15	0.6–6.0	0.14–0.18	6.1–6.5	Low	Low	Low.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
	Ft	*In*			
Carmi: 286	>5	0–27	Sandy loam	SM–SC or SM	A–4 or A–6
		27–36	Gravelly sandy clay loam and gravelly sandy loam.	SC, SM, or GM	A–2, A–4, or A–6
		36–60	Gravelly loamy sand, loamy sand, and coarse sand.	GM or SM	A–1
Channahon: 315	(1)	0–10	Silt loam	CL	A–4 or A–6
		10–18	Silty clay loam	CL	A–6 or A–7
		18	Limestone		
Chauncey: 287	0–3	0–28	Silt loam	CL–ML or CL	A–4
		28–52	Silty clay loam	CL or CH	A–7
		52–60	Silt loam	CL	A–6
Cisne: 2	0–2	0–18	Silt loam	CL–ML or CL	A–4
		18–40	Silty clay loam	CH or CL	A–6 or A–7
		40–60	Silty clay loam	CL	A–6 or A–7
Colp: 122B, 122D2	2–4	0–11	Silt loam	CL–ML or CL	A–4 or A–6
		11–19	Silty clay loam	CL or CH	A–7
		19–60	Silty clay loam and silty clay	CL	A–6 or A–7
Cowden: 112	0–2	0–20	Silt loam	CL–ML or CL	A–4
		20–48	Silty clay loam	CH	A–7
		48–56	Silt loam	CL	A–6 or A–7
		56–60	Silty clay loam	CL	A–6 or A–7
Darwin: 71	2 0–2	0–60	Silty clay	CH	A–7
Disco: 266B	>5	0–36	Sandy loam	SC or SM	A–2 or A–4
		36–60	Sand	SP–SC	A–2
Drummer: 152	0–2	0–20	Silty clay loam	CL	A–6 or A–7
		20–49	Silty clay loam	CL	A–6 or A–7
		49–60	Stratified clay loam and loam	CL	A–4 or A–6
Ebbert: 48	0–2	0–17	Silt loam	CL	A–6
		17–56	Silty clay loam	CL or CH	A–7
		56–60	Silty clay loam	CL	A–7
Genesee: 431	2 >5	0–28	Silt loam	CL–ML or CL	A–4
		28–34	Loam	CL–ML or CL	A–4
		34–52	Stratified sandy loam and loamy sand	SM	A–2 or A–4
		52–60	Stratified sand and loamy sand	SM or SP–SM	A–2 or A–4
Hickory: 8D2, 8D3, 8E2, 8E3, 8F2.	>5	0–8	Loam	CL–ML or CL	A–4 or A–6
		8–42	Clay loam	CL	A–6
		42–60	Loam	CL–ML, CL, or SM–SC	A–4 or A–6
Hosmer: 214B	2–4	0–11	Silt loam	CL	A–4 or A–6
		11–23	Silty clay loam	CL	A–4 or A–6
		23–44	Silty clay loam	CL	A–4 or A–6
		44–60	Silt loam	CL	A–4 or A–6

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Pct		*In/hr*	*In/in of soil*	*pH*			
90–98	90–98	55–78	35–50	15–35	5–15	2.0–6.0	0.13–0.20	5.1–6.5	Low	Low	High.
45–95	45–90	40–65	20–40	15–40	3–15	2.0–6.0	0.12–0.19	5.1–5.5	Low	Low	High.
40–65	35–65	20–50	5–24	0–18	NP–5	6.0–20.0	0.02–0.07	5.1–5.5	Very low.	Low	Low.
90–100	85–95	85–95	55–80	21–38	7–18	0.6–2.0	0.22–0.24	6.1–6.5	Low	Low	Low.
90–100	80–90	80–90	60–85	24–46	15–20	0.6–2.0	0.16–0.18	6.1–6.5	Moderate.	Moderate.	Low.
								7.4–8.4			
100	95–100	90–100	85–100	25–32	6–10	0.2–0.6	0.22–0.24	4.5–6.5	Moderate.		High.
100	95–100	95–100	90–95	45–59	20–30	0.06–0.2	0.18–0.20	5.1–6.0	High	Very high.	Moderate.
100	95–100	90–100	80–95	26–35	11–19	0.06–0.2	0.20–0.22	5.6–6.0	Moderate.	High	Moderate.
100	95–100	90–100	85–100	25–32	6–10	0.2–0.6	0.22–0.24	4.5–6.5	Moderate.		Moderate.
100	95–100	95–100	90–95	33–59	20–35	<0.06	0.18–0.20	4.5–5.0	High	High	Moderate.
100	90–100	90–100	80–95	33–49	20–28	<0.06	0.18–0.20	5.1–6.0	Moderate.	High	Moderate.
	100	95–100	92–98	25–35	6–12	0.2–0.6	0.22–0.24	5.1–6.5	Moderate.		Moderate.
	100	95–100	95–100	43–63	22–43	0.06–0.2	0.18–0.20	4.5–5.0	High	High	High.
	100	98–100	95–100	35–45	20–26	0.06–0.2	0.10–0.19	4.5–8.4	High	High	Low.
	100	95–100	90–100	25–32	5–10	0.2–0.6	0.22–0.24	5.1–6.0	Moderate.		Moderate.
	100	98–100	95–100	57–72	30–53	0.06–0.2	0.18–0.20	4.5–6.0	High	High	High.
	100	98–100	95–100	31–50	21–33	0.2–0.6	0.20–0.22	5.6–6.0	Moderate.	High	Moderate.
	100	98–100	95–100	31–50	21–33	0.2–0.6	0.15–0.17	6.1–6.5	High	High	Low.
		100	95–100	50–83	31–55	<0.06	0.10–0.14	6.6–7.3	Very high.	High	Low.
	100	60–70	30–40	15–28	NP–10	2.0–6.0	0.13–0.15	5.6–7.3	Low	Low	Moderate.
	100	50–70	5–15	10–20	NP–6	6.0–20.0	0.05–0.08	5.6–6.0	Low	Low	Moderate.
95–100	95–100	95–100	85–100	33–50	22–30	0.6–2.0	0.21–0.23	6.1–6.5	Moderate.		Low.
95–100	95–100	95–100	85–100	33–50	22–30	0.6–2.0	0.18–0.20	6.1–7.3	Moderate.	High	Low.
90–100	90–100	85–100	60–80	24–33	7–20	0.6–2.0	0.14–0.19	7.4–7.8	Low	High	Low.
100	97–100	95–100	85–95	32–40	11–17	0.2–0.6	0.22–0.24	6.1–7.3	Low		Low.
	100	95–100	85–95	45–55	23–31	0.06–0.2	0.18–0.20	5.1–6.5	Moderate.	High	Moderate.
100	95–100	95–100	80–90	40–48	22–30	0.06–0.2	0.18–0.20	6.1–6.5	Moderate.	High	Low.
	100	90–100	70–90	26–33	6–10	0.6–2.0	0.22–0.24	7.4–7.8	Low		Low.
	100	85–95	60–75	26–33	6–10	0.6–2.0	0.17–0.19	6.6–7.3	Low	Moderate.	Low.
	100	50–70	15–40	10–37	NP–10	2.0–6.0	0.08–0.14	5.6–6.0	Low	Moderate.	Moderate.
	100	50–75	5–30	10–32	NP–10	2.0–20.0	0.05–0.09	5.6–6.0	Low	Moderate.	Moderate.
95–100	90–100	90–100	51–95	18–32	2–12	0.6–2.0	0.20–0.22	4.5–6.0	Low	Low	High.
95–100	90–100	80–95	51–85	25–40	11–28	0.6–2.0	0.15–0.19	4.5–6.1	Moderate.	Moderate.	High.
95–100	85–95	80–95	50–80	18–38	5–20	0.6–2.0	0.17–0.19	7.9–8.4	Low	Low	Low.
	100	90–100	70–90	27–36	8–15	0.6–2.0	0.20–0.24	4.5–6.0	Low	Moderate.	High.
	100	90–100	70–90	27–36	8–15	0.6–2.0	0.18–0.20	4.5–5.0	Low	Moderate.	High.
	100	90–100	70–90	27–36	8–15	0.06–0.2	[3] 0.06–0.10	4.5–5.0	Low	Moderate.	High.
	100	90–100	70–90	27–36	8–15	0.06–0.2	0.20–0.22	5.1–5.5	Low	Moderate.	Moderate.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
Hoyleton: 3A, 3B, 3C2	1–3	0–19	Silt loam	CL–ML or CL	A–4 or A–6
		19–51	Silty clay loam	CL or CH	A–7
		51–60	Silt loam	CL	A–6 or A–7
Huey: 120	0–2	0–12	Silt loam	ML or CL	A–4 or A–6
		12–37	Silty clay loam	CL	A–6 or A–7
		37–60	Silty clay loam	CL	A–6
Iva: 454A	1–3	0–12	Silt loam	CL	A–4 or A–6
		12–48	Silty clay loam	CL	A–6 or A–7
		48–60	Silt loam	CL	A–4 or A–6
Jules: 28	[2] >5	0–28	Silt loam	CL–ML or CL	A–4
		28–54	Silt loam that has lenses of sand	CL–ML or CL	A–4
Lamont: 175B, 175E2	>5	0–8	Fine sandy loam	SM–SC or SC	A–2 or A–4
		8–40	Fine sandy loam and sandy loam	SM–SC or SC	A–2 or A–4
		40–60	Fine sand	SM or SP	A–3 or A–2
Lawson: 451	[2] 1–3	0–32	Silt loam	ML	A–4
		32–45	Silt loam	CL	A–7
		45–60	Stratified silt loam and fine sand	CL or CL–ML	A–4
Miami: 27C2, 27C3, 27D2, 27D3.	>5	0–7	Silt loam	CL–ML or CL	A–4 or A–6
		7–17	Silty clay loam	CL	A–6 or A–7
		17–48	Clay loam	CL	A–6 or A–7
		48–60	Loam	ML or CL	A–4 or A–6
Millbrook: 219	1–3	0–18	Silt loam	CL–ML or CL	A–4 or A–6
		18–38	Silty clay loam	CL	A–6 or A–7
		38–48	Clay loam	CL	A–6 or A–7
		48–60	Stratified loam and sandy loam	ML, CL, or SM	A–4, A–6, or A–2
Muren: 453B	3–5	0–14	Silt loam	CL	A–4 or A–6
		14–52	Silty clay loam	CL	A–6 or A–7
		52–60	Silt loam	CL	A–4 or A–6
Newberry: 218	0–2	0–18	Silt loam	CL	A–4 or A–6
		18–50	Silty clay loam	CL or CH	A–7
		50–60	Silty clay loam	CL	A–7
Oconee: 113A, 113B	1–3	0–18	Silt loam	CL–ML or CL	A–4 or A–6
		18–60	Silty clay loam	CL or CH	A–7
Petrolia: 288	[2] 0–2	0–19	Silty clay loam	CL	A–6 or A–7
		19–58	Silty clay loam	CL	A–6 or A–7
		58–60	Silt loam	CL	A–6 or A–7
Racoon: 109	0–2	0–29	Silt loam	CL–ML or CL	A–4 or A–6
		29–60	Silty clay loam	CL	A–6 or A–7

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Pct		*In/hr*	*In/in of soil*	*pH*			
---	100	95–100	90–100	25–32	6–13	0.6–2.0	0.22–0.24	5.6–7.3	Moderate.	---	Moderate.
---	100	95–100	90–98	41–52	20–31	0.06–0.2	0.13–0.20	4.5–5.0	High	High	High.
100	95–100	90–100	80–95	30–45	20–27	0.06–0.2	0.17–0.22	5.1–5.5	Moderate.	High	Moderate.
100	95–100	90–100	70–90	22–30	1–14	0.06–0.2	0.22–0.24	5.1–6.5	Low	High	Moderate.
100	95–100	95–100	85–95	30–48	15–24	<0.06	[5] 0.08–0.10	7.4–8.4	Moderate.	Very high.	High.
100	95–100	95–100	80–95	25–32	11–16	0.06–0.2	0.12–0.14	7.9–8.4	Moderate.	Very high.	High.
---	100	90–100	70–90	27–36	8–15	0.6–2.0	0.22–0.24	5.1–6.5	Low	High	Moderate.
---	100	90–100	80–95	34–50	18–30	0.06–0.2	0.18–0.20	4.5–7.3	Low	High	High.
---	100	90–100	70–90	27–36	8–15	0.6–2.0	0.20–0.22	7.4–7.8	Low	High	Low.
---	100	90–100	70–90	27–36	4–10	0.6–2.0	0.22–0.24	7.4–7.8	Low	Low	Low.
---	100	70–100	65–90	27–36	4–10	0.6–2.0	0.20–0.24	7.4–7.8	Low	Low	Low.
---	100	90–95	25–50	15–25	5–10	2.0–6.0	0.16–0.18	6.1–6.5	Very low.	Low	Low.
---	100	90–95	30–50	20–30	5–10	2.0–6.0	0.15–0.17	5.1–6.5	Very low.	Low	Moderate.
---	100	50–70	3–15	---	NP	6.0–20.0	0.05–0.07	5.6–6.0	Very low.	Low	Moderate.
---	100	90–100	85–95	20–30	2–4	0.6–2.0	0.22–0.24	6.1–7.3	Low	Moderate.	Low.
---	100	90–100	85–95	40–50	20–30	0.6–2.0	0.20–0.22	6.6–7.3	Moderate.	Moderate.	Low.
---	100	90–100	70–90	15–25	2–7	0.6–2.0	0.15–0.20	6.6–7.3	Low	Moderate.	Low.
100	95–100	90–100	70–90	22–34	6–15	0.6–2.0	0.22–0.24	6.1–6.5	Low	---	Low.
95–100	95–100	95–100	75–95	37–50	17–30	0.6–2.0	0.18–0.20	5.1–6.0	Moderate.	Moderate.	Moderate.
95–100	95–100	90–100	70–80	37–50	17–30	0.6–2.0	0.15–0.19	5.1–7.8	Moderate.	Moderate.	Moderate.
95–100	95–100	85–95	51–64	17–30	2–14	0.6–2.0	0.17–0.19	7.9–8.4	Low	Low	Low.
100	90–100	90–100	90–100	24–33	4–18	0.6–2.0	0.22–0.24	5.6–7.3	Low	---	Moderate.
100	90–100	90–100	80–95	31–43	12–23	0.2–2.0	0.18–0.20	5.6–6.0	Moderate.	High	Moderate.
100	90–100	90–100	60–90	31–43	12–23	0.6–2.0	0.15–0.19	6.1–6.5	Moderate.	High	Low.
100	90–100	60–90	30–80	10–30	NP–14	0.6–6.0	0.13–0.19	6.6–7.3	Low	High	Low.
---	100	90–100	70–90	25–30	8–15	0.6–2.0	0.22–0.24	5.1–5.5	Low	Moderate.	Moderate.
---	100	90–100	80–95	34–50	18–30	0.2–0.6	0.18–0.20	4.5–5.0	Low	High	High.
---	100	90–100	70–90	27–36	8–15	0.6–2.0	0.20–0.22	5.1–5.5	Low	Moderate.	Moderate.
---	100	90–100	70–90	30–40	8–20	0.2–0.6	0.22–0.24	5.1–7.3	Low	---	Moderate.
---	100	95–100	85–95	45–57	15–35	0.06–0.2	0.18–0.20	5.1–6.5	Moderate.	High	Moderate.
---	100	95–100	85–95	40–48	19–30	0.06–0.2	0.18–0.20	6.1–6.5	Moderate.	High	Low.
---	100	95–100	90–100	26–32	6–13	0.2–0.6	0.22–0.24	5.1–6.5	Moderate.	---	Moderate.
---	100	95–100	90–100	45–75	25–45	0.06–0.2	0.11–0.20	5.1–7.3	High	High	Moderate.
100	95–100	90–100	80–100	30–45	12–20	0.2–0.6	0.21–0.23	7.4–8.4	Moderate.	High	Low.
100	95–100	90–100	80–100	30–45	11–20	0.2–0.6	0.18–0.20	6.6–7.3	Moderate.	High	Low.
100	95–100	90–100	80–100	30–45	11–20	0.6–2.0	0.20–0.22	6.6–7.3	Moderate.	High	Low.
---	100	95–100	90–100	25–35	6–17	0.2–0.6	0.22–0.24	4.5–7.3	Moderate.	---	High.
---	100	95–100	90–100	38–48	15–26	0.06–0.2	0.18–0.20	4.5–5.0	High	High	High.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
Sexton: 208	0–2	0–17	Silt loam	CL–ML or CL	A–4 or A–6
		17–35	Silty clay loam	CL	A–6 or A–7
		35–41	Loam	ML or CL	A–4 or A–6
		41–60	Sandy loam	ML or SM	A–2 or A–4
Shiloh: 138	0–2	0–21	Silty clay loam	CL or CH	A–7
		21–60	Silty clay loam	CL or CH	A–7
Shoals: 424	[2]1–3	0–9	Silt loam	CL–ML or CL	A–4 or A–6
		9–30	Silt loam	CL–ML or CL	A–4, A–6
		30–60	Loam and fine sandy loam	ML	A–4
Starks: 132	1–3	0–13	Silt loam	CL–ML or CL	A–4 or A–6
		13–40	Silty clay loam	CL	A–6 or A–7
		40–52	Clay loam	CL	A–4 or A–6
		52–60	Stratified loam, silt loam, and sandy loam.	CL–ML, CL, or SM	A–2 or A–4
Stockland: 155B, 155C	>5	0–10	Sandy loam	SM	A–2 or A–4
		10–21	Gravelly sandy loam	SM	A–2 or A–4
		21–31	Gravelly sandy clay loam	SM	A–2 or A–4
		31–60	Gravelly sandy loam and gravelly sand.	SM, GP, or GM	A–1
Stonelick: 665	[2]>5	0–10	Fine sandy loam	SM or ML	A–4
		10–60	Stratified fine sandy loam, loamy sand, and sand.	SM	A–4 or A–2
Stoy: 164A, 164B	1–3	0–16	Silt loam	CL or ML	A–4 or A–6
		16–47	Silty clay loam	CL or CH	A–7
		47–60	Silt loam	CL	A–7 or A–6
Tice: 284	[2]1–3	0–15	Silty clay loam	CL	A–6 or A–7
		15–60	Silty clay loam	CL	A–6 or A–7
Weir: 165	0–2	0–23	Silt loam	CL–ML or CL	A–4 or A–6
		23–52	Silty clay loam	CL	A–6 or A–7
		52–60	Silt loam	CL	A–4 or A–6
Wynoose: 12	0–2	0–18	Silt loam	CL or ML	A–4 or A–6
		18–34	Silty clay	CL or CH	A–6 or A–7
		34–60	Silty clay loam	CL	A–4 or A–6
Xenia: 291B	3–5	0–9	Silt loam	CL or ML	A–4 or A–6
		9–26	Silty clay loam	CL	A–6 or A–7
		26–52	Clay loam	CL	A–6 or A–7
		52–60	Loam	CL or SC	A–4 or A–6

[1] NP = nonplastic.
[2] Subject to flooding.
[3] Available water capacity is lower because of the inability of roots to fully penetrate the layer.

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
				Pct		*In/hr*	*In/in of soil*	*pH*			
------	100	90–100	90–100	25–35	6–17	0.2–0.6	0.22–0.24	5.1–7.3	Low	------	Moderate.
------	100	95–100	90–100	35–46	15–28	0.06–0.2	0.18–0.20	4.5–5.5	Moderate to high.	High	High.
100	95–100	85–95	60–75	15–40	2–19	0.2–0.6	0.17–0.19	5.1–5.5	Moderate to high.	High	Moderate.
100	95–100	60–70	30–70	3–40	NP–25	0.6–2.0	0.11–0.13	5.6–6.0	Low	High	Moderate.
------	100	98–100	90–100	43–55	20–32	0.2–0.6	0.12–0.23	6.1–7.3	High	Very high.	Low.
------	100	98–100	90–100	41–56	19–34	0.06–0.6	0.12–0.19	6.1–7.3	High	Very high.	Low.
------	100	90–100	65–90	22–36	6–15	0.6–2.0	0.22–0.24	7.4–7.8	Low	High	Low.
------	100	90–100	75–85	26–33	6–18	0.6–2.0	0.20–0.22	6.6–7.8	Low	High	Low.
95–100	90–100	70–90	55–70	32–40	3–8	0.6–2.0	0.14–0.19	6.6–7.3	Low	High	Low.
------	100	95–100	85–100	22–35	5–15	0.6–2.0	0.22–0.24	5.6–6.5	Moderate.	High	Moderate.
------	100	90–100	80–100	35–45	15–24	0.2–0.6	0.18–0.20	5.1–6.5	Moderate.	High	Moderate.
95–100	90–100	80–95	40–80	20–30	7–17	0.6–2.0	0.15–0.19	5.1–6.0	Moderate.	High	Moderate.
90–100	80–95	40–90	30–60	0–20	NP–10	2.0–6.0	0.08–0.18	6.6–7.3	Very low.	Low	Low.
75–95	50–75	40–65	28–50	15–40	6–10	2.0–6.0	0.13–0.18	5.6–6.0	Low	------	Moderate.
75–95	50–75	40–65	28–50	15–40	6–10	2.0–6.0	0.12–0.15	5.6–7.3	Low	Moderate.	Moderate.
75–95	50–75	40–65	28–50	15–40	6–11	2.0–6.0	0.12–0.15	6.6–7.3	Low	Low	Low.
35–60	25–50	20–40	4–25	0–20	NP–6	6.0–20.0	0.02–0.06	6.6–8.4	Very low.	Low	Low.
------	100	70–90	40–60	0–36	NP–10	2.0–6.0	0.15–0.17	7.4–7.8	Low	Low	Low.
100	70–95	40–60	5–40	------	NP	2.0–6.0	0.06–0.19	7.4–7.8	Low	Low	Low.
------	100	90–100	90–100	23–33	3–14	0.6–2.0	0.22–0.24	5.1–6.5	Low	------	Moderate.
------	100	95–100	95–100	44–55	21–32	0.06–0.2	0.18–0.20	4.5–5.5	Moderate.	High	High.
100	95–100	90–100	85–100	31–43	13–24	0.2–2.0	0.20–0.22	5.6–6.0	Low	High	Moderate.
------	100	92–100	70–95	32–45	12–28	0.6–2.0	0.21–0.23	7.4–7.8	Moderate.	High	Low.
------	100	92–100	70–95	32–45	12–28	0.6–2.0	0.18–0.20	6.6–7.3	Moderate.	High	Low.
------	100	90–100	90–100	23–35	6–17	0.2–0.6	0.20–0.24	4.5–7.3	Low	------	High.
------	100	95–100	95–100	35–46	15–29	<0.06	0.18–0.20	<4.5	High	High	High.
------	100	90–100	90–100	22–39	9–19	0.06–0.2	0.20–0.22	4.5–5.0	Low	High	High.
100	95–100	90–100	78–95	21–33	4–13	0.2–0.6	0.22–0.24	4.5–6.5	Moderate.	------	High.
100	95–100	90–100	80–92	30–54	11–30	<0.06	0.11–0.13	<4.5	High	High	High.
100	95–100	90–100	75–90	20–35	8–15	0.06–0.2	0.18–0.20	4.5–5.5	Moderate.	High	High.
------	100	90–100	70–90	27–36	8–15	0.6–2.0	0.22–0.24	6.1–6.5	Low	Moderate.	Low.
------	100	90–100	80–95	34–50	18–30	0.2–0.6	0.18–0.20	5.1–6.0	Moderate.	High	Moderate.
93–100	90–95	75–95	65–75	35–50	17–30	0.2–0.6	0.15–0.19	5.1–6.5	Moderate.	High	Moderate.
85–95	80–90	75–90	40–65	17–30	2–14	0.2–2.0	0.05–0.19	7.4–8.4	Low	Moderate.	Low.

[4] The only shallow soil mapped in the county. A perched water table is above limestone during wet periods.
[5] Available water capacity cannot be fully used because root penetration is limited by toxic material in the soil.

TABLE 7.—*Interpretations of engineering*

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

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Ade: 98B	Slight[1]	Severe[1]: rapid permeability.	Severe: sandy	Slight	Slight	Good
Alford:						
308B	Slight	Moderate: seepage potential.	Slight	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
308D2	Moderate: slope.	Severe: slope	Moderate: slope.	Moderate: slope.	Severe: high frost-action potential.	Poor: high frost-action potential.
Alvin:						
131B, 131C2	Slight[1]	Severe[1]: moderately rapid permeability.	Slight	Slight	Slight	Good below a depth of 3 feet.
131D2	Moderate[1]: slope.	Severe[1]: moderately rapid permeability; slope.	Moderate: slope.	Moderate: slope.	Moderate: slope.	Good below a depth of 3 feet.
Ambraw: 302	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Poor: wet; high frost-action potential.
Armiesburg: 597.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; high frost-action potential.	Poor: unfavorable texture; high frost-action potential.
Atlas Mapped only with Blair soils.	Severe: very slow permeability; high water table.	Moderate where slopes are less than 7 percent. Severe where slopes are more than 7 percent.	Severe: wet	Severe: high shrink-swell potential; wet.	Severe: high shrink-swell potential; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Ava:						
14B, 14C2	Severe: very slow permeability.	Moderate: slope.	Moderate: wet	Moderate: moderate shrink-swell potential.	Severe: high frost-action potential.	Poor: high frost-action potential.
14D2	Severe: very slow permeability.	Severe: slope	Moderate: wet	Moderate: moderate shrink-swell potential.	Severe: high frost-action potential.	Poor: high frost-action potential.
*Blair: 927C2, 927C3. For Atlas parts, see Atlas series.	Severe: moderately slow permeability; high water table.	Moderate where slopes are less than 7 percent. Severe where slopes are more than 7 percent.	Severe: wet	Severe: high frost-action potential.	Severe: high frost-action potential.	Poor: high frost-action potential.

properties of the soils

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

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Good	Poor: sandy	Seepage potential.	Seepage potential.	Somewhat excessively drained.	Rapid intake rate; low available water capacity.	Sandy; short, uneven slopes.
Unsuited: fines.	Fair: thin layer of material.	Moderate permeability.	Low strength	Well drained	Moderate intake rate.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Moderate permeability.	Low strength; erodes easily.	Well drained	Slope; erodes easily.	Erodes easily.
Good to fair: poorly graded.	Good	High seepage potential.	High seepage potential; poor resistance to piping.	Well drained	Rapid intake rate; moderately rapid permeability; sand below a depth of 2 to 3 feet.	Short slopes.
Good to fair: poorly graded.	Fair: reclamation of borrow site is difficult; droughty.	High seepage potential.	High seepage potential; poor resistance to piping.	Well drained	Slope; subject to water erosion; moderately rapid permeability.	Construction exposes droughty, infertile material in places.
Unsuited: fines.	Poor: wet	Moderate permeability; bands of sand in places below a depth of 4 feet.	Wet; difficult to work.	High water table; moderate permeability.	Subject to flooding; poorly drained.	Not needed.
Unsuited: fines.	Fair: unfavorable texture.	Moderate permeability; nearly level.	Low strength	Well drained	Subject to flooding.	Not needed.
Unsuited: fines.	Poor: thin layer of material; unfavorable texture.	Very slow permeability.	Low strength; difficult to work.	Slope; very slow permeability.	Wet; slow intake rate.	Erodes easily; very slow permeability; short slopes.
Unsuited: fines.	Poor: thin layer of material.	Very slow permeability.	Low strength	Moderately well drained.	Slow intake rate.	Erodes easily; very slow permeability.
Unsuited: fines.	Poor: thin layer of material.	Very slow permeability.	Low strength	Moderately well drained.	Slow intake rate.	Erodes easily; very slow permeability.
Unsuited: fines.	Poor: thin layer of material.	Moderately slow permeability.	Wet; difficult to work.	Slope; moderately slow permeability.	Slow intake rate; slope.	Short slopes; moderately slow permeability.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Bluford: 13A	Severe: slow permeability; high water table.	Slight	Severe: wet	Moderate: moderate shrink-swell potential; wet.	Severe: high frost-action potential.	Poor: high frost-action potential.
13B	Severe: slow permeability; high water table.	Moderate: slope.	Severe: wet	Moderate: moderate shrink-swell potential; wet.	Severe: high frost-action potential.	Poor: high frost-action potential.
Brenton: 149	Severe[1]: seasonal high water table.	Severe[1]: seasonal high water table.	Severe: wet	Moderate: moderate shrink-swell potential; wet.	Severe: high frost-action potential.	Poor: high frost-action potential.
Brooklyn: 136	Severe: slow permeability; high water table.	Slight	Severe: high water table.	Severe: high water table; high shrink-swell potential.	Severe: high water table; high frost-action potential.	Poor: high frost-action potential; wet.
Camden: 134A, 134B	Slight[1]	Severe[1]: moderately rapid permeability in underlying material.	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate frost-action potential; moderate shrink-swell potential.	Fair: moderate frost-action potential; moderate shrink-swell potential.
134D2	Moderate[1]: slope.	Severe[1]: slope	Moderate: slope.	Moderate: slope.	Moderate: slope; moderate shrink-swell potential.	Fair: moderate frost-action potential; moderate shrink-swell potential.
Carmi: 286	Slight[1]	Severe[1]: moderately rapid permeability.	Slight	Slight	Moderate: moderate frost-action potential.	Fair: moderate frost-action potential.
Channahon: 315.	Severe: bedrock at a depth of 10 to 20 inches.	Severe: bedrock at a depth of 10 to 20 inches.	Severe: bedrock at a depth of 10 to 20 inches.	Severe: bedrock at a depth of 10 to 20 inches.	Severe: bedrock at a depth of 10 to 20 inches.	Poor: bedrock at a depth of 10 to 20 inches.
Chauncey: 287	Severe: slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: high water table; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Cisne: 2	Severe: very slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: high water table; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Colp: 122B	Severe: slow permeability.	Moderate: slope.	Severe: too clayey.	Severe: high shrink-swell potential.	Severe: high frost-action potential; high shrink-swell potential.	Poor: high shrink-swell potential.

properties of the soils—Continued

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Unsuited: fines.	Fair: thin layer of material.	Slow permeability; nearly level.	Low strength	Slow permeability.	Slow intake rate; wet.	Not needed.
Unsuited: fines.	Fair: thin layer of material; reclamation of borrow site is difficult.	Slow permeability.	Low strength	Slow permeability.	Slow intake rate.	Wet; slow permeability.
Unsuited: poorly graded sand in places below a depth of 5 feet.	Good	Seepage potential in underlying material; nearly level.	Fair stability; fair resistance to piping.	Moderate permeability; seasonal high water table.	Moderate intake rate; drainage needed in places.	Not needed.
Unsuited: fines.	Poor: wet	Seepage potential in underlying material.	Poor stability; poor workability.	Poorly drained; slow permeability.	Slow intake rate; slow permeability.	Not needed.
Poor: fines; sand and gravel in places below a depth of 5 feet.	Fair: thin layer of material.	Moderately rapid permeability below a depth of 4 feet.	Susceptible to piping; fair compaction characteristics.	Well drained	Moderate intake rate.	Not needed.
Poor: fines; sand and gravel in places below a depth of 5 feet.	Fair: thin layer of material.	Moderately rapid permeability below a depth of 4 feet.	Susceptible to piping; fair compaction characteristics.	Well drained	Moderate intake rate; slope.	Short slopes; moderate permeability.
Good: gravel below a depth of 2 feet.	Good	Moderately rapid permeability; seepage potential.	Susceptible to piping; high permeability when compacted.	Well drained	Rapid intake rate; low to medium available water capacity.	Not needed.
Unsuited: fines; bedrock at a depth of 10 to 20 inches.	Poor: bedrock at a depth of 10 to 20 inches; stony.	Bedrock at a depth of 10 to 20 inches.	Bedrock at a depth of 10 to 20 inches.	Well drained	Bedrock at a depth of 10 to 20 inches; low available water capacity.	Bedrock at a depth of 10 to 20 inches.
Unsuited: fines.	Poor: reclamation of borrow site is difficult.	Slow permeability; high water table.	Fair stability; low permeability when compacted.	Slow permeability; high water table.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: reclamation of borrow site is difficult; wet.	Very slow permeability; high water table.	Fair stability; low permeability when compacted.	Very slow permeability; high water table.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability.	Difficult to work; low permeability when compacted.	Moderately well drained.	Slow intake rate.	Slow permeability.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Colp: cont. 122D2	Severe: slow permeability.	Severe: slope	Severe: too clayey.	Severe: high shrink-swell potential.	Severe: high frost-action potential; high shrink-swell potential.	Poor: high shrink-swell potential.
Cowden: 112	Severe: slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: high water table; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Darwin: 71	Severe: subject to flooding; very slow permeability.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: wet; subject to flooding.	Poor: high shrink-swell potential; high frost-action potential.
Disco: 266B	Slight [1]	Severe [1]: moderately rapid permeability.	Slight	Slight	Moderate: moderate frost-action potential.	Fair: moderate frost-action potential.
Drummer: 152	Severe: high water table.	Severe [1]: high water table.	Severe: high water table.	Severe: wet; high water table.	Severe: high water table; high frost-action potential.	Poor: high frost-action potential; wet.
Ebbert: 48	Severe: slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: high water table; high frost-action potential.	Poor: high frost-action potential; wet.
Genesee: 431	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Fair: moderate frost-action potential.
Hickory: 8D2, 8D3	Moderate: slope.	Severe: slope	Moderate: slope.	Moderate: slope.	Moderate: slope.	Fair: moderate shrink-swell potential; moderate frost-action potential.
8E2, 8E3, 8F2.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Fair: moderate shrink-swell potential; moderate frost-action potential.
Hosmer: 214B	Severe: slow permeability.	Moderate: slope.	Moderate: wet	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
Hoyleton: 3A	Severe: slow permeability; high water table.	Slight	Severe: wet	Severe: high shrink-swell potential.	Severe: high shrink-swell potential; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.

properties of the soils—Continued

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Unsuited: fines.	Poor: thin layer of material; reclamation of borrow site is difficult.	Slow permeability.	Difficult to work; low permeability when compacted.	Moderately well drained.	Slope; slow intake rate.	Short slopes; slow permeability.
Unsuited: fines.	Poor: wet	Slow permeability; high water table.	High shrink-swell potential; fair stability.	Slow permeability; high water table.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: unfavorable texture; wet.	Very slow permeability; high water table.	High shrink-swell potential; difficult to compact.	Very poorly drained to poorly drained; very slow permeability.	Slow intake rate; poorly drained to very poorly drained.	Not needed.
Good: poorly graded.	Good	Moderately rapid permeability; seepage potential.	Difficult to compact; susceptible to piping.	Well drained	Rapid intake rate; moderate available water capacity.	Not needed.
Unsuited: fines.	Poor: wet	Moderate permeability; seepage potential.	Low permeability when compacted; underlying material is variable.	Poorly drained; moderate permeability.	Moderate intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: wet	Slow permeability; high water table.	Fair stability; low permeability when compacted.	Very poorly drained to poorly drained; slow permeability.	Slow intake rate; poorly drained to very poorly drained.	Not needed.
Unsuited: fines.	Good	Seepage potential; moderate permeability.	Low strength; susceptible to piping.	Well drained	Subject to flooding; moderate intake rate.	Moderate permeability.
Unsuited: fines.	Fair: thin layer of material; slope.	Moderate permeability.	Low permeability when compacted.	Well drained	Slope; moderate intake rate.	Short slopes; erodes easily.
Unsuited: fines.	Poor: slope	Moderate permeability.	Low permeability when compacted.	Well drained	Slope; erodes easily.	Steep slopes; erodes easily.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability.	Low strength; susceptible to piping.	Moderately well drained.	Slow intake rate; slow permeability.	Slow permeability.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability; nearly level.	Low permeability when compacted.	Slow permeability.	Slow intake rate.	Not needed.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Hoyleton: cont. 3B, 3C2	Severe: slow permeability; high water table.	Moderate: slope.	Severe: wet	Severe: high shrink-swell potential.	Severe: high shrink-swell potential; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Huey: 120	Severe: very slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: high frost-action potential.	Poor: high frost-action potential; wet.
Iva: 454A	Severe: moderately slow permeability; high water table.	Slight	Severe: wet	Moderate: wet.	Severe: high frost-action potential	Poor: high frost-action potential.
Jules: 28	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Fair: moderate frost-action potential.
Lamont: 175B	Slight [1]	Severe [1]: moderately rapid permeability.	Slight	Slight	Slight	Good
175E2	Severe [1]: slope	Severe [1]: moderately rapid permeability; slope.	Severe: slope	Severe: slope	Severe: slope	Fair: slope
Lawson: 451	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; wet.	Severe: subject to flooding.	Severe: subject to flooding.	Poor: high frost-action potential.
Miami: 27C2, 27C3	Moderate: moderate permeability.	Moderate: slope; moderate permeability.	Slight	Moderate: moderate shrink-swell potential.	Moderate: moderate frost-action potential; moderate shrink-swell potential.	Poor: plasticity index more than 15.
27D2, 27D3	Moderate: moderate permeability; slope.	Severe: slope	Moderate: slope.	Moderate: slope; moderate shrink-swell potential.	Moderate: slope; moderate shrink-swell potential.	Poor: plasticity index more than 15.
Millbrook: 219	Severe [1]: moderate to moderately slow permeability; high water table.	Moderate [1]: moderate to moderately slow permeability.	Severe: wet	Moderate: wet; moderate shrink-swell potential.	Severe: high frost-action potential.	Poor: high frost-action potential.
Muren: 453B	Severe: moderately slow permeability.	Moderate: slope.	Moderate: wet	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
Newberry: 218	Severe: slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: wet; high frost-action potential.	Poor: high frost-action potential.
Oconee: 113A	Severe: slow permeability; high water table.	Slight	Severe: wet	Severe: high shrink-swell potential.	Severe: high shrink-swell potential; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.

properties of the soils—Continued

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Unsuited: fines.	Fair: thin layer of material.	Slow permeability.	Low permeability when compacted.	Slow permeability.	Slope; slow intake rate.	Wet; slow permeability.
Unsuited: fines.	Poor: high content of soluble salt; wet.	High content of soluble salt; nearly level.	Poor stability; poor workability.	Very slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Good	Moderately slow permeability; nearly level.	Low strength	Moderately slow permeability.	Slow intake rate.	Not needed.
Unsuited: fines.	Good	Seepage potential; subject to flooding.	Low strength; susceptible to piping.	Well drained	Subject to flooding; moderate intake rate.	Not needed.
Good: poorly graded.	Good	Moderately rapid permeability.	Medium strength; susceptible to piping.	Well drained	Rapid intake rate; moderate to low available water capacity.	Moderately rapid permeability.
Good: poorly graded.	Poor: slope	Moderately rapid permeability; slope.	Medium strength; susceptible to piping.	Well drained	Slope; rapid intake rate.	Moderately rapid permeability; irregular slopes.
Unsuited: fines.	Good	Moderate permeability; nearly level.	Low strength	Moderate permeability.	Subject to flooding; moderate intake rate.	Moderate permeability.
Unsuited: fines.	Poor: thin layer of material.	Moderate permeability.	Fair stability; fair compaction characteristics.	Well drained	Moderate intake rate.	Moderate permeability; deep cuts expose alkaline material in places.
Unsuited: fines.	Poor: thin layer of material.	Moderate permeability.	Fair stability; fair compaction characteristics.	Well drained	Slope; moderate intake rate.	Moderate permeability; deep cuts expose alkaline material in places.
Unsuited: fines; poorly graded sand in places below a depth of 4 feet.	Good	Seepage potential; nearly level.	Fair stability	Moderate to moderately slow permeability.	Moderate intake rate; wet.	Moderate to moderately slow permeability.
Unsuited: fines.	Fair: thin layer of material.	Moderately well drained.	Low strength	Moderately slow permeability.	Slow intake rate.	Moderately slow permeability; erodes easily.
Unsuited: fines.	Poor: wet	Slow permeability; nearly level.	Fair stability; low permeability when compacted.	Slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability; nearly level.	Fair stability; low permeability when compacted.	Slow permeability.	Slow intake rate.	Wet; slow permeability.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Oconee: cont. 113B	Severe: slow permeability; high water table.	Moderate: slope.	Severe: wet	Severe: high shrink-swell potential.	Severe: high shrink-swell potential; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Petrolia: 288	Severe: subject to flooding; high water table.	Severe: subject to flooding.	Severe: subject to flooding; high water table.	Severe: subject to flooding; high water table.	Severe: wet; subject to flooding.	Poor: high frost-action potential; wet.
Racoon: 109	Severe: slow permeability; high water table.	Slight	Severe: wet; high water table.	Severe: wet; high water table.	Severe: wet; high shrink-swell potential.	Poor: high frost-action potential; wet.
Sexton: 208	Severe [1]: slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: wet; high frost-action potential.	Poor: high frost-action potential; wet.
Shiloh: 138	Severe: slow to moderately slow permeability; high water table.	Slight	Severe: high water table.	Severe: wet; high water table.	Severe: wet; high shrink-swell potential.	Poor: high shrink-swell potential; high frost-action potential.
Shoals: 424	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; high frost-action potential.	Poor: high frost-action potential.
Starks: 132	Severe [1]: moderately slow permeability; high water table.	Severe [1]: high water table.	Severe: wet	Moderate: wet; moderate shrink-swell potential.	Severe: high frost-action potential.	Poor: high frost-action potential; plasticity index more than 15.
Stockland: 155B, 155C.	Slight [1]	Severe [1]: moderately rapid permeability.	Moderate: cutbanks cave.	Slight	Moderate: moderate frost-action potential.	Fair: moderate frost-action potential.
Stonelick: 665	Severe [1]: subject to flooding.	Severe [1]: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Fair: low strength.
Stoy: 164A	Severe: slow permeability; high water table.	Slight	Severe: wet	Moderate: moderate shrink-swell potential; wet.	Severe: high frost-action potential.	Poor: high frost-action potential.
164B	Severe: slow permeability; high water table.	Moderate: slope.	Severe: wet	Moderate: moderate shrink-swell potential; wet.	Severe: high frost-action potential.	Poor: high frost-action potential.
Tice: 284	Severe: subject to flooding; high water table.	Severe: subject to flooding.	Severe: subject to flooding; wet.	Severe: subject to flooding.	Severe: subject to flooding; high frost-action potential.	Poor: high frost-action potential; plasticity index more than 15.

properties of the soils—Continued

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Unsuited: fines.	Fair: thin layer of material.	Slow permeability.	Fair stability; low permeability when compacted.	Slow permeability.	Slow intake rate.	Wet; slow permeability.
Unsuited: fines.	Poor: wet	Subject to flooding; moderately slow permeability.	Low strength; difficult to work.	Moderately slow permeability; poorly drained.	Subject to flooding; poorly drained.	Not needed.
Unsuited: fines.	Poor: wet	Slow permeability; nearly level.	Fair stability; low permeability when compacted.	Slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: wet	Slow permeability; seepage potential.	Fair stability; poor resistance to piping in underlying material.	Slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: wet	Slow to moderately slow permeability; nearly level.	Fair to poor stability; difficult to work.	Slow to moderately slow permeability; very poorly drained.	Slow intake rate; very poorly drained.	Not needed.
Unsuited: fines.	Good	Seepage potential; subject to flooding.	Low strength; susceptible to piping.	Moderate permeability; subject to flooding.	Moderate intake rate; subject to flooding.	Moderate permeability.
Unsuited: fines; poorly graded sand in places below a depth of 4 feet.	Fair: thin layer of material.	Seepage potential; nearly level.	Fair stability; fair resistance to piping.	Moderately slow permeability.	Slow intake rate; drainage needed in places.	Moderately slow permeability.
Good: gravel below a depth of 1 foot.	Fair: small stones.	Moderately rapid permeability; seepage potential.	Susceptible to piping; high permeability when compacted.	Well drained	Rapid intake rate; low available water capacity.	Not needed.
Poor: fines; poorly graded.	Fair: sandy	Moderately rapid permeability; seepage potential.	Susceptible to piping.	Well drained	Subject to flooding; low available water capacity.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability; nearly level.	Fair stability; fair resistance to piping.	Slow permeability.	Slow intake rate; wet.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Slow permeability.	Fair stability; fair resistance to piping.	Slow permeability; slope.	Slow intake rate; wet.	Slow permeability; wet.
Unsuited: fines.	Fair: silty clay loam.	Moderate permeability; subject to flooding.	Low permeability when compacted; good resistance to piping.	Moderate permeability; subject to flooding.	Slow intake rate; subject to flooding.	Not needed.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Local roads and streets	Road fill
Weir: 165	Severe: very slow permeability; high water table.	Slight	Severe: high water table.	Severe: high water table; high shrink-swell potential.	Severe: wet; high shrink-swell potential.	Poor: high shrink-swell potential; high frost-action potential.
Wynoose: 12	Severe: very slow permeability; high water table.	Slight	Severe: high water table.	Severe: high water table; moderate to high shrink-swell potential.	Severe: wet; moderate to high shrink-swell potential.	Poor: moderate to high shrink-swell potential; high frost-action potential.
Xenia: 291B	Severe: moderately slow permeability.	Moderate: slope.	Moderate: wet	Moderate: moderate shrink-swell potential.	Severe: high frost-action potential.	Poor: high frost-action potential.

[1] In places pollution is a hazard because of a permeable substratum.

properties of the embankment material as interpreted from the Unified system of soil classification and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet; for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 7, 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 are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Local roads and streets, as rated in table 7, 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, as well as the shrink-swell potential, indicate traffic-supporting capacity. 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.

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

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 7 provide guidance about probable sources of sand. A soil rated as a *good* or *fair* source generally has a layer at least 3 feet thick, the top of which is above a depth of 6 feet. The ratings do not take in account thickness of overburden, location of the water table, or other factors that effect mining of the materials, and they do not 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 of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of fragments of stone are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment (fig. 21). Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Dikes, levees, and other embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength

properties of the soils—Continued

Suitability as source of—Continued		Soil features affecting—				
Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage of cropland and pasture	Irrigation	Terraces and diversions
Unsuited: fines.	Poor: wet	Very slow permeability; nearly level.	Fair stability; fair resistance to piping.	Very slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Poor: wet	Very slow permeability; nearly level.	Fair stability; low permeability when compacted.	Very slow permeability; poorly drained.	Slow intake rate; poorly drained.	Not needed.
Unsuited: fines.	Fair: thin layer of material.	Moderately slow permeability.	Low strength; low permeability when compacted.	Not needed	Moderate intake rate; moderately slow permeability.	Moderately slow permeability.

***Figure 21.*—Pond suitable for recreational use constructed in drainageway on Hickory soil.**

and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage of cropland and pasture is affected by such soil properties as permeability (fig. 22), 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 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; accumulation 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; amount of water held available to plants; 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 water

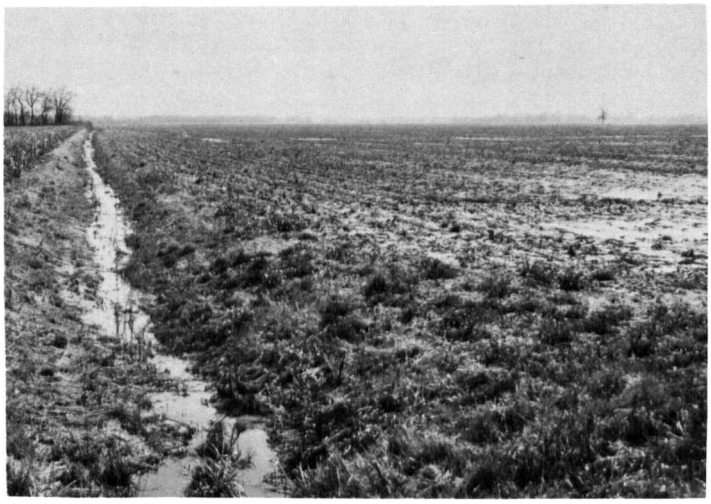

Figure 22.—Shallow surface ditches provide drainage on slowly permeable Cowden soils.

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 unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A suitable soil for these structures provides outlets for runoff and is not difficult to vegetate.

Use of the Soils for Recreational Development

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 8 the soils of Clark County are rated according to limitations that affect their suitability for camp areas, playgrounds, picnic areas, and paths and trails.

In table 8 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 plant cover 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.

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

TABLE 8.—*Recreational uses of the soils*

Soil series and map symbols	Degree and kind of limitation for—			
	Camp areas	Playgrounds	Picnic areas	Paths and trails
Ade: 98B	Moderate[1]: too sandy.	Severe: too sandy	Moderate: too sandy	Moderate: too sandy.
Alford:				
308B	Slight	Moderate: slope	Slight	Slight.
308D2	Moderate: slope	Severe: slope	Moderate: slope	Slight.
Alvin:				
131B, 131C2	Slight	Moderate: slope	Slight	Slight.
131D2	Moderate: slope	Severe: slope	Moderate: slope	Slight.
Ambraw: 302	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Severe: wet.
Armiesburg: 597	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Moderate: subject to flooding; too clayey.
Atlas Mapped only with Blair soils.	Severe: wet; very slow permeability.	Severe: wet; slope	Moderate: wet	Moderate: wet.
Ava:				
14B, 14C2	Moderate: very slow permeability.	Moderate: very slow permeability; slope.	Slight	Slight.
14D2	Moderate: very slow permeability; slope.	Severe: slope	Moderate: slope	Slight.
*Blair: 927C2, 927C3 For Atlas parts, see Atlas series.	Moderate: wet; moderately slow permeability.	Severe: slope	Moderate: wet	Moderate: wet.
Bluford:				
13A	Moderate: wet; slow permeability.	Moderate: wet; slow permeability.	Moderate: wet	Moderate: wet.
13B	Moderate: wet; slow permeability.	Moderate: wet; slope.	Moderate: wet	Moderate: wet.

TABLE 8.—*Recreational uses of the soils*—Continued

Soil series and map symbols	Degree and kind of limitation for—			
	Camp areas	Playgrounds	Picnic areas	Paths and trails
Brenton: 149	Moderate: wet	Moderate: wet	Moderate: wet	Moderate: wet.
Brooklyn: 136	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Camden:				
134A	Slight	Slight	Slight	Slight.
134B	Slight	Moderate: slope	Slight	Slight.
134D2	Moderate: slope	Severe: slope	Moderate: slope	Slight.
Carmi: 286	Slight [1]	Slight	Slight	Slight.
Channahon: 315	Slight	Severe: shallowness to bedrock.	Slight	Slight.
Chauncey: 287	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Cisne: 2	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Colp:				
122B	Moderate: slow permeability.	Moderate: slow permeability; slope.	Slight	Slight.
122D2	Moderate: slow permeability.	Severe: slope	Moderate: slope	Slight.
Cowden: 112	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Darwin: 71	Severe: wet; subject to flooding.	Severe: wet; subject to flooding.	Severe: wet; subject to flooding.	Severe: wet; too clayey.
Disco: 266B	Slight [1]	Slight	Slight	Slight.
Drummer: 152	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Ebbert: 48	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Genesee: 431	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Moderate: subject to flooding.
Hickory:				
8D2, 8D3	Moderate: slope	Severe: slope	Moderate: slope	Slight.
8E2, 8E3	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
8F2	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Hosmer: 214B	Moderate: slow permeability.	Moderate: slow permeability; slope.	Moderate: wet	Slight.
Hoyleton: 3A, 3B, 3C2	Moderate: wet; slow permeability.	Moderate: wet; slow permeability.	Moderate: wet	Moderate: wet.
Huey: 120	Severe: wet; very slow permeability.	Severe: wet; very slow permeability.	Severe: wet	Severe: wet.
Iva: 454A	Severe: wet	Severe: wet	Moderate: wet	Moderate: wet.
Jules: 28	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Slight [1].
Lamont:				
175B	Slight	Moderate: slope	Slight	Slight.
175E2	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Lawson: 451	Severe: subject to flooding.	Moderate: subject to flooding; wet.	Moderate: subject to flooding; wet.	Moderate: wet.
Miami:				
27C2	Slight	Moderate: slope	Slight	Slight.
27C3	Moderate: too clayey	Moderate: too clayey; slope.	Moderate: too clayey	Moderate: too clayey.
27D2, 27D3	Moderate: slope; too clayey.	Severe: slope	Moderate: slope; too clayey.	Moderate: too clayey.
Millbrook: 219	Moderate: wet	Moderate: wet	Moderate: wet	Moderate: wet.
Muren: 453B	Moderate: wet; moderately slow permeability.	Moderate: wet; moderately slow permeability.	Moderate: wet	Slight.

TABLE 8.—*Recreational uses of the soils*—Continued

Soil series and map symbols	Degree and kind of limitation for—			
	Camp areas	Playgrounds	Picnic areas	Paths and trails
Newberry: 218	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Oconee: 113A, 113B	Moderate: wet; slow permeability.	Moderate: wet; slow permeability.	Moderate: wet	Moderate: wet.
Petrolia: 288	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Severe: wet.
Racoon: 109	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Sexton: 208	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Shiloh: 138	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Shoals: 424	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Moderate: subject to flooding; wet.	Moderate: subject to flooding; wet.
Starks: 132	Moderate: wet; moderately slow permeability.	Moderate: wet; moderately slow permeability.	Moderate: wet	Moderate: wet.
Stockland:				
155B	Slight[1]	Slight	Slight	Slight.
155C	Slight[1]	Moderate: slope	Slight	Slight.
Stonelick: 665	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Slight.
Stoy: 164A, 164B	Moderate: wet; slow permeability.	Moderate: wet; slow permeability.	Moderate: wet	Moderate: wet.
Tice: 284	Severe: subject to flooding; wet.	Severe: subject to flooding; wet.	Moderate: subject to flooding; wet.	Moderate: subject to flooding; wet.
Weir: 165	Severe: wet; very slow permeability.	Severe: wet; very slow permeability.	Severe: wet	Severe: wet.
Wynoose: 12	Severe: wet; very slow permeability.	Severe: wet; very slow permeability.	Severe: wet	Severe: wet.
Xenia: 291B	Moderate: wet; moderately slow permeability.	Moderate: wet; moderately slow permeability.	Moderate: wet	Slight.

[1] Some low-lying areas are occasionally flooded.

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 best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

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

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but are 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.

Pond reservoir areas and dwellings without basements are rated in table 7 of the engineering section.

Formation and Classification of Soils

In this section the factors that affected the formation of the soils of Clark County are discussed, and the system of soil classification is explained.

Factors of Soil Formation

Soil is produced by soil-forming processes acting on materials deposited or accumulated by geologic action. The characteristics of the soil at any given point are determined by five factors: the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life, chiefly plant life, are active factors of 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 the parent material into material in 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 formation are unknown.

Parent material

The main parent materials of Clark County soils consist of loess, outwash, till, and alluvium. Bedrock weathered in place and lacustrine sediment are minor in extent. Most of the soil materials were deposited during glacial times, except for the soils that formed in bedrock material and recent alluvium.

The earliest glaciation in the county was the Kansan. This was followed by the Illinoian glaciation and Wisconsin glaciation. The Yarmouth and Sangamon interglacial stages occurred between these glaciation periods (*23*). The Wisconsin glacial advance just entered the northwestern portion of the county while the Illinoian covered most of the county.

Most of the soils in Clark County formed in loess and glacial till or entirely in loess. Xenia soils formed in loess and Wisconsin glacial till. Weir soils formed entirely in loess. The average thickness of loess in Clark County is about 50 inches. Loess is thicker in the eastern part of the county and thinner to the southwest. Soils on sides of the drainageways that interfinger into the Illinoian till plain normally have little loess remaining on the surface. Hickory soils formed in this till material. At the upper ends of these drainageways soils formed in loess, and older soils (paleosols) are thought to have been formed during the Sangamon interglacial period. Blair-Atlas soils are examples of such soils. Soils that formed in outwash material from the Wisconsin moraine are just below the moraine. Starks soils are examples of such soils. Other outwash soils are along the streams that drain to the Wabash flood plain and on the flood plain itself. Carmi soils, Camden soils, and others are on present-day stream terraces.

During the time of the Wisconsin glacial period, blockage of streams occurred in the eastern part of the county. Resulting lake formation followed with deposition of lacustrine clays. After the blockage was removed and subsequent erosion took place, remnants of this material were left as bench terraces along the lower ends of several streams (*9*). Colp soils formed in this material.

Soils that formed in bedrock material are so small in extent and size of areas that they were not mapped separately. They are generally shown by bedrock symbols on the soil map. A few of these areas have soils that formed in shale or sandstone.

Recent alluvium occupies most flood plains of the county. Shoals soils formed in this material.

Climate

Climate affects soil formation through its influence on the rate of weathering of parent material, growth of vegetation, and erosion. Freezing and thawing help break down minerals and rock fragments. Wind causes dust storms and shifting of soil material. Water from rainfall percolates downward in soils that have favorable slope and permeability and carries with it bases and clay. On steeper slopes it erodes material and deposits it in lower positions.

Clark County has a humid temperate climate that has been favorable for soil formation. The climate has been conducive to the relatively rapid breakdown of soil minerals and the formation of clay and to the movement of these materials downward in the soil. Most of the upland soils of the county have considerably more clay in the subsoil than in the surface layer. In most of the upland soils bases have been leached from the solum.

Plant and animal life

Plants, micro-organisms, earthworms, and other forms of life that live on or in the soil are active in the soil-forming processes. As plants die and decay, they contribute organic matter to the soils. Bacteria and fungi promote the decomposition of plant and animal remains. Burrowing animals help loosen soil material.

Most of the soils of Clark County formed under trees, mainly oak and hickory. Some soils formed under grass or grass and scattered trees. Soils that formed under grass generally have more organic matter in the surface layer than those that formed under forest vegetation. Soils in soil associations 3, 7, and 8 formed under forest vegetation. (These associations are described in the section "General Soil Map.")

In more recent times man has influenced soil formation. Trees have been cleared and grasslands plowed for use as cropland. Clearing of areas of steeper soils has resulted in accelerated erosion and increased deposition in low areas. Drainage of wet soils, irrigation of dry soils, and application of fertilizer alter the natural conditions under which soils form. Grading and construction often start a new cycle of soil-forming processes.

Relief

Relief (lay of the land) influences the amount of runoff, the degree of erosion (fig. 23), and the amount of water infiltrating and percolating through the soil profile. Where the soils formed in uniform, permeable parent material such as loess, natural drainage is closely associated with slope. The moderately well drained and well drained soils are on the more rolling areas, and the poorly drained soils are on flats or in depressions.

Clark County has large areas of nearly level, poorly

Figure 23.—The amount of runoff and erosion is greater on strongly sloping and steep Hickory soils (shown here) than it is on nearby Weir soils.

drained soils. Steeper slopes are normally confined to the sides of stream valleys, and rolling areas are mainly on the moraine in the northwestern part of the county.

Time

Evaluation of time in soil formation is difficult because of the interaction of the other factors of soil formation. Soil formation is more rapid in humid climates that support growth of vegetation than in drier climates. Leaching of carbonates and plant nutrients is faster in coarse-textured, permeable material than in fine-textured, slowly permeable material. Acid soils develop much faster in material that has a low content of lime than they do in material that has a high content of lime (*8*).

The soils of Clark County range from those on uplands that have a well-developed profile to soils made up of material that has been recently deposited on flood plains (fig. 24). Generally the soils of the uplands are better developed than the soils of the terraces and flood plains.

Classification of Soils

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

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

Figure 24.—**Recent deposits of sandy material on flood plains such as this one of Stonelick soil have had little time for soil-forming processes to work. Vegetation, however, is already starting to act on the soil material.**

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. The same property or subdivisions of this property may be used in several different categories. In table 9, the soil series of Clark 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 used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. Two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Moll-i-sol).

SUBORDER. Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the order. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging or soil differences resulting from 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 Mollisol).

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 growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium,

TABLE 9.—*Classification of soil series*

Soil series	Family	Subgroup	Order
Ade [1]	Coarse-loamy, mixed, mesic	Psammentic Argiudolls	Mollisols.
Alford	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Alvin	Coarse-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Ambraw	Fine-loamy, mixed, mesic	Fluvaquentic Haplaquolls	Mollisols.
Armiesburg	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols.
Atlas	Fine, montmorillonitic, mesic, sloping	Aeric Ochraqualfs	Alfisols.
Ava	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Blair	Fine-loamy, mixed, mesic	Aquic Hapludalfs	Alfisols.
Bluford	Fine, montmorillonitic, mesic	Aquic Hapludalfs	Alfisols.
Brenton	Fine-silty, mixed, mesic	Aquic Argiudolls	Mollisols.
Brooklyn [2]	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Camden	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Carmi	Coarse-loamy, mixed, mesic	Typic Hapludolls	Mollisols.
Channahon	Loamy, mixed, mesic	Lithic Argiudolls	Mollisols.
Chauncey	Fine, montmorillonitic, mesic	Typic Argialbolls	Mollisols.
Cisne	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Colp	Fine, montmorillonitic, mesic	Aquic Hapludalfs	Alfisols.
Cowden	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Darwin	Fine, montmorillonitic, mesic	Vertic Haplaquolls	Mollisols.
Disco	Coarse-loamy, mixed, mesic	Cumulic Hapludolls	Mollisols.
Drummer	Fine-silty, mixed, mesic	Typic Haplaquolls	Mollisols.
Ebbert	Fine-silty, mixed, mesic	Argiaquic Argialbolls	Mollisols.
Genesee	Fine-loamy, mixed, nonacid, mesic	Typic Udifluvents	Entisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Hosmer	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Hoyleton	Fine, montmorillonitic, mesic	Aquollic Hapludalfs	Alfisols.
Huey	Fine-silty, mixed, mesic	Typic Natraqualfs	Alfisols.
Iva	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Jules	Coarse-silty, mixed (calcareous), mesic	Typic Udifluvents	Entisols.
Lamont	Coarse-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Lawson [3]	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Miami	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Millbrook	Fine-silty, mixed, mesic	Udollic Ochraqualfs	Alfisols.
Muren	Fine-silty, mixed, mesic	Aquic Hapludalfs	Alfisols.
Newberry	Fine-silty, mixed, mesic	Mollic Ochraqualfs	Alfisols.
Oconee [4]	Fine, montmorillonitic, mesic	Udollic Ochraqualfs	Alfisols.
Petrolia	Fine-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Racoon	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Sexton	Fine, montmorillonitic, mesic	Typic Ochraqualfs	Alfisols.
Shiloh	Fine, montmorillonitic, mesic	Cumulic Haplaquolls	Mollisols.
Shoals	Fine-loamy, mixed, nonacid, mesic	Aeric Fluvaquents	Entisols.
Starks	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Stockland	Loamy-skeletal, mixed, mesic	Typic Hapludolls	Mollisols.
Stonelick	Coarse-loamy, mixed (calcareous), mesic	Typic Udifluvents	Entisols.
Stoy	Fine-silty, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Tice	Fine-silty, mixed, mesic	Fluvaquentic Hapludolls	Mollisols.
Weir [5]	Fine, montmorillonitic, mesic	Typic Ochraqualfs	Alfisols.
Wynoose	Fine, montmorillonitic, mesic	Typic Albaqualfs	Alfisols.
Xenia	Fine-silty, mixed, mesic	Aquic Hapludalfs	Alfisols.

[1] Ade soils are loamy sand in the B horizon and are taxadjuncts to the series, which is defined to have coarse loamy texture in the B horizon.

[2] These soils have less sand and gravel in the lower part of the B horizon than is defined for the range of the Brooklyn series.

[3] Distinct mottles are in the lower part of the mollic epipedon below a depth of 2 feet.

[4] These soils are less acid in the lower part of the B horizon than is defined for the range of the Oconee series.

[5] These soils average slightly less than 35 percent clay in the upper 20 inches of the argillic horizon.

sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. 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 Haplaquolls (*Hapl,* meaning simple horizons, *aqu* for wetness or water, and *oll,* from Mollisols).

SUBGROUP. Great groups are subdivided into subgroups, one that represents 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 may 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 Haplaquolls (a typical Haplaquoll).

FAMILY. Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the

class names for texture, mineralogy, and so on, that are used as family differentiae (table 9). An example is the fine-silty, mixed, mesic family of Typic Haplaquolls.

References for Laboratory Data

Physical and chemical data applicable to a number of soils in Clark County have been published in other Illinois soil surveys. Data for Alford, Hosmer, Wynoose, Camden, and Darwin soils are given in a publication describing Lawrence County soils (*5*). Data for Alford, Hosmer, Camden, and Darwin soils are given in the soil survey of Wabash County (*17*). Some data on the soils of Clark County are on file in the Department of Agronomy, University of Illinois. These include Ade, Bluford, Carmi, Cisne, Darwin, Genesee, Shoals, Stockland, Weir, and Wynoose soils.

Environmental Features Affecting Soil Use

This section presents the chief natural and cultural features of Clark County that affect use and management of the different kinds of soil.

Natural Features

Natural features are those that are little influenced by man—in this case, the physical characteristics of Clark County. Some items considered are geology, relief, water, climate, and natural vegetation. Each is briefly discussed in the following paragraphs.

Geology.—Clark County is a part of the Springfield Plain in the till plain section of the Central Lowland Province. This province is a low basin formed from weak Pennsylvania rocks that had eroded to a level plain prior to the glacial period. The till plain section includes all that part of the province that is covered by glacial till. The Springfield Plain is an unusually flat plain formed of Illinoian glacial till, generally lying on till from the Kansas Glacier. Total depth to bedrock averages about 35 feet (*12*).

The Wisconsin Glacier cut across the northwestern corner of the county. Glacial outwash lies below the Westfield Moraine of the Shelbyville morainic system (*23*).

These upland areas were covered by an average of 4 feet of loess. Between the loess and glacial till is a material that is coarser than the silty loess and contains less gravel than the glacial till. The source of this material and the mode of deposition have not been determined at this time.

Streams cut into the till plain resulting in steep-sided narrow valleys with alluvial plains. Blockage of these streams resulted in quiet tributary lakes where lacustrine deposits were laid. When this blockage was removed, the lakes drained. Lacustrine deposits eroded, leaving remnants such as the bench terraces of the lower Mill Creek Valley (*9*).

Outwash sediment from the Wisconsin drift was deposited in the Wabash River flood plain. Different periods of erosion and deposition have resulted in different terrace levels in addition to the present flood plain. Because of differences in material, different soils formed on the terraces than on the bottom land. Most of the terraces are sandy or gravelly (*9*).

Limestone is present under the glacial drift south of Casey and east of Marshall. Quarries are operated in both areas. Agricultural limestone and stone for building material are products of these operations.

Relief.—Clark County has relatively low relief. Elevation ranges from about 430 feet above sea level in the southeastern part of the county to about 760 feet in the northwestern part. Most of the county is a relatively flat plain, and the greatest relief is associated with the streams that cut into the plain. In places the bottom land near these streams is as much as 100 feet lower than the plain. The glacial moraine in the northwestern part of the county rises about 100 feet above the outwash plain.

Water.—Ground-water sources in Clark County range from poor to good. Good areas are mainly in the Wabash River flood plain. Fair to good sources are in smaller stream valleys and the outwash plain areas in the northwestern part of the county. Small supplies are available in some of the upper parts of Pennsylvania bedrock. Dug wells and cisterns can supply individual needs but generally have limited yield (*15*).

Several constructed reservoirs provide potential water sources. A number of sites are considered to have potential (*4*). Most of the streams do not have a dependable enough flow to ensure a source of water.

Climate [5].—Clark County has the continental climate typical of central Illinois. As indicated in table 10, there is a wide annual temperature range. Low-pressure areas and the associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year.

Summers are warm, but hot periods are seldom prolonged. Cool air invasions from the north occur frequently enough during most summers to prevent stagnation of hot, humid airmasses.

Normal July and August rainfall alone is insufficient 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 growth. Major droughts are infrequent. Prolonged dry periods during a part of the growing season are not unusual. Such periods often result in reduced crop yield.

Summer precipitation occurs mostly as showers or thunderstorms of brief duration. As much as 4.3 inches of rain has fallen in a 24-hour period, and more than 14 inches has fallen in one month. Thunderstorms occasionally are accompanied by hail and damaging winds. The average number of hail-producing thunderstorms in the same locality is less than three during the year and less than one during the summer months (*10*). Not all hailstorms produce stones of sufficient size or quantity to damage crops extensively.

The number of days between the average date of

[5] Prepared by WILLIAM L. DENMARK, climatologist for Illinois, Environmental Science Services Administration, National Weather Service, Champaign, Illinois.

TABLE 10.—*Temperature and precipitation data*

Month	Temperature					Precipitation				
	Average daily maximum	Average daily minimum	Average daily mean	Highest recorded	Lowest recorded	Average total	Maximum monthly	Minimum monthly	Average precipitation of 0.1 inch or more	Average monthly snow and sleet
	°F	°F	°F	°F	°F	In	In	In	Days	In
January	39	22	31	70	−17	2.2	6.9	(1)	5	4.7
February	42	24	33	74	−16	2.3	5.8	(1)	5	5.0
March	51	31	41	82	−14	3.4	8.7	(1)	7	3.7
April	65	42	53	87	19	3.6	7.0	(1)	8	.2
May	75	52	64	101	29	4.4	14.3	(1)	8	(1)
June	85	62	73	108	35	4.6	9.7	(1)	8	0
July	89	65	77	110	45	3.7	12.7	(1)	6	0
August	88	64	76	105	42	2.7	5.6	.5	4	0
September	82	56	69	104	26	3.1	7.4	.3	5	0
October	70	45	58	94	19	2.5	8.9	.3	5	(1)
November	52	33	43	84	−1	3.2	7.0	(1)	6	1.2
December	41	25	33	73	−14	2.4	8.0	(1)	5	3.8
Year	65	43	54	110	−17	38.0	[2] 52.7	[3] 26.8	72	18.6

[1] Trace.
[2] Highest annual total.
[3] Lowest annual total.

the last freezing temperature in spring and the average date of the first freezing temperature in fall has been termed the "growing season." This is a misleading term, however, since different crops have different temperatures at which growth is affected. The average length of the growing season in Clark County is 173 days. Table 11 indicates the probability of several threshold temperatures (*11*). Temperatures are often much cooler in valley locations than on ridges during clear, calm nights; therefore, growing seasons are often shorter.

Natural vegetation.—Most of Clark County was once covered with hardwood trees. As a result the soils have a surface layer that is low in content of organic matter. Soil associations 1, 2, 4, 5, and 6 (general soil map) were covered with grass or a mixture of grass and trees. Some of the more poorly drained soils in the county formed under swamp conditions.

Cultural Features [6]

Transportation facilities, school facilities, manufacturing and business services for farming, and certain trends in soil use in the county are briefly discussed in the following paragraphs.

Transportation facilities.—The Penn-Central is one of the two railroads in the county. It runs east to west and north to south. Clark County has one interstate highway (I–70) in addition to U.S. 20 and State Routes 1 and 29. Facilities are available for light aircraft on the western side of the county at the airport at Casey.

School facilities.—High schools are at Westfield, Casey, Martinsville, and Marshall. The facilities of Lake Land Junior College and Lincoln Trail Junior College are available in addition to those of Eastern Illinois University at Charleston; Indiana State University at nearby Terre Haute, Indiana; and the University of Illinois at Urbana.

Manufacturing and business services for farming.—Animals can be taken to be slaughtered for home consumption at two slaughter houses in the county. Eight grain elevators are in the county, and major machinery and equipment companies are represented throughout the county.

Trends in soil use.—The number of farm operating units is decreasing. The average size of farms is increasing (218 acres in 1964 and 227 acres in 1969).

[6] Prepared by FREMONT C. SCHOECK, district conservationist, Soil Conservation Service.

TABLE 11.—*Probabilities of last freezing temperatures in spring and first in fall*

Probability	Freezing temperature and dates for given probability				
	32°F	28°F	24°F	20°F	16°F
Last in spring:					
Average date	April 24	April 5	March 25	March 13	March 4.
25 percent chance after	May 3	April 14	April 3	March 22	March 13.
10 percent chance after	May 11	April 22	April 11	March 30	March 21.
First in fall:					
Average date	October 15	October 29	November 10	November 20	December 1.
25 percent chance before	October 6	October 20	November 1	November 11	November 22.
10 percent chance before	September 29	October 13	October 25	November 4	November 15.

The average price per acre for farmland rose 44 percent between 1964 and 1969. About 10 percent of the land is tenant operated. The average age of the farm operator was 50 in 1968, but the average age has decreased during the past 5 years (*20*).

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Glossary

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

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

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; but that in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

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

Animal unit. In pasture management, one cow, one horse, one mule, five sheep, or five goats.

Animal-unit-month. The amount of forage or feed required to maintain one animal unit for a period of 30 days. Abbreviated: A.U.M.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

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.

Base (chemistry). Any of the positive, generally metallic elements or combinations of elements that make up the nonacid plant nutrients. The most important of these in plant nutrition are calcium (Ca), potassium (K), magnesium (Mg), and ammonium (NH_4).

Bedrock. The soil rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A shelflike embankment of earth that has a level or nearly level top and a steep or nearly vertical downhill face.

Bottom land (geology). See flood plain.

Buried soil. A developed soil, once exposed but now overlain by more recently formed 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.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clean tillage. Cultivation to prevent the growth of all vegetation except the particular crop desired.

Coarse fragments. Mineral or rock particles more than 2 millimeters in diameter.

Coarse-textured soil. Sand and loamy sand.

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.

Contour. An imaginary line connecting points of equal elevation on the surface of the soil.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production or a crop grown between trees and vines in orchards and vineyards.

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

Drainage, surface. Runoff, or surface flow, of water from an area.

Drift (geology). Material of any sort deposited by geologic processes in one place after having been removed from another; includes drift material deposited by glaciers and by streams and lakes associated with them.

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

Fallow. Cropland left idle in order to restore productivity, mainly through accumulation of water, nutrients, or both. Summer fallow is a common stage before cereal grain in regions of limited rainfall. The soil is tilled for at least one growing season to control weeds, to aid decomposition of plant residues, and to encourage the storage of moisture for the succeeding grain crop.

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.

Fine-textured soils. *Moderately fine textured*: Clay loam, sandy clay loam, silty clay loam; *Fine-textured*: sandy clay, silty clay, and clay. Roughly, soil that contains 35 percent or more of clay.

Flood plain. Nearly level land, consisting of stream sediment, that borders a stream and is subject to flooding unless protected artificially. (Often referred to as bottom land).

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Glacial drift (geology). Rock material transported by glacial ice and then deposited; also includes the assorted and unassorted materials deposited by streams flowing from glaciers.

Glacial outwash (geology). Crossbedded gravel, sand, and silt deposited by meltwater as it flowed from glacial ice.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

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

Gravelly soil material. From 15 to 50 percent of material, by volume, consists of rounded or angular rock fragments that are not prominently flattened and are up to 3 inches in diameter.

Ground moraine (geology). Glacial till accumulated beneath the advancing ice and deposited from it during its dissolution, rather than aggregated in a thickened belt at ice edge; the deposit is relatively thin and characteristically forms an undulating plain with gently sloping swells, sags, and closed depressions.

Ground water (geology). Water that fills all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Heaving (of plants). The partial lifting of plants out of the ground, frequently with breaking of roots, that results from material freezing and thawing during winter.

Heavy soil. An old term formerly used for clayey or fine-textured soils.

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.

Humid climate. A climate with enough precipitation to support a forest vegetation, although there are exceptions where the plant cover includes no trees, as in the Arctic or high mountains. The lower limit of precipitation may be as little as 15 inches in cool regions and as much as 60 inches in hot regions. The precipitation-effectiveness index ranges between 64 and 128. A climate that has a high average relative humidity.

Immature soil. A soil lacking clearly defined horizons because the soil-forming forces have acted on the parent material only a relatively short time since it was deposited or exposed.

Inherited soil characteristic. Any characteristic of a soil that results directly from the nature of the material from which it formed, as contrasted to characteristics that are wholly or partly the result of soil-forming processes acting on parent material. For example, some soils are red because the parent material was red, but the color of most red soils is the result of the soil-forming processes.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Land classification. The classification of units of land for the purpose of showing their relative suitabilities for some specfiic use.

Leached soil. A soil from which most of the soluble materials have been removed from the entire profile or have been removed from one part of the profile and have accumulated in another part.

Light soil. A term formerly used for sandy, or coarse-textured, soil.

Lime. Chemically, lime is calcium oxide (CaO), but its meaning has been extended to include all limestone-derived materials applied to neutralize acid soils. Agricultural lime can be obtained as ground limestone, hydrated lime, or burned lime, with or without magnesium minerals. Basic slag, oystershells, and marl also contain calcium.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state. In engineering a high liquid limit indicates that the soil has a high content of clay and a low capacity for supporting loads.

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

Made land. Areas filled artificially with earth, trash, or both.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. It may be limited either by the infiltration capacity of the soil or by the rate at which water is applied to the surface soil.

Intensive cropping. Maximum use of the land through the frequent growing of harvested crops.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Furrow.—Water is applied in small ditches made by cultivation implements used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Lacustrine deposit (geology). Material deposited in lake water and exposed by lowering of the water level or elevation of the land.

Land. The total natural and cultural environment within which production takes place. Land is a broader term than soil. In addition to soil, it applies to mineral deposits and water supply; location in relation to centers of commerce and population; the size of the individual tracts of holdings; and the existing plant cover, works of improvement, and the like.

Mature soil. Any soil with well-developed soil horizons having characteristics produced by the natural processes of soil formation and in near equilibrium with its present environment.

Mechanical analysis (soils). The percentage of the various sizes of individual mineral particles, or separates, in the soil. Also, a laboratory method of determining soil texture.

Medium-textured soil. Soil of very fine sandy loam, loam, silt loam, or silt texture.

Mineral soil. Soil composed mainly of inorganic (mineral) material and is low in content of organic material. Its bulk density is greater than that of organic soil.

Montmorillonite. A fine, platy, alumino-silicate clay mineral that expands and contracts with the absorption and loss of water. It has a high cation-exchange and is plastic and sticky when moist.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contract—*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.

Natural soil drainage. 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 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.

Imperfectly or somewhat poorly drained soils are wet for significant periods but not all the time, and in podzolic soils commonly have mottlings below a depth of 6 to 16 inches in the lower A horizon and in the B and C horizons.

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. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil and carbon, hydrogen, and oxygen obtained largely from the air and water, are plant nutrients.

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 stages of rapid decomposition.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Percolation. The downward movement of water through the soil.

Permanent pasture. Pasture that is on the soil for a long time, in contrast to rotation pasture, which is on the soil only a year or two because it is grown in rotation with other crops.

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.*

ph value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Physiographic province. One of the major geographic divisions of the continent.

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

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plow layer. The soil ordinarily moved in tillage; equivalent to surface soil.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Productivity (of soil). The present capability of a soil for producing a specified plant or sequence of plants under a specified system of management. It is measured in terms of output, or harvest, in relation to input of production for the specific kind of soil under a specified system of management.

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

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

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.

Sandy soils. A broad term for soils of the sand and loamy sand classes; soil material with more than 70 percent sand and less than 15 percent clay.

Shrink-swell potential (engineering). Amount that a soil will expand when wet or contract when dry. Indicates kinds of clay in soil.

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.

Slick spots. Small areas in a field that are slick when wet because they contain exchangeable sodium, or alkali.

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.

Soil map. A map designed to show the distribution of soil mapping units in relation to the prominent physical and cultural features of the earth's surface.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millmeter). The separates recognized by the Internal Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

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.

Stratified. Composed of, or arranged in, strata, or layers, such as stratified alluvium. The term is confined to geological material. Layers of soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

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.

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

Surface layer. A term used in nontechnical soil descriptions for one or more layers above the subsoil. Includes A horizon; has no depth limit.

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

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

Tight soil. Compact, impervious, and cohesive, usually plastic soil.

Tile drain. Concrete, plastic, or pottery pipe placed at suitable spacings and depths in the soil or subsoil to provide water outlets from the soil.

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

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

Undercutting (erosion). Removal of material at the base of a steep slope or cliff by falling water, a stream, wind, or waves. The process steepens the slope or produces an overhanging cliff.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Value (color). One of the three variables of color. Value increases as the relative intensity of reflected light increases. See Munsell notation.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both 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, read the introduction to the section it is in for general information about its management.

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
2	Cisne silt loam	25	IIIw-1	53	4w2
3A	Hoyleton silt loam, 0 to 2 percent slopes	32	IIw-3	51	3o1
3B	Hoyleton silt loam, 2 to 4 percent slopes	33	IIe-3	50	3o1
3C2	Hoyleton silt loam, 4 to 7 percent slopes, eroded	33	IIIe-3	53	3o1
8D2	Hickory loam, 7 to 12 percent slopes, eroded	30	IIIe-1	53	1o1
8D3	Hickory clay loam, 7 to 12 percent slopes, severely eroded	30	IVe-1	55	1o1
8E2	Hickory loam, 12 to 18 percent slopes, eroded	30	IVe-1	55	1r2
8E3	Hickory clay loam, 12 to 18 percent slopes, severely eroded	30	VIe-1	55	1r2
8F2	Hickory loam, 18 to 60 percent slopes, eroded	30	VIe-1	55	1r2
12	Wynoose silt loam	48	IIIw-1	53	4w2
13A	Bluford silt loam, 0 to 2 percent slopes	19	IIw-3	51	3o1
13B	Bluford silt loam, 2 to 4 percent slopes	19	IIe-3	50	3o1
14B	Ava silt loam, 2 to 4 percent slopes	17	IIe-2	50	2o1
14C2	Ava silt loam, 4 to 7 percent slopes, eroded	17	IIIe-2	53	2o1
14D2	Ava silt loam, 7 to 12 percent slopes, eroded	17	IIIe-2	53	2o1
27C2	Miami silt loam, 4 to 7 percent slopes, eroded	36	IIe-1	50	2o1
27C3	Miami clay loam, 4 to 7 percent slopes, severely eroded	36	IIIe-1	53	2o1
27D2	Miami silt loam, 7 to 15 percent slopes, eroded	36	IIIe-1	53	2o1
27D3	Miami clay loam, 7 to 15 percent slopes, severely eroded	36	IVe-1	55	2o1
28	Jules silt loam	34	I-1	50	1o4
48	Ebbert silt loam	29	IIw-1	50	3w2
71	Darwin silty clay	27	IIIw-2	54	3w6
98B	Ade loamy sand, 1 to 6 percent slopes	13	IIIs-1	54	3s2
109	Racoon silt loam	41	IIIw-1	53	3w2
112	Cowden silt loam	26	IIw-1	50	3w2
113A	Oconee silt loam, 0 to 2 percent slopes	39	IIw-3	51	3o1
113B	Oconee silt loam, 2 to 4 percent slopes	39	IIe-3	50	3o1
120	Huey silt loam	33	IVw-1	55	4t3
122B	Colp silt loam, 1 to 7 percent slopes	25	IIIe-2	53	3o1
122D2	Colp silt loam, 7 to 12 percent slopes, eroded	26	IVe-2	55	3o1
131B	Alvin fine sandy loam, 1 to 4 percent slopes	14	IIe-1	50	2o1
131C2	Alvin fine sandy loam, 4 to 7 percent slopes, eroded	14	IIIe-1	53	2o1
131D2	Alvin fine sandy loam, 7 to 12 percent slopes, eroded	14	IIIe-1	53	2o1
132	Starks silt loam	43	IIw-3	51	2o1
134A	Camden silt loam, 0 to 2 percent slopes	21	I-2	50	1o1
134B	Camden silt loam, 2 to 7 percent slopes	21	IIe-1	50	1o1
134D2	Camden silt loam, 7 to 15 percent slopes, eroded	21	IIIe-1	53	1o1
136	Brooklyn silt loam	20	IIw-1	50	3w2
138	Shiloh silty clay loam	42	IIw-1	50	3w2
149	Brenton silt loam	20	I-2	50	2o1
152	Drummer silty clay loam	28	IIw-1	50	2w3
155B	Stockland sandy loam, 0 to 4 percent slopes	44	IIIs-1	54	3s2
155C	Stockland sandy loam, 4 to 7 percent slopes	44	IIIe-4	53	3s2
164A	Stoy silt loam, 0 to 2 percent slopes	45	IIw-3	51	3o1
164B	Stoy silt loam, 2 to 5 percent slopes	46	IIe-3	50	3o1
165	Weir silt loam	47	IIIw-1	53	4w2
175B	Lamont fine sandy loam, 1 to 6 percent slopes	35	IIIe-4	53	3s2
175E2	Lamont fine sandy loam, 12 to 25 percent slopes, eroded	35	VIe-2	55	3s3
208	Sexton silt loam	41	IIIw-1	53	3w2
214B	Hosmer silt loam, 2 to 4 percent slopes	32	IIe-2	50	2o1
218	Newberry silt loam	39	IIw-1	50	3w2
219	Millbrook silt loam	37	I-2	50	2o1
266B	Disco sandy loam, 1 to 4 percent slopes	27	IIIs-1	54	3s2
284	Tice silty clay loam	46	I-1	50	2o4

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
286	Carmi sandy loam	22	IIs-1	52	3s2
287	Chauncey silt loam	24	IIIw-1	53	3w2
288	Petrolia silty clay loam	40	IIw-2	51	2w5
291B	Xenia silt loam, 2 to 7 percent slopes	48	IIe-1	50	1o1
302	Ambraw clay loam	15	IIw-2	51	2w5
308B	Alford silt loam, 2 to 7 percent slopes	13	IIe-1	50	1o1
308D2	Alford silt loam, 7 to 12 percent slopes, eroded	14	IIIe-1	53	1o1
315	Channahon silt loam	23	IIIs-1	54	3d2
424	Shoals silt loam	42	IIw-4	52	2o4
431	Genesee silt loam	29	I-1	50	1o4
451	Lawson silt loam	36	IIw-4	52	2o4
453B	Muren silt loam, 1 to 6 percent slopes	38	IIe-1	50	1o1
454A	Iva silt loam, 0 to 2 percent slopes	34	IIw-3	51	3o1
597	Armiesburg silty clay loam	16	I-1	50	1o4
665	Stonelick fine sandy loam	44	IIs-2	53	2o4
927C2	Blair-Atlas silt loams, 4 to 10 percent slopes, eroded	18	IIIe-3	53	3o1
927C3	Blair-Atlas silty clay loams, 4 to 10 percent slopes, severely eroded	18	IVe-2	55	3o1

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