United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Fayette County, Illinois

How To Use This Soil Survey

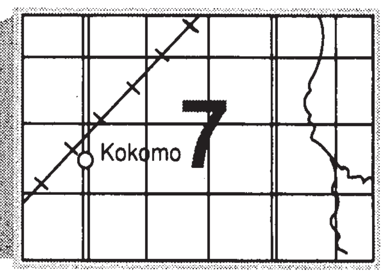
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

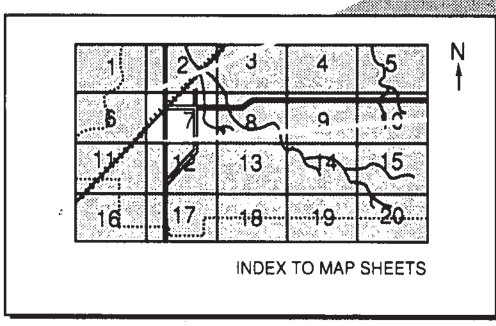
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

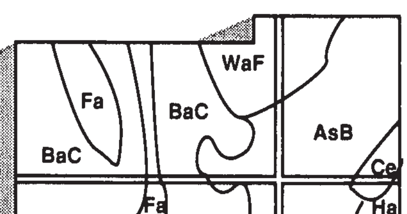
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Fayette County Soil and Water Conservation District. The cost was shared by the Fayette County Board of Supervisors and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 149.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: The Old State House (old capitol) in an area of Parke silt loam, 1 to 5 percent slopes.

Contents

Issued July 1997

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Fayette County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Thomas W. Christenson
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Fayette County, Illinois

By Mack S. Hodges, Natural Resources Conservation Service

Soils surveyed by Mack S. Hodges and Laurie L. King, Natural Resources Conservation Service, and Chris Borden, Kent Brinkmann, and Keith Whitaker, Fayette County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
Illinois Agricultural Experiment Station

FAYETTE COUNTY is in the south-central part of Illinois (fig. 1). It has an area of 464,610 acres, or about 726 square miles. It is bordered on the north by Shelby and Montgomery Counties, on the east by Effingham and Clay Counties, on the south by Marion and Clinton Counties, and on the west by Bond and Montgomery Counties. In 1980, the population of the county was 22,167. Vandalia, the county seat and the largest town, had a population of 5,339.

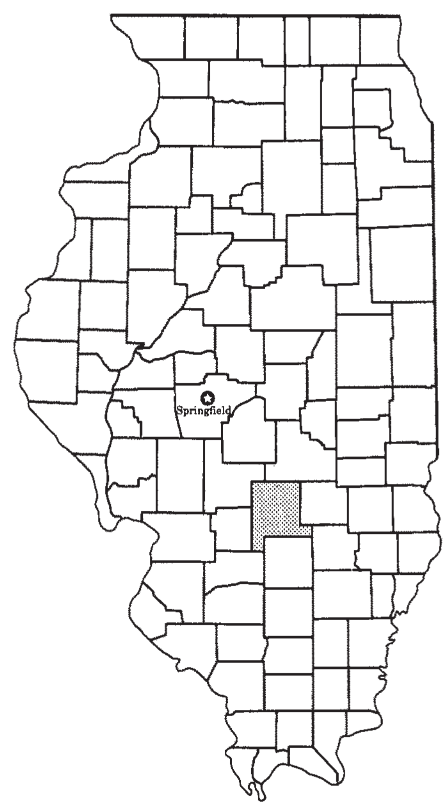


Figure 1.—Location of Fayette County in Illinois.

General Nature of the County

This section gives general information concerning Fayette County. It describes climate; history; transportation facilities; farming; and relief, physiography, and drainage.

Climate

Wayne Wendland, Illinois State Water Survey, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Effingham in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 29.4 degrees F and the average daily minimum temperature is 20.4 degrees. The lowest temperature on record, which occurred at Effingham on January 18, 1977, is -24 degrees. In summer, the average temperature is 74.9 degrees and the average daily maximum temperature is 86.8 degrees. The highest recorded temperature, which occurred at Effingham on July 14, 1954, is 111 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 39.93 inches. Of this, 21.9 inches, or nearly 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 16.05 inches. The heaviest 1-day rainfall during the period of record was 5.66 inches.

The average seasonal snowfall is 21.9 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 33 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 64 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 70 percent of the time possible in summer and 47 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 13.8 miles per hour, in March.

History

Fayette County was organized from parts of Bond, Clark, and Crawford Counties by an act of the Second Illinois General Assembly on February 14, 1821. The original boundaries included a tract almost 200 miles long and approximately 42 miles wide. Acts of the State Legislature have since divided this tract, making part or all of 17 different counties. The county was named in honor of the General Lafayette, the French officer who fought for the Colonies during the Revolutionary War *(6)*.

On March 30, 1819, the second session of the First General Assembly passed an act authorizing the relocation of the State Capital. The act required commissioners to locate a site along the Kaskaskia River, as near as possible to the third principal meridian. The site chosen was within the present town of Vandalia. Vandalia served as the State Capital until 1839, when the seat of government was moved to Springfield.

The Kickapoo Indians were the first inhabitants of the county. A number of their burial mounds remain. The earliest permanent white settlement was established in the spring of 1815 by Guy Beck and his wife. In 1818, other settlers followed, forming a small settlement in Carson Township.

General prosperity and progress in the county followed the completion of the Central Railroad in 1855. Four other railroads were extended across the county in the next several years. The population of the county and the extent of commerce increased after the completion of these railroads.

Transportation Facilities

The transportation facilities in Fayette County include highways, roads, railroads, and an airport. Interstate 70, a major east-west link, and Interstate 57, which crosses the southeast corner of the county, allow access to large cities. Illinois Highways 37, 40, 140, 128, and 185 extend through the county. Federal Highway 51, a major north-south link, and Federal Highway 40, a major east-west link, provide access to many of the secondary township and county roads. Several railroads in the county provide rail service to the large towns and to most of the smaller towns. A small airport northwest of Vandalia provides limited air service.

Farming

Farming has been the chief industry in Fayette County since the period of settlement. In 1982, about 336,950 acres in the county was farmed. In that year, the county had 1,463 farms, which averaged 230 acres in size. A total of 272,681 acres was used for crops, chiefly corn, soybeans, grain sorghum, and wheat. About 64,000 was used for oats, hay, or pasture. In 1983, about 130,000 acres was used for soybeans; 48,700 acres for corn; 44,500 acres for wheat; and 64,500 acres for hay or pasture *(7)*.

The livestock industry in the county is diversified. The kinds of livestock include beef cattle, hogs, sheep, poultry, dairy cattle, and horses. In 1982, about 8,300 cattle and calves, 84,000 hogs, and 1,300 sheep were raised in the county. Also, about 57,200 hens produced 15,100,000 eggs, and 2,000 dairy cows produced more than 24 million pounds of milk. Riding horses are kept on many of the farms.

Relief, Physiography, and Drainage

The Illinoian glacier covered the survey area during the Pleistocene. It deposited 50 and 200 feet of drift in most areas of the county. The southeast corner of the county and small isolated areas throughout the county have less than 50 feet of glacial drift. Silty loess as much as 6 feet thick covers the drift.

The glacier left the topography in the county nearly level. As a result of geologic erosion, stream valleys and drainageways dissect the landscape. The highest elevation in the county, 710 feet above sea level, is in North Hurricane Township. The lowest elevation, 430 feet above sea level, is in an area where the Kaskaskia River enters Lake Carlyle.

The county is drained by the Kaskaskia River and by 11 major creeks, which are tributaries of the river. About 114,000 acres on flood plains and along drainageways is subject to flooding.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Cisne-Hoyleton-Darmstadt Association

Nearly level to gently sloping, poorly drained and somewhat poorly drained, very slowly permeable and slowly permeable soils that formed in loess and the underlying glacial till or entirely in loess; on uplands

This association consists of soils on broad till plains that have some low rises. It is throughout the county. The soils formed under prairie vegetation. Slopes range from 0 to 5 percent.

This association makes up about 29 percent of the county. It is about 36 percent Cisne soils, 28 percent Hoyleton soils, 19 percent Darmstadt soils, and 17 percent minor soils (fig. 2).

Cisne soils are poorly drained and very slowly permeable. They formed in 45 to 49 inches of loess and in the underlying glacial till. They are nearly level and are on broad upland till plains. Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is light brownish gray and mottled. The upper part is silt loam, the next part is silty clay loam, and the lower part is clay loam.

Hoyleton soils are somewhat poorly drained and slowly permeable. They formed in 34 to 50 inches of loess and in the underlying glacial till. They are nearly level to gently sloping and are on low ridges on upland till plains. Typically, the surface layer is very dark brown silt loam about 9 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil is mottled silty clay loam about 30 inches thick. The upper part is yellowish brown, and the lower part is light brownish gray. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable loam.

Darmstadt soils are somewhat poorly drained and have a very slowly permeable subsoil that has a high content of sodium. They formed in loess. They are nearly level to gently sloping and are on flats and low ridges in the uplands. Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is grayish brown silt loam about 6 inches thick. The subsoil is mottled silty clay loam about 30 inches thick. The upper part is pale brown, and the lower part is light brownish gray. The underlying material to a depth of about 60 inches is light brownish gray, mottled clay loam.

The minor soils in this association include the nearly level Ebbert soils in shallow depressions on till plains, the nearly level Huey soils on broad till plains, and the nearly level Newberry soils on broad till plains and in wide, shallow depressions on till plains. Huey soils have a high content of sodium in the subsoil.

Most areas of this association are used for cultivated crops. The Cisne and Hoyleton soils are well suited to the crops commonly grown in the county. The main management needs are measures that maintain or improve the drainage system, control erosion, and maintain tilth and fertility.

The major soils generally are poorly suited to dwellings and septic tank absorption fields. A seasonal high water table, the shrink-swell potential, and the slow

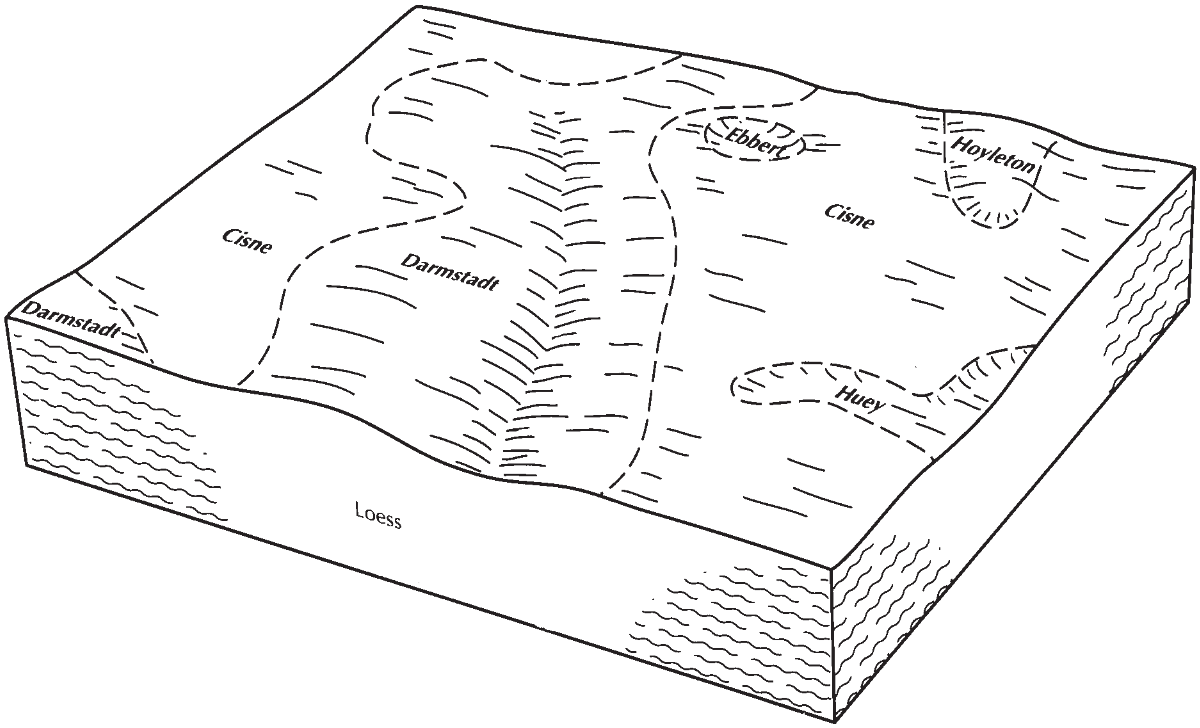


Figure 2.—Typical pattern of soils and parent material in the Cisne-Hoyleton-Darmstadt association.

or very slow permeability are severe limitations affecting these uses.

2. Bluford-Hickory-Ava Association

Nearly level to very steep, well drained to somewhat poorly drained, moderately permeable to slowly permeable soils that formed in glacial till, in loess, or in loess and the underlying glacial till; on uplands

This association consists of soils on ridges and side slopes on till uplands throughout the county. The soils are in nearly level to gently sloping areas on broad ridges and narrow ridges and in strongly sloping to very steep areas on side slopes. They formed under forest vegetation. Slopes range from 0 to 60 percent.

This association makes up about 38 percent of the county. It is about 46 percent Bluford soils, 33 percent Hickory soils, 11 percent Ava soils, and 10 percent minor soils (fig. 3).

Bluford soils are somewhat poorly drained and slowly permeable. They formed in 44 to 60 inches of loess and in the underlying glacial till. They are nearly level to gently sloping and are on broad ridges. Typically, the surface layer is brown silt loam about 7 inches thick. The subsurface layer is pale brown, mottled silt loam about 6 inches thick. The subsoil extends to a depth of about 44 inches. It is mottled. The upper part is yellowish brown silty clay loam, the next part is pale brown silty clay loam, and the lower part is light brownish gray silt loam. The underlying material to a depth of about 60 inches is brown, mottled loam.

Hickory soils are well drained and moderately permeable. They formed in glacial till. They are strongly sloping to very steep and are on side slopes. Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is pale brown and yellowish brown loam about 12 inches thick. The subsoil is mottled clay loam about 24 inches thick. The upper part is yellowish brown, and the lower part is light brownish gray, yellowish brown, and strong brown. The underlying material to a depth of 60 inches or more is yellowish brown, mottled sandy clay loam and sandy loam.

Ava soils are moderately well drained and moderately slowly permeable. They formed in loess. They are in nearly level to gently sloping areas on narrow ridgetops and in moderately sloping areas on side slopes. Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown silty clay loam, and the lower part is mottled yellowish brown, strong brown, pale brown, light gray, and brown, brittle silt loam.

The minor soils in this association are Parke soils on ridges, the moderately sloping Atlas soils at the upper end of drainageways, Wynoose soils on broad till plains, and the nearly level Wakeland soils on narrow stream bottoms.

This association is used mainly for cultivated crops or for pasture. The steeper areas are used as woodland or as wildlife habitat. The association is well suited to woodland and to woodland wildlife habitat. The gently sloping soils are well suited to cultivated crops and pasture. Erosion is the major hazard in cultivated areas. The slope and the hazard of erosion are the main concerns in managing wooded areas.

The major soils generally are moderately suited to dwellings, except for the very steep soils. The slope and the shrink-swell potential are limitations. Seasonal wetness in the Ava soils is an additional limitation on sites for dwellings with basements. The association is poorly suited to septic tank absorption fields. The restricted permeability in the Ava and Bluford soils is a limitation. The Hickory soils are generally unsuited to onsite waste disposal because of the slope.

3. Ava-Parke Association

Gently sloping to strongly sloping, well drained and moderately well drained, moderately permeable and moderately slowly permeable soils that formed in loess or in loess and the underlying glacial drift; on uplands

This association consists of soils on narrow ridges and side slopes adjacent to the Kaskaskia River. The soils formed under forest vegetation. Slopes range from 1 to 15 percent.

This association makes up about 5 percent of the county. It is about 58 percent Parke soils, 40 percent Ava soils, and 2 percent minor soils.

Ava soils are moderately well drained and moderately slowly permeable. They formed in loess. They are gently sloping and moderately sloping and are on narrow ridges. Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown silty clay loam, and the lower part is mottled yellowish brown, strong brown, pale brown, light gray, and brown, brittle silt loam.

Parke soils are well drained and moderately

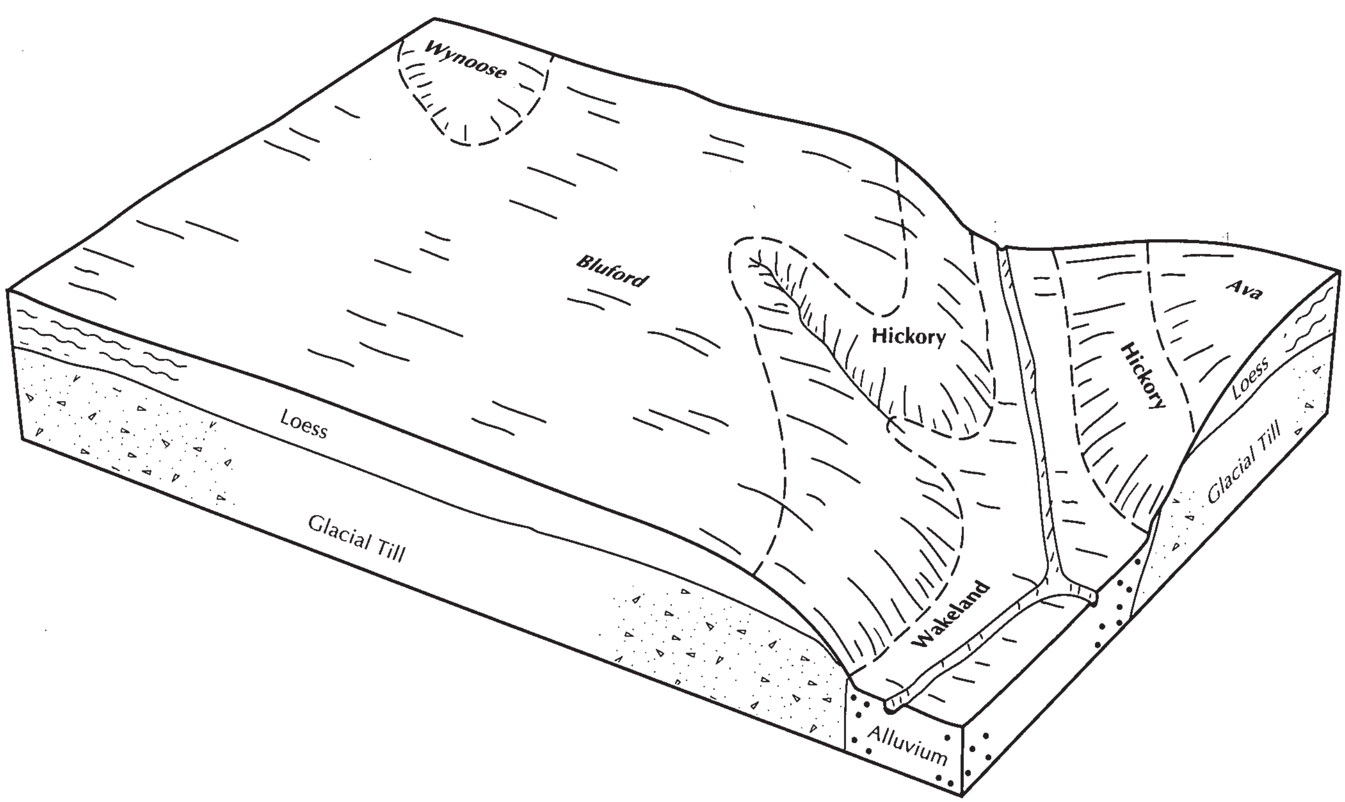


Figure 3.—Typical pattern of soils and parent material in the Bluford-Hickory-Ava association.

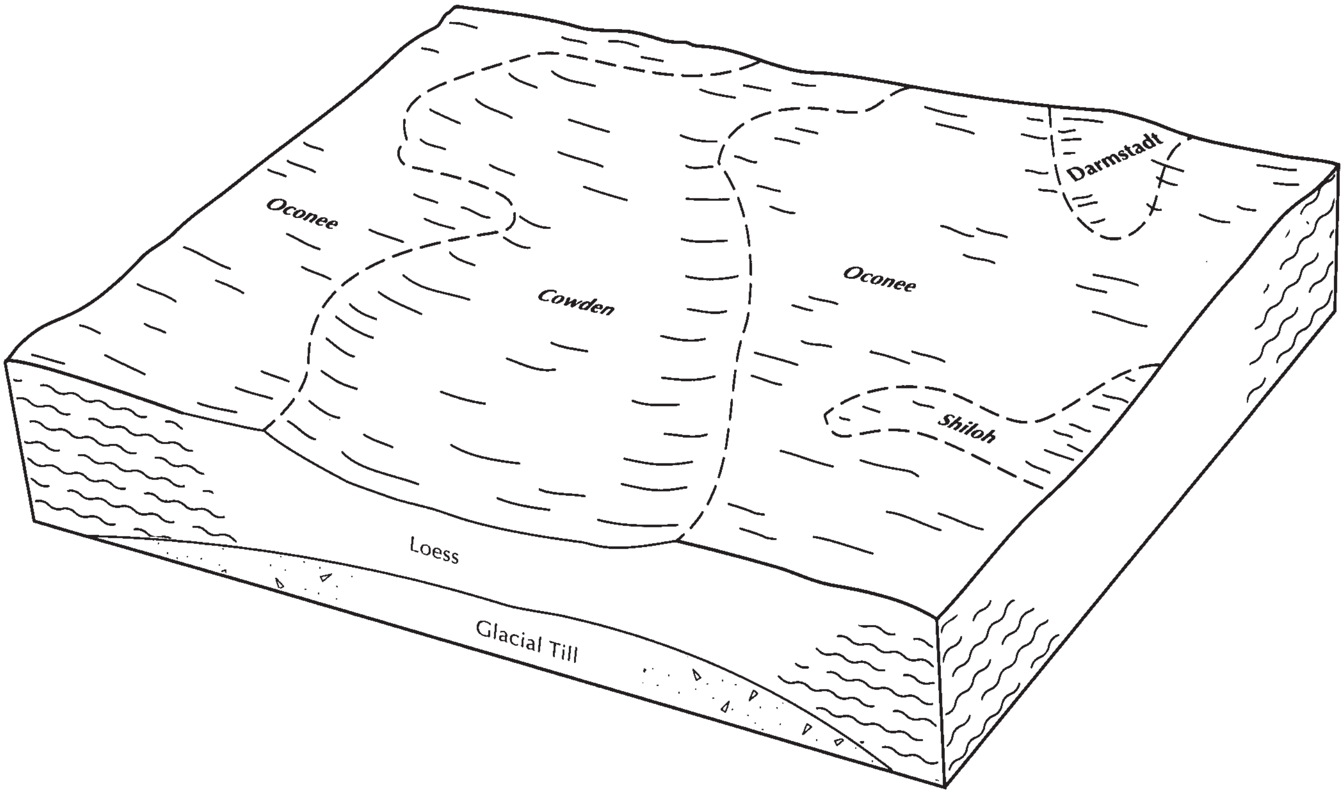


Figure 4.—Typical pattern of soils and parent material in the Oconee-Cowden association.

permeable. They formed in 24 to 40 inches of loess and in the underlying glacial drift. They are gently sloping to strongly sloping and are on narrow ridges and side slopes. Typically, the surface layer is dark yellowish brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown silty clay loam, and the lower part is strong brown silty clay loam, silt loam, and loam.

The minor soils in this association include Hickory and Negley soils on steep side slopes, Douglas and Harrison soils on low ridges, Bluford soils on broad ridges, and Atlas soils at the end of drainageways.

This association is used mainly for cultivated crops or for pasture. The steeper areas are used as woodland or as wildlife habitat. The association is well suited to woodland and to woodland wildlife habitat. The gently sloping soils are well suited to cultivated crops and pasture. Erosion is the major hazard in cultivated areas. The slope and the hazard of erosion are the main concerns in managing wooded areas.

The major soils generally are moderately suited to dwellings. The slope and the shrink-swell potential are limitations. Seasonal wetness in the Ava soils is an additional limitation on sites for dwellings with basements. The association is poorly suited to septic tank absorption fields. The moderately slow permeability in the Ava soils is a limitation.

4. Oconee-Cowden Association

Nearly level to gently sloping, somewhat poorly drained and poorly drained, slowly permeable soils that formed in loess or in loess and the underlying glacial till; on broad uplands

This association consists of soils on broad till plains that have some low rises. It is in the northwestern part of the county. The soils formed under prairie vegetation. Slopes range from 0 to 5 percent.

This association makes up about 3 percent of the county. It is about 40 percent Oconee soils, 10 percent Cowden soils, and 50 percent minor soils (fig. 4).

Oconee soils are somewhat poorly drained and have a slowly permeable, acid subsoil. They formed in loess. They are nearly level to gently sloping and are on low rises and in other areas on broad uplands. Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled silt loam about 5 inches thick. The subsoil is mottled silty clay loam about 35 inches thick. The upper part is grayish brown, and the lower part is pale brown. The underlying material to a depth of about 60 inches is grayish brown, mottled silty clay loam.

Cowden soils are poorly drained and have a slowly permeable, acid subsoil. They formed in 55 to more than 60 inches of loess and the underlying glacial till. They are nearly level and are on broad uplands. Typically, the surface layer is very dark grayish brown silt loam about 6 inches thick. The subsurface layer is grayish brown, mottled silt loam about 15 inches thick. The subsoil is about 35 inches thick. It is mottled. The upper part is dark grayish brown silty clay loam, and the lower part is gray silty clay. The underlying material to a depth of about 60 inches is light olive gray, mottled silt loam.

The minor soils in this association include the gently sloping Atlas soils at the upper end of drainageways, Piasa soils on broad uplands, Darmstadt soils on broad ridges and side slopes, and Shiloh soils in depressions on till plains. Piasa and Darmstadt soils have a high content of sodium in the subsoil.

In most areas the major soils are used for cultivated crops. The Oconee and Cowden soils are well suited to the crops commonly grown in the county. The main management needs are measures that maintain or improve the drainage system, control erosion, and maintain tilth and fertility.

The major soils generally are poorly suited to dwellings and septic tank absorption fields. A seasonal high water table, the shrink-swell potential, and the slow permeability are severe limitations affecting these uses.

5. Hickory-Hosmer-Stoy Association

Nearly level to very steep, well drained to somewhat poorly drained, moderately permeable, very slowly permeable, and slowly permeable soils that formed in glacial till and loess; on uplands

This association consists of soils on broad ridges, side slopes, and narrow ridges in the northwestern part of the county. The soils formed under forest vegetation. Slopes range from 0 to 60 percent.

This association makes up about 1 percent of the county. It is about 34 percent Hickory soils, 32 percent Hosmer soils, 24 percent Stoy soils, and 10 percent minor soils.

Hickory soils are well drained and moderately permeable. They formed in glacial till. They are strongly sloping to very steep and are on side slopes. Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is pale brown and yellowish brown loam about 12 inches thick. The subsoil is clay loam about 24 inches thick. The upper part is yellowish brown, and the lower part is light brownish gray, yellowish brown, and strong brown. The underlying material to a depth of about 60 inches is light brownish gray and yellowish brown, mottled sandy clay loam.

Hosmer soils are moderately well drained and very slowly permeable. They formed in loess. They are gently sloping and are on narrow ridges. Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is brownish yellow silt loam about 4 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is yellowish brown silt loam, the next part is yellowish brown silty clay loam, and the lower part is dark yellowish brown, brittle silty clay loam and silt loam. The underlying material to a depth of about 60 inches is brown, mottled loam.

Stoy soils are somewhat poorly drained and slowly permeable. They formed in loess. They are nearly level and are on broad ridges. Typically, the surface layer is brown silt loam about 8 inches thick. The subsurface layer is light yellowish brown, mottled silt loam about 5 inches thick. The subsoil is mottled silty clay loam about 40 inches thick. The upper part is yellowish brown, and the lower part is yellowish brown and brown. The underlying material to a depth of about 60 inches is grayish brown, brown, and strong brown, mottled loam.

The minor soils in this association include the moderately sloping Atlas soils on side slopes at the head of drainageways, the gently sloping and moderately sloping Parke soils on narrow ridges, and the nearly level Cowden soils on broad ridges.

The soils on broad ridges and in moderately sloping areas on side slopes are used mainly for cultivated crops or pasture. The steeper areas are used as woodland.

6. Wakeland-Beaucoup-Petrolia Association

Nearly level, somewhat poorly drained and poorly drained, moderately permeable and moderately slowly permeable soils that formed in silty alluvium; on flood plains

This association consists of soils on bottom land along the major streams and their tributaries. Slopes range from 0 to 3 percent.

This association makes up about 24 percent of the county. It is about 31 percent Wakeland soils, 11 percent Beaucoup soils, 7 percent Petrolia soils, and 51 percent minor soils.

Wakeland soils are frequently flooded for brief periods from March through May. They are somewhat poorly drained and moderately permeable. They formed in silty alluvium on nearly level flood plains. Typically, the surface layer is grayish brown silt loam about 9 inches thick. The underlying material to a depth of more than 60 inches is stratified brown, dark brown, and light brownish gray silt loam.

Beaucoup soils are frequently flooded for brief periods from March through June. They are poorly drained and moderately slowly permeable. They formed in silty alluvium in low depressions on bottom land. Typically, the surface layer is very dark grayish brown silty clay loam about 12 inches thick. The subsoil is mottled silty clay loam about 24 inches thick. The upper part is dark grayish brown, and the lower part is dark gray. The underlying material to a depth of about 60 inches is gray and dark gray, mottled silt loam and silty clay loam.

Petrolia soils are frequently flooded for brief or long periods from March through June. They are poorly drained and moderately slowly permeable. They formed in silty alluvium on nearly level bottom land. Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The underlying material to a depth of about 60 inches is mottled silty clay loam. The upper part is gray, and the lower part is grayish brown.

The minor soils in this association include Birds soils on nearly level bottom land, Coffeen and Tice soils on slight rises on bottom land, Lawson soils on low ridges on bottom land, Titus soils in shallow depressions on flood plains, Medway soils on foot slopes along the edges of bottom land, and Hickory soils on steep side slopes.

This association is used for cultivated crops or woodland.

Broad Land Use Considerations

About 56 percent of the acreage in Fayette County is used for soybeans, corn, or wheat; 20 percent is used as woodland; and 10 percent is used for hay or pasture. The suitability of the soils for these uses varies significantly.

Soybeans, corn, and wheat are grown most extensively in areas of associations 1, 4, and 6. These associations generally are moderately suited or well suited to cultivated crops. Wetness is a problem where Cisne, Cowden, Wakeland, and other major soils are in nearly level or low areas. Also, flooding can damage crops on the Wakeland soils. The more sloping soils in these associations, such as Darmstadt, Hoyleton, and Oconee soils, are very susceptible to erosion. Darmstadt soils have a high content of sodium, which reduces yields and increases the susceptibility to erosion.

Much of the hayland and pasture in the county is in areas of associations 2, 3, and 5. The less sloping major soils in these associations, such as Ava, Bluford, Hosmer, and Parke soils, are well suited to hay and pasture. The slope limits the suitability of the Hickory soils in associations 2 and 5 for hay and pasture.

Most of the woodland in the county is in areas of associations 2, 5, and 6. The Ava, Bluford, Hosmer, and Stoy soils in associations 2 and 5 are well suited to woodland, but the Hickory soils are only moderately suited because of the hazard of erosion and an equipment limitation. Because of plant competition, the Wakeland soils in association 6 are only moderately suited to woodland and the Beaucoup soils are poorly suited. Important trees in the county include white oak, red oak, shagbark hickory, and white ash. Sycamore and silver maple are abundant in areas of association 6.

Dwellings and septic tank absorption fields are in areas of all the associations. Association 6 generally is unsuited to dwellings and septic tank absorption fields because of flooding. Most of the major soils in the other associations in the county are poorly suited, mainly because of wetness, the shrink-swell potential, restricted permeability, or the slope. The Bluford soils in association 2 and the Stoy soils in association 5 are moderately suited to dwellings without basements and poorly suited to septic tank absorption fields. The Parke and Ava soils in association 3 are moderately suited to dwellings. The Parke soils are well suited to septic tank absorption fields, but the Ava soils are poorly suited.

The suitability for the development of wildlife habitat is good throughout the county. Associations 1 and 4 are well suited to openland wildlife habitat. Associations 2, 3, and 5 are well suited to woodland wildlife habitat. Association 6 is moderately suited to wetland wildlife habitat.

Recreational uses include camp and picnic areas, playgrounds, and paths and trails. Associations 1, 4, and 6 are poorly suited to these uses because of wetness and flooding. Many of the soils in associations 2 and 5 are only moderately suited because of restricted permeability and wetness. The Hickory soils in associations 2 and 5 are moderately suited to paths and trails, but they generally are poorly suited to the other recreational uses because of the slope. The Parke soils in association 3 are well suited to recreational uses.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Bluford silt loam, 2 to 5 percent slopes, is a phase of the Bluford series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

2—Cisne silt loam. This nearly level, poorly drained soil is on broad till plains. Individual areas are irregular in shape and range from 2 to 500 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is light brownish gray, mottled, and friable. The upper part is silt loam, the next part is silty clay loam, and the lower part is clay loam. In some areas the surface layer is lighter in color. In other areas it is thicker. In places the subsoil contains less clay.

Included with this soil in mapping are small, closely intermingled areas of Huey soils. These soils have a high content of sodium in the subsoil. Also included are some areas of the somewhat poorly drained Darmstadt and Hoyleton soils on ridges and knolls and small areas of the poorly drained Ebbert and Newberry soils in shallow depressions. Included soils make up 5 to 20 percent of the unit.

Water and air move through the Cisne soil at a very slow rate. Surface runoff is slow. A perched seasonal high water table is within a depth of 2 feet from March through June in most years. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings. This soil is moderately suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of soybeans, corn, and small grain. Measures that maintain or improve the drainage system are needed. A combination of surface drains and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth. Winter wheat and hay are subject to frost heave in some years.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

The land capability classification is IIIw.

3A—Hoyleton silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on uplands. Individual areas are irregular in shape and range from 2 to 300 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is yellowish brown and pale brown silt loam about 4 inches thick. The subsoil is about 30 inches thick. It is friable, mottled silty clay loam and silt loam. The upper part is yellowish brown, and the lower part is light olive brown. The underlying material to a depth of 60 inches or more grayish brown, mottled, friable loam. In some areas the surface soil and subsoil have a very low content of sand. In other areas the surface soil is thicker and is darker in the lower part. In some places the subsoil contains less clay. In other places it has a higher proportion of grayish colors.

Included with this soil in mapping are small, closely intermingled areas of Darmstadt soils. These soils have a high content of sodium in the subsoil. Also included are some areas of the poorly drained Cisne and Huey soils on the lower flats. Included soils make up 15 to 25 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is high in the subsoil.

Most areas are used for soybeans, wheat, or corn. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness delays planting in most years. It can be reduced, however, by surface or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal wetness and the high shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIw.

3B—Hoyleton silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is brown silt loam about 6 inches thick. The subsoil is about 41 inches thick. It is mottled. The upper part is yellowish brown, firm silty clay loam; the next part is brown, firm silty clay loam; and the lower part is light brownish gray, friable silt loam that has a high content of sand. The underlying material to a depth of 60 inches is grayish brown, friable silt loam. In some areas the subsoil contains less clay. In other areas the surface layer is lighter in color. In some eroded areas it has been mixed with the upper part of the subsoil through cultivation.

Included with this soil in mapping are small areas of the poorly drained Cisne and Huey soils on the lower flats. Also included are closely intermingled areas of Darmstadt soils, which have a high content of sodium in the subsoil. Included soils make up 5 to 20 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard unless the surface is protected. Also, the wetness can delay planting in some years. It can be reduced by surface drains. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal wetness and the high shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

3B2—Hoyleton silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on ridges in the uplands. Individual areas are irregular in shape and range from 2 to 120 acres in size.

Typically, the surface layer is very dark brown silt loam about 4 inches thick. The subsurface layer is yellowish brown silt loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is yellowish brown, firm silty clay loam, and the lower part is light brownish gray and grayish brown, firm clay loam and loam. In some areas the subsoil contains less clay. In other areas the surface layer is lighter in color.

Included with this soil in mapping are small areas of the poorly drained Cisne and Huey soils on the lower flats. Also included are closely intermingled areas of Darmstadt soils. Darmstadt and Huey soils have a high content of sodium in the subsoil. Included soils make up 5 to 20 percent the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is medium. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The wetness delays planting, however, in most years. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table and the high shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

7C2—Atlas silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, somewhat poorly drained soil is on the side slopes of drainageways on uplands. Individual areas are irregular in shape and range from 2 to 220 acres in size.

Typically, the surface layer is brown, friable silt loam. Erosion has reduced the thickness of this layer to about

6 inches. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is yellowish brown, friable silty clay loam; the next part is light gray, very firm clay; and the lower part is gray and light brownish gray, firm clay. In some areas the subsoil contains less clay. In other areas it contains less sand. In places the surface layer is darker.

Included with this soil in mapping are small areas of the well drained Hickory, moderately well drained Ava, and somewhat poorly drained Bluford soils. Hickory soils are on side slopes below the Atlas soil. Ava and Bluford soils are on ridges above the Atlas soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Atlas soil at a very slow rate. Surface runoff is rapid in cultivated areas. A perched seasonal high water table is at a depth of 1 to 2 feet from April through June in most years. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops or for hay or pasture. This soil is moderately suited to cultivated crops and to woodland. It is well suited to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Suitable forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, seedling mortality and windthrow are management concerns. The seedling mortality rate can be reduced by planting species that can withstand the moderate available water capacity, which results from the high content of clay in the subsoil. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the hazard of windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing tile drains near the foundations or interceptor drains in areas that are higher on the side slopes than the building helps to lower the water table. Extending footings below the subsoil or reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing interceptor tile drains in areas that are higher on the side slopes than the absorption field helps to lower the water table. Specially designed systems that include sand filters are needed to overcome the very slow permeability.

The land capability classification is IIIe.

8D2—Hickory silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on short, uneven side slopes adjacent to narrow flood plains. Individual areas are long and narrow or irregularly shaped and range from 5 to 175 acres in size.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer is brown, friable clay loam about 4 inches thick. The subsoil to a depth of 60 inches or more is yellowish brown, firm clay loam. It is mottled in the lower part. In some places the surface layer is thicker. In other places the soil has a buried soil.

Included with this soil in mapping are small areas of soils along narrow drainageways on bottom land. Also included are the moderately well drained Ava and Hosmer and somewhat poorly drained Bluford and Stoy soils on ridges and the somewhat poorly drained Atlas soils on side slopes below the Hickory soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is moderate.

Most areas are pastured. This soil is well suited to pasture and hay, to woodland, and to habitat for openland and woodland wildlife. It is moderately well suited to cultivated crops and to dwellings and septic tank absorption fields.

Further erosion is a hazard if this soil is used for corn, soybeans, or small grain. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation that is dominated by forage crops and by a combination of contour farming and a system of conservation tillage that leaves crop residue on the surface after planting. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent surface crusting, and improve tilth.

Suitable forage and hay crops grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, protection from fire and grazing is essential. Logging roads and skid trails should be established on the contour. Logs or trees can be skidded uphill with a cable and winch. Surface water can be diverted from logging roads and skid trails by water bars. Firebreaks should be the grass type. Bare logging areas should be seeded to grasses or to a grass-legume mixture. Operating machinery only during periods when the soil is firm enough to support the equipment helps to prevent the formation of ruts. When trees are planted in bare areas, a cover of grasses should be established between the rows. Also, the trees should be planted on the contour if a mechanical tree planter is used. Competing vegetation can be controlled by chemicals.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation.

The moderate permeability and the slope are limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the moderate permeability. Installing the filter lines on the contour or cutting and land shaping help to overcome the slope.

The land capability classification is IIIe.

8F—Hickory loam, 15 to 30 percent slopes. This steep, well drained soil is along drainageways on dissected uplands. Individual areas are long and narrow or irregularly shaped and range from 5 to 375 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is light yellowish brown, friable silt loam about 12 inches thick. The subsoil is clay loam about 24 inches thick. The upper part is yellowish brown and dark yellowish brown, is mottled, and is firm, and the lower part is yellowish brown and brownish gray and is firm. The underlying material to a depth of 60 inches is light yellowish brown, mottled, firm loam. In some areas the surface layer and subsoil contain more sand and gravel. In other areas the slope is more than 30 percent or less than 15 percent. In some places the subsoil has free carbonates. In other places it formed in shale residuum. In some eroded areas the surface layer is silty clay loam.

Included with this soil in mapping are small areas of soils along narrow drainageways on bottom land. Also included are the moderately well drained Ava and Hosmer and somewhat poorly drained Bluford and Stoy soils on ridges and the somewhat poorly drained Atlas soils on side slopes below the Hickory soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is low in the subsoil.

Most areas are used as woodland. Some are used as pasture. This soil is very well suited to woodland and poorly suited to pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the slope.

Erosion control is needed when grasses and legumes are becoming established in the pastured areas. In areas where the pasture is established, seeding legumes on the contour improves the quality of the forage and helps to control erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. Operating machinery is difficult on the steeper slopes. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as woodland, the hazard of erosion and an equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grasses or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIe.

8G—Hickory loam, 30 to 60 percent slopes. This very steep, well drained soil is on the side slopes of drainageways. Individual areas are long and narrow or irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is pale brown and yellowish brown, friable silt loam about 12 inches thick. The subsoil is friable clay loam about 24 inches thick. The upper part is yellowish brown and mottled, and the lower part is yellowish brown, strong brown, and light brownish gray. The underlying material to a depth of 60 inches is dark yellowish brown and yellowish brown, mottled, friable sandy clay loam and sandy loam. In some areas the surface layer and subsoil contain more sand and gravel. In other areas the slope is less than 30 percent. In some places the soil has a thinner subsoil and has calcareous underlying material within a depth of 40 inches. In other places the surface layer is clay loam or silty clay loam.

Included with this soil in mapping are small areas of soils along narrow drainageways on bottom land. Also included are the moderately well drained Ava and Hosmer and somewhat poorly drained Bluford and Stoy soils on ridges and the somewhat poorly drained Atlas soils on side slopes below the Hickory soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The potential for frost action and the shrink-swell potential are moderate.

Most areas are used as woodland. This soil is well suited to woodland and to habitat for woodland wildlife. It is poorly suited to pasture and hay and is generally unsuited to cultivated crops and to dwellings and septic tank absorption fields because of the slope.

If this soil is used as pasture, erosion is the major hazard. Also, large machinery generally cannot cross the short, very steep slopes. Therefore, the only method of seeding, applying fertilizer, and spraying is by airplane or by hand. Some kind of ground cover is essential to control erosion. Proper stocking rates, timely deferment of grazing, applications of fertilizer, and pasture rotation help to keep the pasture in good condition and control erosion.

If this soil is used as woodland, the hazard of erosion and an equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grasses or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIIe.

12—Wynoose silt loam. This level or slightly depressional, poorly drained soil is on broad, loess-covered till plains in the uplands. Individual areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is dark grayish brown, mottled silt loam about 8 inches thick. The subsurface layer is grayish brown and light gray, mottled silt loam about 12 inches thick. The subsoil to a depth of 60 inches or more is mottled silty clay loam. The upper part is grayish brown and is firm and very firm, and the lower part is grayish brown and gray and is friable. In some areas the surface layer is darker. In other areas the subsoil contains less clay. In places the lower part of the subsoil and the underlying material contain less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils on broad ridges. These soils make up less than 15 percent of the unit.

Water and air move through the Wynoose soil at a very slow rate. Surface runoff is slow. A seasonal high water table is within a depth of 2 feet from March through June in most years. Available water capacity is high. Organic matter content is low. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some small areas are used as woodland. This soil is moderately suited to cultivated crops. It is poorly suited to woodland and to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. A combination of surface drains and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth.

A cover of pasture plants or hay improves tilth. The wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing reduce the wetness. Applications of fertilizer, applications of lime in areas where the surface soil is medium acid to very strongly acid, weed control, pasture rotation, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons and mounds are alternative methods of waste disposal.

The land capability classification is IIIw.

13A—Bluford silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad flats and ridges in the uplands. Individual areas are irregular in shape and range from 2 to 650 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsurface layer is pale brown, mottled silt loam about 6 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is yellowish brown, friable silty clay loam; the next part is pale brown, friable silty clay loam; and the lower part is light brownish gray, firm, brittle silt loam. The underlying material to a depth of 60 inches is brown, mottled, firm loam. In some areas the lower part of the subsoil contains less sand. In other areas, the surface soil is thicker and the subsoil contains less clay.

Included with this soil in mapping are small areas of the moderately well drained Ava soils on the higher ridges and knolls. These soils contain less clay in the subsoil than the Bluford soil. Also included are small areas of the poorly drained Wynoose soils on flats and in depressions and the well drained Hickory and somewhat poorly drained Atlas soils on side slopes. Included soils make up 15 to 25 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. The surface layer typically is neutral because of past liming practices but is very strongly acid or strongly acid in areas that have not been limed. The subsoil is slightly acid to extremely acid. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist. It tends to crust and puddle, however, after hard rains. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness delays planting in most years. It can be reduced, however, by surface or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal wetness and the shrink-swell potential are limitations. Installing subsurface drains around footings helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIw.

13B—Bluford silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on mounds, knolls, and ridges in the uplands. Individual areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer is yellowish brown, mottled, friable silt loam about 6 inches thick. The subsoil extends to a depth of about 50 inches. It is mottled silty clay loam. The upper part is grayish brown and firm, the next part is yellowish brown and light brownish gray and is firm and slightly brittle, and the lower part is dark yellowish brown and friable. The underlying material to a depth of 60 inches is brown, mottled, firm loam. In some areas the surface layer is darker. In other areas the subsoil is extremely acid.

Included with this soil in mapping are small areas of the moderately well drained Ava soils. These soils have a brittle layer in the subsoil. They are slightly higher on the landscape than the Bluford soil. Also included are the poorly drained Wynoose soils on flats and in depressions and the well drained Hickory and somewhat poorly drained Atlas soils on side slopes. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderate. Reaction is very strongly acid to medium acid in the subsoil and slightly acid to mildly alkaline in the surface layer. The shrink-swell potential is moderate in the subsoil. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture and is moderately suited to woodland. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The wetness delays planting, however, in most years. It can be reduced be surface or subsurface drains. Further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal wetness and the shrink-swell potential are limitations. Installing subsurface drains around footings helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

13B2—Bluford silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on the side slopes of knolls and ridges in the uplands and on slopes along the upper end of drainageways. Individual areas are irregular in shape and range from 2 to 90 acres in size.

Typically, the surface layer is brown and dark brown, friable silt loam about 8 inches thick. The subsoil is about 43 inches thick. It is mottled and is friable and firm. The upper part is brown silty clay loam, the next part is grayish brown and brown silty clay loam, and the lower part is brown and dark brown silt loam. The underlying material to a depth of 60 inches is brown and pinkish gray, mottled, firm and friable silt loam. In some areas the surface layer is silty clay loam. In other areas it is darker. In places the subsoil is extremely acid.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and well drained Hickory soils on the steeper slopes. Also included are the moderately well drained Ava soils on the slightly higher parts of the landscape and small areas of the poorly drained Wynoose soils in depressions at the end of drainageways. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderately low. Reaction is very strongly acid to medium acid in the subsoil and slightly acid to mildly alkaline in the surface layer. The shrink-swell potential is moderate in the subsoil. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to woodland and is well suited to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The wetness delays planting, however, in most years. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface drains around footings helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

14B—Ava silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on the crest of narrow ridges in the uplands. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown silt loam about 10 inches thick. The subsoil is mottled, firm silty clay loam about 28 inches thick. The upper part is yellowish brown, dark yellowish brown, brown, and strong brown, and the lower part is brown and yellowish brown and is brittle. The underlying material to a depth of 60 inches is pale brown, mottled, friable loam. In some areas the subsoil contains more sand and gravel. In other areas the slope is more than 5 percent. In places the lower part of the subsoil contains less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils on the lower ridges and on side slopes. These soils contain more clay in the subsoil than the Ava soil. Also included are the well drained Hickory and the somewhat poorly drained Atlas soils on side slopes. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium. A perched seasonal high water table is at a depth of 1.5 to 3.5 feet from March through June in most years. Available water capacity is moderate. The surface layer commonly is slightly acid because of past liming practices but in some areas is very strongly acid. The subsoil is extremely acid to strongly acid. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is moderately suited to dwellings without basements and is poorly suited to dwellings with basements and to septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. The wetness is more severely limiting on sites for dwellings with basements than on sites for dwellings without basements. Installing subsurface drains around foundations helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

14C2—Ava silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on side slopes along drainageways and on convex, narrow ridgetops on loess-covered till plains. Individual areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer is yellowish brown, mottled silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown silty clay loam; the next part is yellowish brown, mottled, brittle silt clay loam; and the lower part is brown, brittle silt loam. In some areas the subsoil is reddish and is not so brittle. In other areas the surface layer is yellowish brown silty clay loam because it has been mixed with part of the subsoil through cultivation.

Included with this soil in mapping are some areas of the somewhat poorly drained Atlas and well drained Hickory soils along drainageways. Atlas soils are often seepy in the spring. They contain more clay in the subsoil than the Ava soil. Hickory soils are on the steeper slopes. Also included are small areas of the somewhat poorly drained Bluford soils and some areas of soils that have sandstone residuum in the lower part of the subsoil. Bluford soils contain more clay in the subsoil than the Ava soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid. A perched seasonal high water table is at a depth of 1.5 to 3.5 feet from March through June in most years. Available water capacity is high. The surface layer typically is medium acid because of past liming practices but is very strongly acid in areas that have not been limed. The subsoil is strongly acid or very strongly acid. The surface layer is friable, but it tends to crust or puddle after hard rains, especially in cultivated areas. The shrink-swell potential is moderate in the subsoil.

Most areas are used as pasture or woodland. Some are cultivated. This soil is moderately suited to cultivated crops and to pasture and hay and is well suited to woodland. It is moderately suited to dwellings without basements and is poorly suited to dwellings with basements and to septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, protection from fire and grazing is essential. Chemical or mechanical methods, or both, are needed to control competing vegetation when seedlings are becoming established.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. The wetness is more severely limiting on sites for dwellings with basements than on sites for dwellings without basements. Installing subsurface drains around foundations helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

The land capability classification is IIIe.

15B—Parke silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the surface layer is dark yellowish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam, and the lower part is strong brown, friable silty clay loam, clay loam, and loam. In severely eroded areas the surface layer is silty clay loam. In some areas the subsoil has a higher content of sand. In other areas it has a lower content of sand. In some places the lower part of the subsoil is firm and brittle. In other places the soil is deeper to the redder loamy material.

Included with this soil in mapping are small areas of the moderately well drained, very slowly permeable Ava and somewhat poorly drained Bluford soils on the lower ridgetops. Also included are the well drained Hickory and Negley soils on side slopes. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is high. The surface layer typically is neutral because of past liming practices but is medium acid or strongly acid in areas that have not been limed. The subsoil is strongly acid or very strongly acid. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops and to dwellings and septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

15C2—Parke silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, firm silty clay loam; the next part is reddish brown, firm clay loam; and the lower part is yellowish red, friable clay loam and loam. In severely eroded areas the surface layer is silty clay loam. In some areas the subsoil contains more sand. In other areas it contains less sand. In some places the lower part of the subsoil is firm and brittle. In other places the soil is deeper to the redder loamy material.

Included with this soil in mapping are small areas of the moderately well drained, very slowly permeable Ava and somewhat poorly drained Bluford soils on the lower ridges. Also included are the well drained Hickory and Negley soils on side slopes. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is high. The surface layer commonly is neutral because of past liming practices. The subsoil is strongly acid. Organic matter content is low. The surface layer is friable and can be easily tilled when moist. It tends to crust and puddle, however, after hard rains, especially in areas where it has been mixed with part of the subsoil through cultivation. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used for pasture or hay or as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and is well suited to pasture and hay and to septic tank absorption fields. It is moderately suited to dwellings.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending footings below the subsoil or reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

15D2—Parke silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on narrow ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 190 acres in size.

Typically, the surface layer is dark yellowish brown silt loam. Erosion has reduced the thickness of this layer to about 7 inches. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, firm silty clay loam, and the lower part is strong brown, friable loam. In severely eroded areas the surface layer is silty clay loam. In places the lower part of the subsoil is firm and brittle.

Included with this soil in mapping are small areas of the moderately well drained, very slowly permeable Ava soils; the somewhat poorly drained Bluford soils; and the well drained Hickory and Negley soils. Ava and Bluford soils are on ridgetops. They generally are lower on the landscape than the Parke soil. Hickory and Negley soils are on side slopes below the Parke soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is low. The surface layer is friable and can be easily tilled when moist. It tends to crust and puddle, however, after hard rains. The shrink-swell potential is moderate.

Most areas are used for pasture or hay. This soil is well suited to pasture and hay. It is moderately suited to cultivated crops and to dwellings and septic tank absorption fields.

Measures that control erosion are needed in areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Suitable forage and hay crops grow well on this soil.

Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they sufficiently established.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Extending footings below the subsoil or reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the slope is a limitation. Installing the filter lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IVe.

48—Ebbert silt loam. This nearly level, poorly drained soil is in depressions on till plains. It is subject to brief periods of ponding from April through June. Individual areas are oval and range from 2 to 100 acres in size.

Typically, the surface layer is very dark gray, mottled silt loam about 10 inches thick. The subsurface layer is dark gray silt loam about 5 inches thick. The subsoil to a depth of 60 inches or more is gray, mottled, friable silty clay loam. In some areas the surface soil is thinner. In other areas the subsoil contains less clay. In places the lower part of the surface soil is darker.

Included with this soil in mapping are small areas of Cisne and Newberry soils near the edge of the depressions. Also included, on the lower parts of the landscape, are small areas of Shiloh soils, which have more clay than the Ebbert soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Ebbert soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface from April through July in most years. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding is a hazard. This hazard can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table.

The seasonal wetness and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIw.

50—Virden silty clay loam. This nearly level, poorly drained soil is on broad uplands. It is occasionally ponded for brief periods in winter and early spring. Individual areas are irregular in shape and range from 5 to 450 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray silty clay loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled and firm. The upper part is very dark gray silty clay, and the lower part is yellowish brown and grayish brown silty clay loam. In some areas the surface layer contains less clay. In other areas it is thinner and is lighter in color.

Included with this soil in mapping are small areas of the poorly drained Cowden, Ebbert, Piasa, and Shiloh soils. Cowden soils do not have a mollic epipedon. Ebbert soils have less clay in the subsoil than the Virden soil. Piasa soils have a high content of sodium in the subsoil. They are closely intermingled with areas of the Virden soil. Shiloh soils have a mollic epipedon that is more than 24 inches thick. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Virden soil at a moderately slow rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface from March through June. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

If drained, this soil can be used for corn, soybeans, and small grain. A drainage system has been installed in most areas. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction, and increase the rate of water infiltration.

If this soil is used for pasture or hay, the ponding is the main hazard. It can be controlled by subsurface drains and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and poor tilth. Proper stocking rates, pasture rotation, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. The hazard of ponding can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the moderately slow permeability.

The land capability classification is IIw.

112—Cowden silt loam. This nearly level, poorly drained soil is on broad uplands. Individual areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 5 inches thick. The subsoil is mottled, firm silty clay loam about 45 inches thick. The upper part is dark grayish brown, and the lower part is light olive gray and light gray. The underlying material to a depth of 60 inches is dark gray, mottled, friable silty clay loam. In some areas the depth to a seasonal high water table is more than 2 feet. In other areas the surface layer is darker and thicker.

Included with this soil in mapping are small areas of the poorly drained Chauncey and Piasa soils. Piasa soils have a high content of sodium in the subsoil. They are closely intermingled with areas of the Cowden soil. Chauncey soils have a mollic epipedon. Also included are the somewhat poorly drained Oconee soils on the slightly higher parts of the landscape. Included soils make up 3 to 12 percent of the unit.

Water and air move through the Cowden soil at a slow rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface from March through June. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of soybeans, corn, and small grain. Measures that maintain or improve the drainage system are needed. A combination of surface drains and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth. Winter wheat and hay are subject to frost heave in some years.

A cover of pasture plants or hay improves tilth. The wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing reduce the wetness. Applications of fertilizer, applications of lime in areas where the surface soil is medium acid to very strongly acid, weed control, pasture rotation, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons and mounds are alternative methods of waste disposal.

The land capability classification is IIw.

113A—Oconee silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad uplands. Individual areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil is mottled, friable silty clay loam about 33 inches thick. The upper part is brown and grayish brown, and the lower part is brown. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silty clay loam. In some places the depth to a seasonal high water table is less than 1 foot. In other areas the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Darmstadt and poorly drained Cowden and Shiloh soils. Atlas soils are on side slopes below the Oconee soil. Darmstadt soils have a high content of sodium in the subsoil. They are closely intermingled with areas of the Oconee soil. Cowden and Shiloh soils are in slight depressions below the Oconee soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Oconee soil at a slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface from March through June. Available water capacity is high. Organic matter content is moderate. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies in the surface soil as a result of local liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness delays planting in most years. It can be reduced, however, by surface or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal wetness and the high shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIw.

113B—Oconee silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on slight rises on broad uplands. Individual areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 5 inches thick. The subsoil is mottled silty clay loam about 35 inches thick. The upper part is brown and yellowish brown and is firm, and the lower part is grayish brown and friable. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silty clay loam. In some areas the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Darmstadt and poorly drained Cowden and Shiloh soils. Atlas soils are on side slopes below the Oconee soil. Cowden and Shiloh soils are in slight depressions below the Oconee soil. Darmstadt soils have a high content of sodium in the subsoil. They are closely intermingled with areas of the Oconee soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Oconee soil at a slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface from March through June. Available water capacity is high. Organic matter content is moderate. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies in the surface soil as a result of local liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The wetness delays planting, however, in most years. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal wetness and the high shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around footings helps to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

120—Huey silt loam. This nearly level, poorly drained soil is on broad till plains. Individual areas are irregular in shape and range from 2 to 120 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is grayish brown silt loam about 4 inches thick. The subsoil is about 42 inches of brown and light brownish gray, mottled, friable silty clay loam and clay loam. The underlying material to a depth of 60 inches is gray, mottled, friable loam. In some areas the surface layer is darker. In other areas the subsoil contains more clay. In places the soil is deeper to a layer having a high content of sodium.

Included with this soil in mapping are small, closely intermingled areas of the poorly drained Cisne and somewhat poorly drained Darmstadt and Hoyleton soils. Cisne and Hoyleton soils are dark and have a low content of sodium in the subsoil. Darmstadt soils are on slight rises above the Huey soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Huey soil at a very slow rate. Surface runoff is slow. A perched seasonal high water table is 0.5 foot above to 2.0 feet below the surface from March through June in most years. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential is moderate.

Most areas are used for cultivated crops. Some are used for hay or pasture or as sites for dwellings and septic tank absorption fields. This soil is poorly suited to cultivated crops and well suited to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

A drainage system is needed in the areas used for corn, soybeans, or small grain. Measures that improve tilth and fertility and that control soil blowing also are needed. A combination of surface ditches and land leveling reduces the wetness. The content of sodium in the subsoil restricts the availability and uptake of moisture and thus results in moisture stress during dry periods. Because of the sodium, the soil is wet for longer periods in spring than the adjacent soils that do not have concentrations of sodium. Adding soil amendments, such as gypsum, enables the sodium to be leached through the soil and thus improves moisture uptake. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and improve tilth and fertility. Applying lime in areas where the surface soil is medium acid or strongly acid improves fertility. Leaving crop residue on the surface and establishing field windbreaks help to control soil blowing.

A cover of pasture plants or hay improves tilth and helps to control soil blowing. The wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing reduce the wetness. Applications of fertilizer, applications of lime in areas where the surface soil is medium acid to very strongly acid, weed control, pasture rotation, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

The seasonal wetness is a limitation if this soil is used as a site for dwellings. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Also, excess sodium causes the soil to disperse when saturated. The dispersion reduces the absorption rate. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

The land capability classification is IVw.

127A—Harrison silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on slight rises on broad uplands. Individual areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil is about 41 inches thick. It is mottled and friable. The upper part is brown and yellowish brown silty clay loam, and the lower part is strong brown silt loam. The underlying material to a depth of more than 60 inches is yellowish red, friable loam and silt loam. In some areas the surface layer is thinner. In other areas the loess is thicker.

Included with this soil in mapping are small areas of the well drained Douglas and Parke soils. Douglas soils are on the upper part of the rises. Parke soils do not have a mollic epipedon and have less than 40 inches of loess in the upper part of the solum. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Harrison soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 3 to 6 feet below the surface from February through May. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is moderately well suited to dwellings and poorly suited to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the moderate shrink-swell potential are limitations. Installing subsurface drains around footings helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains help to lower the water table. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the moderate permeability.

The land capability classification is I.

128B—Douglas silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on side slopes and ridges in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown and strong brown, friable silty clay loam; and the lower part is reddish brown, friable clay loam. In some areas the surface layer is lighter in color.

Included with this soil in mapping are small areas of the moderately well drained Harrison and well drained Parke soils. Harrison soils are on the lower parts of ridges. Parke soils do not have a mollic epipedon and have less than 40 inches of loess in the upper part of the solum. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Douglas soil at a moderate rate. Surface runoff is medium. Available water capacity is high. The surface layer is neutral. Organic matter content is moderate. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops or for pasture or hay. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, to pasture and hay, and to septic tank absorption fields. It is moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard and tilth is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion. Incorporating crop residue into the soil or adding other organic material helps to prevent surface crusting and improves tilth. A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending footings below the subsoil or reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

134B—Camden silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on stream terraces. Individual areas are long and narrow or irregularly shaped and range from 2 to 90 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown, mottled, friable silty clay loam and silt loam. In some areas the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Hickory, moderately well drained Medway, and somewhat poorly drained Coffeen and Wakeland soils. Hickory soils are on side slopes above the Camden soil. Medway soils are on foot slopes. Coffeen and Wakeland soils are on flood plains below the Camden soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Camden soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4 to 6 feet below the surface from March through June. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, to pasture and hay, to dwellings with basements, and to septic tank absorption fields. It is moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Suitable forage and hay crops grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the moderate permeability.

The land capability classification is IIe.

138—Shiloh silty clay loam. This nearly level, very poorly drained soil is in shallow depressions on broad till plains. Individual areas are irregularly shaped or oval and range from 2 to 250 acres in size.

Typically, the surface layer is very dark gray and black silty clay loam about 7 inches thick. The subsoil to a depth of more than 60 inches is mottled, very firm silty clay loam. The upper part is black and very dark gray, and the lower part is gray. In some areas the control section contains less clay. In other areas the surface layer contains more clay.

Included with this soil in mapping are the poorly drained Cisne, Ebbert, and Newberry and somewhat poorly drained Oconee soils. Cisne and Newberry soils do not have a mollic epipedon. Ebbert soils have a mollic epipedon that is less than 24 inches thick. Oconee soils are on slight rises above the Shiloh soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Shiloh soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal water table is 1 foot above to 2 feet below the surface from March through June in most years. Available water capacity and organic matter content are high. The shrink-swell potential is high in the subsoil.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, ponding is a hazard and the shrink-swell potential is a limitation. The hazard of ponding can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons and mounds are alternative methods of waste disposal.

The land capability classification is IIw.

164A—Stoy silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad, slightly undulating divides in the uplands. Individual areas are irregular in shape and range from 2 to 120 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is light yellowish brown, mottled, friable silt loam about 5 inches thick. The subsoil is mottled silty clay loam about 41 inches thick. The upper part is yellowish brown and friable, and the lower part is brown and yellowish brown and is firm. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable loam. In some areas the subsoil is grayer. In other areas the surface layer is darker. In some places the subsoil contains more clay. In other places it is extremely acid.

Included with this soil in mapping are small areas of the moderately well drained Hosmer and well drained Hickory soils. Hickory soils are on side slopes below the Stoy soil. Hosmer soils are on the higher parts of ridges. Included soils make up less than 1 percent of the unit.

Water and air move through the Stoy soil at a slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is at a depth of 1 to 3 feet from February through April in most years. Available water capacity is high. Organic matter content is moderately low. Reaction is very strongly acid to medium acid in the subsoil and slightly acid to mildly alkaline in the surface layer. The shrink-swell potential is moderate in the subsoil. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to woodland. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness delays planting in most years. It can be reduced, however, by surface or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

The seasonal wetness is a limitation if this soil is used as a site for dwellings. The wetness is more severely limiting on sites for dwellings with basements than on sites for dwellings without basements. Installing subsurface drains around foundations helps to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIw.

214B—Hosmer silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is brownish yellow silt loam about 5 inches thick. The subsoil is about 44 inches thick. The upper part is yellowish brown, firm silt loam; the next part is yellowish brown and brown, mottled, firm silty clay loam; and the lower part is yellowish brown, mottled, firm, brittle silty clay loam and silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled loam. In some areas the subsoil contains more clay. In severely eroded areas the surface layer is silty clay loam. In places the lower part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Hickory soils on the steeper slopes. Also included are some areas of the somewhat poorly drained Stoy soils on broad ridges. Included soils make up 5 to 20 percent of the unit.

Water and air move through the upper part of the Hosmer soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is medium. A perched seasonal high water table is at a depth of 1.5 to 3.0 feet in March and April during most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops or for pasture. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops and to pasture. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Examples are a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. The wetness is more severely limiting on sites for dwellings with basements than on sites for dwellings without basements. Installing subsurface drains around foundations helps to lower the water table. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

218—Newberry silt loam. This nearly level, poorly drained soil is on broad plains and in wide, shallow depressions in the uplands. Individual areas are irregular in shape and range from 2 to 500 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is dark gray, mottled silt loam about 5 inches thick. The subsoil is mottled, firm silty clay loam about 42 inches thick. The upper part is grayish brown, the next part is gray, and the lower part is light brownish gray. The underlying material to a depth of 60 inches is strong brown, mottled silty clay loam. In some areas the dark surface layer is more than 10 inches thick. In other areas the subsoil contains more clay. In places the surface soil is dark throughout.

Included with this soil in mapping are small areas of the poorly drained Cisne, Ebbert, and Shiloh soils. Cisne soils are characterized by an abrupt textural change in the subsoil. Ebbert and Shiloh soils have a mollic epipedon. They are in the lower parts of the depressions. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Newberry soil at a slow rate. Surface runoff is slow. A seasonal high water table is within a depth of 2 feet from March through June in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, ponding is a hazard. This hazard can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIw.

287—Chauncey silt loam. This nearly level, poorly drained soil is on concave foot slopes and in broad drainageways on uplands. Individual areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 15 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled silt loam about 14 inches thick. The subsoil to a depth of more than 60 inches is mottled silty clay loam. The upper part is grayish brown and very firm, and the lower part is light brownish gray and firm. In some areas the surface soil is less than 24 inches thick. In other areas the subsoil contains less clay. In places the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are the poorly drained Cisne, Cowden, and Newberry and somewhat poorly drained Hoyleton and Oconee soils. Cisne and Newberry soils are in landscape positions similar to those of the Chauncey soil. They do not have a mollic epipedon. Hoyleton and Oconee soils are on slight rises above the Chauncey soil. Included soils make up about 5 to 10 percent of the unit.

Water and air move through the Chauncey soil at a slow rate. Surface runoff is slow. A perched seasonal high water table is within a depth of 2 feet from February through June in most years. Available water capacity is high. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of soybeans, corn, and small grain. Measures that maintain or improve the drainage system are needed. A combination of surface drains and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth. Winter wheat and hay are subject to frost heave in some years.

The seasonal wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons and mounds are alternative methods of waste disposal.

The land capability classification is IIw.

430A—Raddle silt loam, 0 to 3 percent slopes. This nearly level, well drained soil is on low rises on flood plains. It is subject to rare flooding. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 14 inches thick. The subsoil to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the surface layer is thicker.

Included with this soil in mapping are small areas of the well drained Huntsville soils. These soils are in landscape positions similar to those of the Raddle soil. They have a mollic epipedon that is more than 24 inches thick. Also included are the somewhat poorly drained Tice and Wakeland soils in the lower landscape positions. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Raddle soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. Some are used for pasture or hay. This soil is well suited to cultivated crops and to pasture and hay. It is generally unsuited to septic tank absorption fields and dwellings because of the flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is I.

474—Piasa silt loam. This nearly level, poorly drained soil is on broad flats on till plains. Individual areas are irregular in shape and range from 2 to 90 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is grayish brown silt loam about 5 inches thick. The subsoil is silty clay loam about 43 inches thick. The upper part is dark grayish brown and very firm; the next part is grayish brown, mottled, and very firm; and the lower part is olive gray and light gray, mottled, and very firm and firm. The underlying material to a depth of 60 inches is gray clay loam. In some areas the soil does not have a subsurface layer. In other areas the surface layer is lighter in color.

Included with this soil in mapping are small, closely intermingled areas of Cowden soils. Also included are some areas of Ebbert soils in depressions that are subject to ponding and small areas of the somewhat poorly drained Oconee soils on the higher parts of the till plains. The included soils have a low content of sodium in the subsoil. They make up 10 to 20 percent of the unit.

Water and air move through the Piasa soil at a very slow rate. Surface runoff is slow. A perched seasonal high water table is within a depth of 2 feet from February through May in most years. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is high in the subsoil.

Most areas are used for cultivated crops. Some are used for hay or pasture. This soil is moderately suited to cultivated crops and well suited to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed in some areas. Drainage can be improved by diversions and surface drains. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Minimizing tillage and returning crop residue to the soil increase the infiltration rate and help to maintain good tilth.

If this soil is used for pasture or hay, ponding is a hazard. It can be controlled by surface drains, ditches, and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, ponding is a hazard and the shrink-swell potential is a limitation. The hazard of ponding can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIIw.

585F—Negley loam, 15 to 30 percent slopes. This steep, well drained soil is on the sides of mounds in the uplands. Individual areas are long and narrow or irregularly shaped and range from 5 to 150 acres in size.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsurface layer is yellowish brown, friable sandy loam about 6 inches thick. The subsoil to a depth of 60 inches or more is friable sandy clay loam. The upper part is strong brown, and the lower part is yellowish red. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of the well drained Hickory and Parke soils. Hickory soils are in landscape positions similar to those of the Negley soil. They have less sand and gravel in the subsoil than the Negley soil. Parke soils are higher on the landscape than the Negley soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Negley soil at a moderately rapid rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low.

Most areas are used as woodland. Some are used as pasture. This soil is very well suited to woodland and is poorly suited to pasture. It is generally unsuited to dwellings and septic tank absorption field because of the slope.

Erosion control is needed when grasses and legumes are becoming established in the pastured areas. In areas where the pasture is established, seeding legumes on the contour improves the quality of the forage and helps to control erosion. A permanent cover of pasture plants helps to control erosion and maintain tilth. Operating machinery is difficult on the steeper slopes. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as woodland, the hazard of erosion and an equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical and mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grasses or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIe.

585G—Negley loam, 30 to 60 percent slopes. This very steep, well drained soil is on the crest and sides of mounds in the uplands. Individual areas are long and narrow or irregularly shaped and range from 5 to 250 acres in size.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsurface layer is yellowish brown loam about 6 inches thick. The subsoil to a depth of more than 60 inches is firm sandy clay loam. The upper part is strong brown and yellowish red, the next part is red, and the lower part is yellowish red. In some areas the upper part of the subsoil contains less sand and gravel. In other areas the subsoil is less than 50 inches thick.

Included with this soil in mapping are small areas of the well drained Hickory and Parke soils. Hickory soils are in landscape positions similar to those of the Negley soil. They have less sand and gravel in the subsoil than the Negley soil. Parke soils are higher on the landscape than the Negley soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Negley soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is low.

Most areas are used as woodland. This soil is well suited to woodland and to habitat for woodland wildlife. It is poorly suited to pasture and hay and is generally unsuited to cultivated crops and to dwellings and septic tank absorption fields because of the slope.

If this soil is used as pasture, erosion is the major hazard. Also, large machinery generally cannot cross the short, very steep slopes. Therefore, the only method of seeding, applying fertilizer, and spraying is by airplane or by hand. Some kind of ground cover is essential to control erosion. Proper stocking rates, timely deferment of grazing, applications of fertilizer, and pasture rotation help to keep the pasture in good condition and control erosion.

If this soil is used as woodland, the hazard of erosion and an equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grasses or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIIe.

620A—Darmstadt silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on flats and low ridges in the uplands. Individual areas are irregular in shape and range from 2 to 500 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsurface layer is grayish brown silt loam about 6 inches thick. The subsoil is mottled silty clay loam about 31 inches thick. The upper part is pale brown and friable, and the lower part is light brownish gray and firm. The underlying material to a depth of 60 inches is light brownish gray, mottled clay loam. In some areas the subsoil has more clay. In other areas sodium is closer to the surface.

Included with this soil in mapping are small areas of the poorly drained Cisne and Huey soils on the lower flats. Cisne soils have a low content of sodium in the subsoil. Also included are the somewhat poorly drained Hoyleton and Oconee soils, which are closely intermingled with areas of the Darmstadt soil. These soils have a surface layer that is darker than that of the Darmstadt soil and have a low content of sodium in the subsoil. Included soils make up 4 to 15 percent of the unit.

Water and air move through the Darmstadt soil at a very slow rate. Surface runoff is slow. A perched seasonal high water table is 1 to 3 feet below the surface from March through June in most years. Available water capacity is moderate. The subsoil has a high content of sodium. Organic matter content is low. The shrink-swell potential is moderate in the subsoil.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness delays planting in most years. It can be reduced, however, by surface or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

A cover of pasture plants or hay improves tilth. The wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing reduce the wetness. Applications of fertilizer, applications of lime in areas where the surface soil is medium acid to very strongly acid, weed control, pasture rotation, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

The seasonal wetness is a limitation if this soil is used as a site for dwellings. Installing subsurface drains around footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function well on this soil.

The land capability classification is IIIw.

620B—Darmstadt silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on the side slopes of low ridges and at the head of drainageways. Individual areas are irregular in shape and range from 2 to 90 acres in size.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is brown, the next part is light brownish gray, and the lower part is grayish brown. The underlying material to a depth of 60 inches is brown clay loam. In some areas the surface layer is silty clay loam. In other areas the lower part of the subsoil and the underlying material are silty clay loam or silt loam. In places sodium is closer to the surface.

Included with this soil in mapping are small areas of the poorly drained Cisne and Huey soils on low flats. Cisne soils have a low content of sodium in the subsoil. Also included are the somewhat poorly drained Hoyleton and Oconee soils, which are closely intermingled with areas of the Darmstadt soil. These soils have a surface layer that is darker colored than that of the Darmstadt soil and have a low content of sodium in the subsoil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Darmstadt soil at a very slow rate. Surface runoff is medium. A perched seasonal high water table is 1 to 3 feet below the surface from March through June in most years. Available water capacity is moderate. The subsoil has a high content of sodium. Organic matter content is low. The shrink-swell potential is moderate in the subsoil.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to pasture, dwellings, and septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The wetness delays planting, however, in most years. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal wetness is a limitation. Installing subsurface drains around footings helps to lower the water table.

The seasonal wetness and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIIe.

865—Pits, gravel. This map unit consists of excavations from which gravel and some sand have been removed. It is generally on stream terraces or on oval or oblong ridges of glacial drift. The ridges are prominently higher than the adjacent areas on the loess-covered till plains. The excavated material is used mainly for roadfill, for concrete or asphalt, or for other construction purposes. Individual areas commonly are oval and range from 5 to 80 acres in size.

Included with this unit in mapping are some disturbed areas where sand and gravel have been piled. These areas are adjacent to the pits.

The excavations are commonly 10 to 40 feet deep. A few areas are filled with water. The surrounding soil material generally has been scraped or mixed with sand and gravel during mining activities. It is mainly low in fertility and organic matter content. Available water capacity varies. The movement of water and air through the soil material varies because the material is diverse and has been compacted to varying degrees by heavy equipment.

Abandoned pits are commonly used as wildlife habitat or recreational areas. Some of the pits that are filled with water have been stocked with fish. Woody and herbaceous plants have grown in disturbed areas around the pits. In some areas the pits themselves support woody vegetation. The vegetated areas provide good habitat for upland wildlife. If the pits are to be used for most other purposes, intensive reclamation that includes filling or grading is needed. Onsite investigation is needed to plan the development for a specific use.

This map unit is not assigned to a land capability classification.

1426—Karnak silty clay loam, wet. This nearly level, poorly drained soil is generally on the lowest parts of flood plains. It is frequently flooded for long periods. Individual areas generally are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 9 inches thick. The subsoil to a depth of more than 60 inches is mottled, firm silty clay. The upper part is dark grayish brown and light brownish gray, and the lower part is light brownish gray. In some areas the subsoil contains less clay in the lower part. In other areas it is strongly acid.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and Petrolia soils. These soils have less clay throughout than the Karnak soil. They make up 2 to 5 percent of the unit.

Water and air move through the Karnak soil at a very slow rate. Surface runoff is very slow in cultivated areas. A seasonal high water table is 3 feet above to 1 foot below the surface from January through December in most years. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. Some support native hardwoods. This soil is poorly suited to cultivated crops and to hay and pasture and is well suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding, the seasonal wetness, and the very slow permeability.

In the areas used for soybeans, corn, or small grain, a drainage system is needed. One has been installed in most areas. In some areas, however, a combination of surface or subsurface drains and drainage outlets is needed. The wetness or the flooding delays planting in some years. The flooding, however, generally does not occur during the growing season. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Including grasses and legumes in the cropping sequence helps to maintain tilth. Harvesting or grazing during wet periods and overgrazing reduce forage yields and cause surface compaction and poor tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer, and restricted use during wet periods help to keep the pasture in good condition.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a management concern. It retards the growth of desirable seedlings. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the hazard of windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IVw.

3070—Beaucoup silty clay loam, frequently flooded. This nearly level, poorly drained soil is in slight depressions on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 2 to 1,200 acres in size.

Typically, the surface layer is very dark grayish brown and dark gray, mottled silty clay loam about 16 inches thick. The subsoil to a depth of more than 60 inches is firm silty clay loam. It is dark grayish brown in the upper part and dark gray in the lower part. In some areas the surface soil is thicker. In other areas the subsoil contains more clay. In some places the soil is stratified and does not have a subsoil. In other places, the surface soil is lighter colored and a dark buried soil is at a depth of 20 to 50 inches. In some areas the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the poorly drained Birds and Titus and somewhat poorly drained Lawson, Tice, and Wakeland soils. Birds and Wakeland soils do not have a mollic epipedon. Lawson, Tice, and Wakeland soils are on the higher parts of the flood plains. Titus soils contain more clay in the subsoil than the Beaucoup soil. They are on the lower parts of the landscape. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Beaucoup soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal high water table is 0.5 foot above to 1.0 feet below the surface from March through June. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used for pasture or hay. This soil is moderately suited to cultivated crops and to pasture and hay and is well suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. Dikes or diversions can reduce the extent of the crop damage caused by floodwater in some years. Selecting crop varieties that are adapted to a relatively short growing season and wet conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in some years.

If this soil is used as woodland, the seasonal high water table limits the use of equipment and seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature nursery stock on ridges reduces the seedling mortality rate. Some replanting may be necessary. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3077A—Huntsville silt loam, 0 to 3 percent slopes, frequently flooded. This nearly level, well drained soil is on natural levees along flood plains. It is occasionally flooded for brief periods from April through June. Individual areas are irregular in shape and range from 5 to 450 acres in size.

Typically, the surface soil is very dark grayish brown and dark brown silt loam about 26 inches thick. It is mottled in the lower part. The underlying material to a depth of 60 inches is brown, mottled silt loam. It is stratified in the lower part. In some areas the surface soil is less than 24 inches thick. In other areas it is lighter in color. In some places the underlying material contains more sand. In other places the surface layer is very fine sandy loam to fine sand. In some areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and somewhat poorly drained Lawson and Tice soils. These soils are lower on the flood plains than the Huntsville soil. They make up 5 to 10 percent of the unit.

Water and air move through the Huntsville soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 4 to 6 feet from March through June in most years. Available water capacity is very high. Organic matter content is moderate.

Most areas are used for soybeans, corn, small grain, pasture, or hay. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

In the areas used as cropland, the flooding is a hazard, but it occurs during the growing season less often than once in 2 years. Erosion or scouring by floodwater is a hazard if the soil is cultivated. As a result, the soil should not be cultivated in the fall and strips of grass are needed in critical areas. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

If this soil is used as pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in some years.

The land capability classification is IIw.

3107—Sawmill silty clay loam, frequently flooded. This nearly level, poorly drained soil is in the lower areas on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 10 to 150 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, mottled, firm silty clay loam about 20 inches thick. The subsoil is mottled, firm silty clay loam about 31 inches thick. The upper part is very dark gray, and the lower part is gray. The underlying material to a depth of 60 inches is light brownish gray, mottled, firm silty clay loam. In some areas the surface soil and subsoil contain more clay. In other areas the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Tice soils. These soils are on ridges. They make up 2 to 8 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. A seasonal high water table is within a depth of 2 feet during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn or soybeans, the seasonal high water table can delay planting. The flooding is a hazard, but it does not occur during the growing season in most years. Surface ditches help to remove excess water. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and fertility and increase the rate of water infiltration.

The land capability classification is IIIw.

3225—Holton silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is in the lower areas on flood plains. It is frequently flooded for brief periods in winter and spring. Individual areas commonly are long and narrow and range from 10 to 200 acres in size.

Typically, the surface layer is brown silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled and friable. The upper part is dark grayish brown silt loam, and the lower part is grayish brown loam. The underlying material to a depth of 60 inches or more is grayish brown and brown, mottled, friable loam. In some places the subsoil has less sand. In other places a dark buried soil is below a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Birds and Sawmill soils. These soils are lower on the landscape than the Holton soil. They make up 5 to 10 percent of the unit.

Water and air move through the Holton soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is low.

Most areas are used for cultivated crops. Some are used as pasture. This soil is moderately suited to cultivated crops and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. The flooding is a hazard, but it does not occur during the growing season in most years. The wetness or the flooding can delay planting. The wetness can be reduced by surface ditches or subsurface drains. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

If this soil is used as pasture, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. Bromegrass, tall fescue, and alfalfa are suitable for planting. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

3226—Wirt silt loam, frequently flooded. This nearly level, well drained soil is in the higher areas on flood plains. It is frequently flooded for brief periods in spring and winter. Individual areas are irregularly shaped and range from 5 to 200 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is friable loam about 33 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. The underlying material to a depth of 60 inches or more is dark brown and dark yellowish brown, friable loam. In some areas the surface layer is darker. In other areas a dark buried soil is within a depth of 60 inches.

Included with this soil in mapping are small areas of recently deposited sandy overwash near stream channels. These areas make up 2 to 8 percent of the unit.

Water and air move through the Wirt soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. Organic matter content is low. The shrink-swell potential also is low, and the potential for frost action is moderate.

Most areas are used for cultivated crops. Some are used as pasture. This soil is very well suited to woodland. It is well suited to cultivated crops and moderately suited to pasture. Because of the flooding, it is generally unsuited to dwellings and septic tank absorption fields.

In the areas used as cropland, the flooding is a hazard, but it does not occur during the growing season in most years. Erosion or scouring by floodwater is a hazard if the soil is cultivated. As a result, the soil should not be cultivated in the fall and strips of grass are needed in critical areas. Minimizing tillage and returning crop residue to the soil help to maintain tilth and increase the rate of water infiltration.

If this soil is used as pasture, the flooding is a hazard. Overgrazing causes surface compaction and poor tilth. Bromegrass, tall fescue, and alfalfa are suitable for planting. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

3284—Tice silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on broad flood plains. It is frequently flooded for brief periods from January through June. Individual areas are irregular in shape and range from 5 to 250 acres in size.

Typically, the surface layer is very dark grayish brown, firm silt loam about 8 inches thick. The subsurface layer is dark grayish brown and very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil to a depth of more than 60 inches is mottled, friable silty clay loam. The upper part is dark grayish brown, and the lower part is dark brown. In some areas the surface layer is lighter in color. In other areas the soil contains less clay throughout. In places the dark surface soil is more than 24 inches thick.

Included with this soil in mapping are small areas of the well drained Huntsville soils on natural levees and small areas of the somewhat poorly drained Lawson soils. Lawson soils have a mollic epipedon that is more than 24 inches thick. Also included are small areas of the poorly drained Beaucoup and Titus soils in shallow depressions. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet from March through June in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. Some are used as woodland. This soil is well suited to cultivated crops and to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

In the areas used for soybeans, corn, or small grain, the wetness or the flooding delays planting in most years. The crops are occasionally damaged by flooding. The wetness can be reduced by surface or subsurface drains. Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Including grasses and legumes in the cropping sequence helps to maintain tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer, and restricted use during wet periods help to keep the pasture in good condition.

In the areas used as woodland, the seasonal high water table limits the use of equipment and seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature nursery stock on ridges reduces the seedling mortality rate. Some replanting may be necessary. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3288—Petrolia silty clay loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief or long periods and in the lower areas is ponded for brief periods from March through June. Individual areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The underlying material to a depth of about 60 inches is mottled silty clay loam. It is gray in the upper part and grayish brown in the lower part. In some areas the underlying material contains more clay in the lower part. In other areas it is strongly acid. In places the soil is silt loam throughout.

Included with this soil in mapping are small areas of the poorly drained Birds and somewhat poorly drained Wakeland soils. Birds soils are in landscape positions similar to those of the Petrolia soil. They have less clay in the control section than the Petrolia soil. Wakeland soils are on the slightly higher parts of the landscape. Also included are the poorly drained Karnak and Titus soils in slight depressions. These soils have more clay in the control section than the Petrolia soil. Included soils make up 8 to 10 percent of the unit.

Water and air move through the Petrolia soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal high water table is 0.5 foot above to 3.0 feet below the surface from April through June. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is moderate in the underlying material.

Most areas are cultivated. This soil is well suited to cultivated crops and is moderately well suited to pasture, hay, and woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

This soil can be sufficiently drained by artificial means for the production of soybeans and corn. Measures that maintain or improve the drainage system, such as surface or subsurface drains, are needed. The flooding is a hazard, but it occurs only occasionally during the growing season. Soil blowing also is a hazard. It can be controlled by leaving crop residue on the surface and by establishing windbreaks. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.

Including grasses and legumes in the cropping sequence helps to maintain tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer, and restricted use during wet periods help to keep the pasture in good condition.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a management concern. It retards the growth of desirable seedlings. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the hazard of windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3333—Wakeland silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 10 to 2,500 acres in size.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The underlying material to a depth of more than 60 inches is stratified brown, dark brown, and light brownish gray silt loam. In some areas the underlying material has a higher content of sand. In other areas the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the well drained Raddle and Camden and somewhat poorly drained Lawson and Coffeen soils. Coffeen, Lawson, and Raddle soils have a mollic epipedon. Camden soils are on stream terraces above the Wakeland soil. Also included are small areas of the poorly drained Birds, Beaucoup, and Petrolia soils on the slightly lower parts of the flood plains and areas along natural levees where the soil is fine sandy loam to a depth of 40 inches or more. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Wakeland soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface from March through June. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to pasture, hay, and cultivated crops. It is moderately suited to habitat for openland wildlife and well suited to habitat for woodland wildlife. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. Dikes or diversions can reduce the extent of the crop damage caused by floodwater in some years. Selecting crop varieties that are adapted to a relatively short growing season and wet conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

A cover of grasses improves tilth and helps to control erosion and scouring by floodwater. Selection of suitable species for planting, proper stocking rates, applications of fertilizer, and restricted use during wet periods help to keep the pasture in good condition.

The grain and seed crops, grasses, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIw.

3334—Birds silt loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are long and narrow or circular and range from 10 to 1,200 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The underlying material to a depth of about 60 inches is gray, mottled silt loam and silty clay loam. In some areas the underlying material contains more clay in the lower part. In other areas it is strongly acid. In places the soil is silt loam throughout.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and Petrolia and somewhat poorly drained Wakeland soils. Beaucoup soils have a mollic epipedon. Petrolia soils have more clay in the subsoil than the Birds soil. Wakeland soils are on the slightly higher parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Birds soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal high water table is 0.5 foot above to 1.0 foot below the surface from March through June. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is low in the underlying material.

Most areas are cultivated. Some are used as woodland. This soil is well suited to cultivated crops and to woodland and is moderately suited to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

This soil can be sufficiently drained by artificial means for the production of soybeans and corn. Measures that maintain or improve the drainage system, such as surface or subsurface drains, are needed. The flooding is a hazard, but it occurs only occasionally during the growing season. Soil blowing also is a hazard. It can be controlled by leaving crop residue on the surface and by establishing windbreaks. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.

Including grasses and legumes in the cropping sequence helps to maintain tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer, and restricted use during wet periods help to keep the pasture in good condition.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a management concern. It retards the growth of desirable seedlings. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the hazard of windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3404—Titus silty clay loam, frequently flooded. This nearly level, poorly drained soil is in shallow depressions on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 5 to 1,300 acres in size.

Typically, the surface layer is very dark grayish brown silty clay loam about 10 inches thick. The subsoil to a depth of 60 inches or more is dark gray, mottled silty clay. In some areas the surface layer is thicker.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and Petrolia soils on nearly level flood plains. Also included are some areas of the somewhat poorly drained Tice soils on slight rises on the flood plains. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Titus soil at a slow rate. Surface runoff is slow. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface from March through June. Available water capacity is moderate. Organic matter content also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to woodland. Because of the flooding and the ponding, it is unsuited to dwellings. Because of the flooding, the ponding, and the slow permeability, it is unsuited to septic tank absorption fields.

This soil can be sufficiently drained by artificial means for the production of corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed in some areas. After periods of heavy rainfall, water often remains standing in depressions for extended periods. This water can delay planting or otherwise hamper crop production. Drainage can be improved by diversions and surface drains. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Minimizing tillage and returning crop residue to the soil increase the infiltration rate and help to maintain good tilth.

If this soil is used as woodland, the seasonal high water table limits the use of equipment and seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature nursery stock on ridges reduces the seedling mortality rate. Some replanting may be necessary. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IVw.

3428—Coffeen silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 5 to 250 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 12 inches thick. The subsoil to a depth of 60 inches or more is grayish brown and brown, mottled, friable silt loam. In some areas the surface layer is thicker. In other areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the well drained Camden and moderately well drained Medway soils. Camden soils are on stream terraces above the Coffeen soil. Medway soils are on foot slopes. Also included are the somewhat poorly drained Lawson and Wakeland soils in landscape positions similar to those of the Coffeen soil. Wakeland soils do not have a mollic epipedon. Lawson soils have a mollic epipedon that is more than 24 inches thick. Included soils make up 3 to 15 percent of the unit.

Water and air move through the Coffeen soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface from March through June. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to woodland wildlife habitat and is moderately suited to openland wildlife habitat. Because of the flooding, it is generally unsuited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the wetness or the flooding delays planting in most years. The crops are occasionally damaged by floodwater. The wetness can be reduced by surface or subsurface drains. Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

In areas used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversion help to control flooding, and subsurface tile drains help to lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in some years.

Trees and shrubs can be easily established on this soil. The existing stands of trees provide good habitat for woodland wildlife. Protecting the habitat from fire and grazing helps to prevent depletion of the shrubs and sprouts that provide food for the wildlife.

The land capability classification is IIw.

3451—Lawson silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on low ridges on flood plains. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface soil is very dark grayish brown silt loam about 28 inches thick. The underlying material to a depth of 60 inches is dark grayish brown and dark gray, mottled, friable silt loam. In some areas the surface layer is lighter in color. In other areas it is thinner. In a few areas the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Beaucoup soils in shallow depressions. Also included are areas of the well drained Huntsville soils on slight rises above the Lawson soil and the somewhat poorly drained Tice and Wakeland soils in landscape positions similar to those of the Lawson soil. Tice soils have a mollic epipedon that is less than 24 inches thick. Wakeland soils do not have a mollic epipedon. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Lawson soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1 to 3 feet from November through May in most years. Available water capacity is very high. Organic matter content is high. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is moderate in the underlying material.

Most areas are used for cultivated crops. Some small areas are used for hay, pasture, or woodland. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Selecting crop varieties that are adapted to a relatively short growing season and wet conditions also reduces the extent of this damage. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used as pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in some years.

The land capability classification is IIIw.

8682B—Medway loam, 0 to 3 percent slopes, occasionally flooded. This nearly level, moderately well drained soil is on foot slopes. It is occasionally flooded for brief periods from March through June.

Individual areas are irregular in shape and range from 2 to 30 acres in size.

Typically, the surface layer is very dark grayish brown loam about 18 inches thick. The subsoil is brown, mottled loam about 30 inches thick. The underlying material to a depth of 60 inches also is brown, mottled loam. In some areas the surface soil is more than 24 inches thick.

Included with this soil in mapping are small areas of the well drained Camden and Hickory and somewhat poorly drained Coffeen and Wakeland soils. Camden soils are in landscape positions similar to those of the Medway soil. They do not have a mollic epipedon. Coffeen and Wakeland soils are on flood plains below the Medway soil. Hickory soils are on side slopes above the Medway soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Medway soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface from January through April. Available water capacity is high. Organic matter content also is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. Because of the flooding, it is generally unsuited to dwellings and septic tank absorption fields.

In the areas used for soybeans, corn, or small grain, the flooding delays planting in some years. The crops are occasionally damaged by flooding. Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

If this soil is used as pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in most years.

The land capability classification is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

In Fayette County, 309,378 acres, or more than 65 percent of the total acreage, meets the requirements for prime farmland. The prime farmland is throughout the county. A total of 249,152 acres of the prime farmland is used for crops, mainly corn, soybeans, and winter wheat. The crops grown on this land account for most of the local agricultural income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Doyce Sheraden, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

About 272,000 acres in Fayette County is cropland, and 46,000 acres is hayland or pasture. The primary crops are corn and soybeans. Because it has drought-tolerant qualities, grain sorghum is being grown on an increasing acreage. Wheat is the main close-growing crop.

The soils in the county have good potential for increased production of crops, particularly corn and soybeans. This soil survey can be used as a valuable guide to the latest management techniques that increase crop production.

Water erosion is a major concern on many of the soils in the county. In the areas of cropland where erosion exceeds soil loss tolerance limits, the average annual loss is 5 tons per acre per year. On approximately 140,000 acres in the county, erosion exceeds the tolerance limits. Soils that have a slope of 2 percent or more are susceptible to excessive erosion. Soils that have a slope of less than 2 percent also are susceptible if runoff is concentrated.

Sheet erosion, or loss of the surface layer, is damaging for three reasons. First, the productivity of most soils is reduced if the surface layer is eroded away and the subsoil is incorporated into the plow layer. Second, erosion causes deterioration of tilth and reduces the rate of water intake. It is especially damaging on soils that have a clayey or unfavorable subsoil or have a root-restricting layer near the surface. Cisne, Ebbert, and Hoyleton are examples of soils that have a clayey subsoil. These soils tends to be cloddy if they are worked when too wet and tend to crust after a hard rain. As a result, preparing a good seedbed is difficult. Darmstadt, Huey, and Piasa soils have an unfavorable subsoil because of a high content of exchangeable sodium. Ava and Hosmer soils have a firm, brittle subsoil that cannot be easily penetrated by roots. Third, erosion causes the sedimentation of drainage ditches, road ditches, streams, and lakes. Removing the sediments is very expensive. Management that controls erosion also helps to prevent pollution by sediments and improves water quality for municipal and recreational uses and for fish and wildlife.

Conservation practices provide a protective plant cover, increase the rate of water infiltration, reduce the runoff rate, and help to control erosion. Many conservation practices are suitable on the cropland in Fayette County. In many areas a combination of practices is needed to control erosion.

A conservation cropping system that keeps a plant cover on the surface in winter and early spring can hold soil loss to a minimum amount. Conservation cropping is a combination of a cropping sequence and the needed cultural and management measures. A protective cover of grasses and legumes reduces the runoff rate, helps to control erosion, and provides nitrogen and improves tilth for the following crop. Grasses and legumes included in the cropping sequence can provide feed for livestock or be sold for cash.

Terraces are most effective in controlling erosion in areas where slopes are smooth and uniform. They help to control erosion by intercepting surface runoff and conducting it to a stable outlet at a nonerosive velocity. The several different types of terraces consist of a series of embankments or of ridges and channels that are properly spaced and have a proper grade. Outlets may be grassed waterways or tile outlets. Atlas, Hickory, and other soils in areas where the topography is irregular and slopes commonly are short and steep cannot be easily terraced. Conversion to other uses, such as pasture, hay, or woodland, is needed to control erosion on these soils.

Grassed waterways in drainageways safely dispose of surface runoff. They help to prevent gully erosion and provide outlets for terraces. Other conservation practices are contour farming, contour stripcropping, water diversions, and conservation tillage. Commonly used in combination with terraces, contour farming is planting and tilling on the contour of the land. It is most effective in areas where the slope is 7 percent or less. Contour stripcropping is a systematic arrangement of crops on the contour. Strips of grass, hay, or small grain crops are alternated with strips of corn or soybeans. A water diversion consists of a channel constructed across the slope to divert excess water for use or safe disposal in another area. A system of conservation tillage that leaves crop residue on the surface throughout the year, such as minimum tillage and chisel planting, can significantly reduce the extent of erosion on many of the soils in the county. It helps to control erosion, maintains or promotes good soil structure, helps to prevent compaction, and improves aeration, infiltration, and tilth. Minimum tillage is most effective on moderately well drained and well drained soils. Till-plant or ridge-plant systems are more effective on somewhat poorly drained soils.

Soil blowing is a hazard during part of the winter and early in spring. The hazard can be reduced by maintaining a plant cover, leaving crop residue on the surface, or using tillage methods that leave the surface rough. Windbreaks of suitable trees or shrubs also are effective in controlling soil blowing.

Further information about measures that control erosion and soil blowing is available at the office of the Fayette County Soil and Water Conservation District.

A drainage system is needed on much of the farmland in Fayette County. In areas of poorly drained or somewhat poorly drained soils, wetness can reduce the productivity of cropland and delay planting in most years. These soils include Beaucoup, Coffeen, Lawson, and Wakeland soils on bottom land and Bluford, Cisne, Cowden, Hoyleton, Oconee, and Wynoose soils on uplands. A drainage system has been installed in most areas of these soils.

The design of drainage systems differs from soil to soil. Surface drains are needed in some areas. Measures that control flooding are needed in areas that are subject to damaging overflow during the growing season. Standard tile lines do not function well in the claypan soils on uplands in the county. Surface ditches are needed on these soils. Systems of random tile lines and surface inlets have been used successfully in areas of soils on the bottom land along the Kaskaskia River, such as the poorly drained Beaucoup soils. In some areas land leveling is needed to smooth out depressions.

The content of organic matter generally is low in soils that have a high content of sodium in the subsoil. Excessive amounts of sodium in Darmstadt, Huey, and Piasa soils restrict the availability and uptake of moisture. Additions of soil amendments, such as gypsum, allow the sodium to be leached through the soils and thus improve the availability and uptake of moisture. Returning crop residue to the soils and regularly adding other organic material, such as manure, improve fertility.

The content of organic matter generally is high in Cisne, Cowden, Ebbert, and other soils that have a dark surface layer. These soils formed under prairie grasses.

They have a deep root zone and a high or very high available water capacity. Plants on these soils respond well to applications of fertilizer and lime.

The content of organic matter generally is moderate in Ava, Bluford, Wynoose, and other soils that formed under forest vegetation and have a light colored surface layer. Reaction in these soils ranges from extremely acid to strongly acid. Applications of limestone are needed to raise the pH level. The supply of available nitrogen, phosphorus, and potassium is low in some of these soils.

Additions of lime, nitrogen, phosphorus, potassium, or other elements needed for optimum yields should be based on the results of soil tests. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth is an important factor influencing the germination of seeds, runoff, and the intake of water into the soil. Soils with good tilth generally are granular and porous and have a surface layer of silt loam in which the content of organic matter is high. Cisne, Cowden, Hoyleton, and Lawson soils are examples.

Tilth is poor in soils that have a low content of organic matter or a high content of sodium and have weak structure in the surface layer. Examples are Bluford and Darmstadt soils. After periods of heavy rainfall, a crust forms unless the surface of these soils is protected by a plant cover. The crust is hard when dry. As a result, the rate of water infiltration is decreased and runoff and erosion are excessive. Returning crop residue to the soils and adding other organic material improve tilth.

Tilling or grazing when the soil is too wet results in deterioration of tilth, increases the extent of surface compaction, and decreases the rate of water infiltration. Minimizing tillage, returning crop residue to the soil, and deferring grazing during wet periods help to maintain good tilth. Erosion also causes poor tilth. The plow layer becomes more clayey as it is mixed with part of the subsoil in Atlas and other eroded soils. As a result, the rate of water infiltration is decreased and the runoff rate and the susceptibility to erosion are increased. These soils are sticky when wet and hard and cloddy when dry. A conservation cropping system that is dominated by hay and pasture improves tilth in these soils.

The need for an adequate amount of soil moisture during dry periods is a management concern in soils that have an unfavorable or root-restricting subsoil. These soils have a moderate or low available water capacity. Examples are Ava, Darmstadt, Hosmer, and Huey soils.

If properly managed, the hayland and pasture in the county can be productive. Selection of suitable species for planting, applications of fertilizer, proper stocking rates, and rotation grazing help to keep the stand productive. Overgrazing or grazing when the soil is wet reduces forage production and causes surface compaction and excessive runoff and erosion. Assistance in managing specific tracts is available from the local office of the Natural Resources Conservation Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(4)*. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(8)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

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. The classes are 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 or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that 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.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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 hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the table 6.

Woodland Management and Productivity

Hardwoods once covered about 60 percent of Fayette County. Most of the trees have been cleared from the soils that are suitable for cultivated crops. Only about 92,000 acres in the county, or less than 20 percent of the total acreage, remains wooded. A limited part of this acreage is managed as commercial woodland. Christmas trees are grown in a few areas. Markets for trees are available in the county. Important trees are silver maple, ash, and sycamore on bottom land and white oak, red oak, black walnut, and shagbark hickory on uplands.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Approximately 15,000 acres in Fayette County is public land developed for recreational uses. About 4,800 acres of Carlyle Lake, a flood-control reservoir that is a popular area for fishing and duck hunting, is in the southwest corner of the county. Carlyle Game Management Area, which makes up 7,100 acres of the flood plain along Kaskaskia River north of Carlyle Lake, is used extensively for fishing, hunting, and riding off-road vehicles. Lake Nellie, a 53-acre impoundment north of St. Elmo, and Lake Vandalia, a 700-acre impoundment north of Vandalia, offer good opportunities for fishing. Ramsey Lake State Park, a recreational area 1,868 acres in size, includes a 47-acre impoundment with good access for fishing. It also includes well managed woodland and fields, which provide good picnicking areas, camping sites, hunting areas, and equestrian trails.

This soil survey can be helpful in comprehensive regional planning of recreational uses and in selecting individual sites for recreational development. The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, sorghum, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and foxtail.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and sumac. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

In the following paragraphs the associations described under the heading "General Soil Map Units" are grouped into three wildlife areas. Some of the plants and animals that are common in the three areas are specified.

Wildlife area 1 consists of the Cisne-Hoyleton-Darmstadt and Oconee-Cowden associations. The soils in this area generally are nearly level to gently sloping and are poorly drained or somewhat poorly drained. They are prairie soils on uplands.

This area is used mainly as cropland. A few small areas are pastured or wooded. Wildlife habitat is fair or poor because of a scarcity of crop residue, herbaceous nesting and roosting cover, woody cover, travel lanes, and hedgerows. The areas along field borders and minor streams, the meadows, and the pastured areas provide some habitat for openland wildlife. This area attracts rabbits, quail, squirrels, red fox, and many types of songbirds.

Keeping pastures in good condition, excluding livestock from wooded areas, applying a system of conservation tillage that leaves crop residue on the surface after harvesting, and delaying the mowing of grassy areas until August improve the habitat. Seeding roadsides, fence rows, and travel lanes to perennial plants, such as smooth bromegrass, alfalfa, and alsike clover, or allowing the native perennial grasses, such as bluestem, switchgrass, and cordgrass, to dominate helps to control undesirable weeds and provides good cover for the wildlife.

Wildlife area 2 consists of the Bluford-Hickory-Ava, Ava-Parke, and Hickory-Hosmer-Stoy associations. The soils in this area generally are nearly level to very steep and are somewhat poorly drained to well drained. They border the major streams and creeks in the county. They are light colored forest soils.

Because this area is used as cropland, pasture, and woodland, it provides habitat for a variety of wildlife. Wildlife habitat is generally good, especially in areas of woodland. Wildlife attracted to this area include deer, quail, wild turkeys, squirrels, raccoons, opossum, foxes, coyotes, raptors, snakes, turtles, and many species of songbirds.

The habitat can be improved by managing the pastured areas properly, excluding livestock from the wooded areas, planting trees and shrubs that bear fruit and nuts in the wooded areas, leaving crop residue on the surface after harvesting, establishing food plots of grain crops, and delaying the mowing of grassy areas until after the nesting season.

Wildlife area 3 consists of the Wakeland-Beaucoup-Petrolia association. The soils in this area generally are nearly level and are somewhat poorly drained or poorly drained. This area includes the bottom land and terraces along the Kaskaskia River and along the major streams and creeks.

Because this area is used as cropland, pasture, and woodland, it provides habitat for a variety of upland and wetland wildlife. Wildlife habitat generally is good or fair. The area attracts migratory waterfowl, herons, shore birds, muskrats, beavers, amphibians, turtles, snakes, deer, squirrels, raccoons, opossum, rabbits, wild turkeys, quail, raptors, foxes, and coyotes.

The native trees, shrubs, and wetland plants in this area provide good cover for wildlife if livestock are excluded from the habitat. The habitat can be improved by leaving crop residue on the surface after harvesting and by establishing food plots of grain crops.

The wetland wildlife habitat in this area can be improved by establishing or preserving areas of open water; increasing the capacity of ditches, pits, dikes, and levees to retain water; and planting millet, buckwheat, sorghum, corn, and other crops that provide food for waterfowl.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe *(12)*. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content.

Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(10)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of rock fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information about flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the

American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning river, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(11)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(9)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on uplands. These soils formed in a thin mantle of loess and in the underlying glacial till, which has a strongly developed paleosol. Slopes range from 5 to 10 percent.

The Atlas soils in this county are taxadjuncts because the upper part of the Bt horizon typically has a slightly higher chroma than is defined as the range for the series. This difference, however, does not significantly affect use and management.

Atlas soils commonly are adjacent to Ava, Bluford, Hickory, and Oconee soils. The moderately well drained Ava and somewhat poorly drained Bluford and Oconee soils are on broad uplands above the Atlas soils. They formed in loess. The well drained Hickory soils are on the side slopes of drainageways downslope from the Atlas soils.

Typical pedon of Atlas silt loam, 5 to 10 percent slopes, eroded, 1,020 feet east and 1,440 feet north of the southwest corner of sec. 30, T. 9 N., R. 3 E.

Ap—0 to 6 inches; dominantly brown (10YR 5/3) silt loam with some yellowish brown (10YR 5/6); brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt—6 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) and few medium faint pale brown (10YR 6/3) mottles; moderate very fine and fine subangular blocky structure; friable; few fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt2—15 to 20 inches; brown (10YR 5/3) clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; about 3 percent pebbles; very strongly acid; clear smooth boundary.

2Btg1—20 to 29 inches; gray (5Y 6/1) clay; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; about 5 percent pebbles; very strongly acid; clear smooth boundary.

2Btg2—29 to 39 inches; gray (5Y 6/1) clay; common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct dark yellowish brown (10YR 3/4) clay films along root channels; very strongly acid; clear smooth boundary.

2Btg3—39 to 44 inches; gray (5Y 5/1) clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; about 3 percent pebbles; very strongly acid; clear smooth boundary.

2Btg4—44 to 60 inches; mottled gray (N 6/0 and 5Y 5/1) and strong brown (7.5YR 5/6) clay; weak coarse prismatic structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid.

The solum is 55 to more than 60 inches thick. The overlying silty material is 12 to 17 inches thick. The solum ranges from very strongly acid to slightly acid.

In severely eroded areas the Ap horizon has chroma of 3 or 4. The E horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 4. The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The 2B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 3. It has few to many high-chroma mottles. This horizon is silty clay loam, clay loam, or clay.

Ava Series

The Ava series consists of moderately well drained soils on convex ridgetops and side slopes in the uplands. These soils formed in loess. They are moderately permeable in the upper part and moderately slowly permeable in the lower part. Slopes range from 1 to 10 percent.

Ava soils commonly are adjacent to Atlas, Bluford, Hickory, and Parke soils. The somewhat poorly drained Atlas soils are on side slopes at the end of drainageways. The somewhat poorly drained Bluford soils are on broad ridges below the Ava soils. The well drained Hickory soils formed in glacial till on side slopes. The well drained Parke soils are in landscape positions similar to those of the Ava soils. They have less loess in the upper part of the solum than the Ava soils.

Typical pedon of Ava silt loam, 5 to 10 percent slopes, eroded, 1,000 feet west and 1,400 feet north of the southeast corner of sec. 32, T. 9 N., R. 1 W.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

E—5 to 9 inches; yellowish brown (10YR 5/4) silt loam, very pale brown (10YR 7/3) dry; few fine faint strong brown (10YR 5/6) mottles; moderate thin and medium platy structure; friable; common fine roots; common distinct brown (10YR 4/3) organic coatings on faces of peds; strongly acid; abrupt smooth boundary.

Bt—9 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; strong fine subangular blocky structure; friable; common fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; abrupt smooth boundary.

Bt/E—15 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; strong fine and medium subangular blocky structure; friable; common fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct (10YR 8/2) silt coatings on faces of peds; strongly acid; abrupt smooth boundary.

B't—21 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Btx1—28 to 36 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/8), pale brown (10YR 6/3), and light gray (10YR 7/2) silt loam; weak coarse prismatic structure; friable; slightly brittle; few very fine roots; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine black (10YR 2/1) accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btx2—36 to 44 inches; mottled brown (7.5YR 5/4) and strong brown (7.5YR 5/6) silt loam; weak coarse prismatic structure; friable; brittle; few fine roots; common prominent pale brown (10YR 6/3) silt coatings on vertical faces of peds; many fine black (10YR 2/1) accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

2Btx3—44 to 60 inches; strong brown (7.5YR 5/6) silt loam; weak coarse prismatic structure; friable; many fine black (10YR 2/1) accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to the fragipan ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 5, and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silt loam. It is strongly acid to extremely acid. The Bx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8 and is mottled. It is silt loam, silty clay loam, loam, or clay loam. It has 10 to 15 percent fine sand and very fine sand. It is medium acid to very strongly acid. The 2C horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 3 to 6. It is silt loam. It is very strongly acid.

In Ava silt loam, 1 to 5 percent slopes (map unit 14B), the structure in the fragipan is finer than is defined as the range for the series. This difference, however, does not significantly affect use and management.

Beaucoup Series

The Beaucoup series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Beaucoup soils commonly are adjacent to Birds, Lawson, Tice, Titus, and Wakeland soils. The poorly drained Birds and somewhat poorly drained Wakeland soils do not have a mollic epipedon. The somewhat poorly drained Lawson and Tice soils have less clay than the Beaucoup soils. Lawson soils have a mollic epipedon that is 24 to 36 inches thick, and Tice soils have one that is 16 to 20 inches thick. The poorly drained Titus soils are in shallow depressions. They have less clay than the Beaucoup soils.

Typical pedon of Beaucoup silty clay loam, frequently flooded, 1,100 feet east and 900 feet south of the northwest corner of sec. 28, T. 9 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; few fine prominent strong brown (7.5YR 4/6) mottles; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A—7 to 16 inches; very dark grayish brown (10YR 3/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine and medium subangular blocky structure; firm; many fine roots; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bg1—16 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—27 to 41 inches; mottled dark gray (10YR 4/1), dark grayish brown (10YR 4/2), and dark yellowish brown (10YR 4/6) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bg3—41 to 50 inches; dark gray (10YR 4/1) silty clay loam; many medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure; firm; few fine roots; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bg4—50 to 60 inches; dark gray (10YR 4/1) silty clay loam; many medium prominent strong brown (7.5YR 4.6) mottles; weak coarse prismatic structure; firm; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few distinct light gray (10YR 7/2) silt grains; neutral.

The solum is more than 60 inches thick. The content of organic carbon decreases regularly with increasing depth, but it remains more than 0.3 below a depth of 50 inches.

Birds Series

The Birds series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Birds soils commonly are adjacent to Beaucoup, Petrolia, and Wakeland soils. The poorly drained Beaucoup and Petrolia soils are in landscape positions similar to those of the Birds soils. Beaucoup soils have a mollic epipedon. Petrolia soils have a higher content of clay in the control section than the Birds soils. The somewhat poorly drained Wakeland soils are higher on the landscape than the Birds soils.

Typical pedon of Birds silt loam, frequently flooded, 1,300 feet east and 20 feet north of the center of sec. 4, T. 8 N., R. 2 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; common very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; thin yellowish brown (10YR 5/4) strata; medium acid; clear smooth boundary.

ACg—9 to 28 inches; gray (10YR 5/1) silt loam, light gray (10YR 7/1) dry; few fine distinct dark yellowish brown (10YR 4/4) and common medium faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg1—28 to 42 inches; gray (10YR 5/1) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; friable; few very fine roots; many distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg2—42 to 60 inches; gray (10YR 5/1), stratified silt loam and silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; massive; friable; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 8 to 28 inches. The control section ranges from 18 to 27 percent clay.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It is dominantly silt loam but has strata of silty clay loam.

Bluford Series

The Bluford series consists of somewhat poorly drained, slowly permeable soils on broad uplands. These soils formed in loess over Illionian till. They formed under forest vegetation. Slopes range from 0 to 5 percent.

Bluford soils commonly are adjacent to Atlas, Ava, Hickory, Parke, and Wynoose soils. The somewhat poorly drained Atlas soils are on side slopes. They have a paleosol in the control section. The moderately well drained Ava and the well drained Parke soils are on narrow ridges above the Bluford soils. The well drained Hickory soils are on steep side slopes. They formed in glacial till. The poorly drained Wynoose soils are in broad, level areas below the Bluford soils.

Typical pedon of Bluford silt loam, 0 to 2 percent slopes, 1,500 feet east and 220 feet south of the northwest corner of sec. 30, T. 9 N., R. 3 E.

Ap—0 to 7 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate very fine and fine granular structure; friable; few fine roots; few fine rounded accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

E—7 to 13 inches; pale brown (10YR 6/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles;

moderate medium platy structure; friable; few fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few medium rounded accumulations of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

Bt1—13 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; extremely acid; clear smooth boundary.

Bt2—25 to 39 inches; pale brown (10YR 6/3) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and few fine distinct gray (10YR 6/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btx—39 to 47 inches; light brownish gray (10YR 6/2) silt loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

2C—47 to 60 inches; brown (10YR 5/3) loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Some pedons have a BE horizon. The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is silty clay loam or silty clay. The Btx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. The C horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is silt loam or loam.

Camden Series

The Camden series consists of well drained, moderately permeable soils on stream terraces. These soils formed in silty alluvium over loamy outwash. Slopes range from 2 to 5 percent.

Camden soils commonly are adjacent to Coffeen, Hickory, Medway, and Wakeland soils. The somewhat poorly drained Coffeen and Wakeland soils are on flood plains below the Camden soils. The well drained Hickory soils are on steep side slopes above the Camden soils. The moderately well drained Medway soils are in landscape positions similar to those of the Camden soils. They have a mollic epipedon.

Typical pedon of Camden silt loam, 2 to 5 percent slopes, 1,188 feet west and 924 feet south of the center of sec. 2, T. 8 N., R. 1 W.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine roots; medium acid; abrupt smooth boundary.

E—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate thin platy structure; few very fine roots; common distinct yellowish brown (10YR 5/4) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate very fine and fine subangular blocky; friable; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—28 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt4—37 to 60 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. The silty material is 35 to 40 inches thick.

Chauncey Series

The Chauncey series consists of poorly drained, slowly permeable soils on broad flats or in slight depressions on till plains. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Chauncey soils commonly are adjacent to Cisne, Cowden, Hoyleton, and Newberry soils. The adjacent soils do not have a mollic epipedon. Their dark surface layer is less than 10 inches thick. The poorly drained Cisne, Cowden, and Newberry soils are in landscape positions similar to those of the Chauncey soils. The somewhat poorly drained Hoyleton soils are on ridges above the Chauncey soils.

Typical pedon of Chauncey silt loam, 50 feet east and 50 feet north of the southwest corner of sec. 19, T. 8 N., R. 1 W.

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

A—9 to 15 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E1—15 to 22 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; few fine distinct yellowish brown (10YR 5/6) mottles; moderate thin and medium platy structure; friable; few very fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine black accumulations of iron and manganese oxide; slightly acid; abrupt smooth boundary.

E2—22 to 29 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; few fine distinct yellowish brown (10YR 5/6) mottles; moderate thin and medium platy structure; friable; few very fine roots; many distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine black accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

Bt1—29 to 38 inches; grayish brown (10YR 5/2) silty clay loam; few fine faint gray (10YR 6/1) and distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine black accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt2—38 to 45 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; many faint dark grayish brown (10YR 4/2) clay films in root channels; few fine black accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—45 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct very dark gray (10YR 3/1) clay films in root channels; few fine black accumulations of iron and manganese oxide; strongly acid.

The thickness of the solum ranges from 47 to more than 60 inches. The loess commonly is more than 60 inches thick. The mollic epipedon is 12 to 15 inches thick.

Cisne Series

The Cisne series consists of poorly drained, very slowly permeable soils on broad upland plains. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Cisne soils commonly are adjacent to Chauncey, Darmstadt, Ebbert, Hoyleton, Huey, Newberry, and Shiloh soils. The poorly drained Chauncey soils are in landscape positions similar to those of the Cisne soils. They have a mollic epipedon. Darmstadt and Huey soils have a high content of sodium in the subsoil. The poorly drained Huey soils are in landscape positions similar to those of the Cisne soils. The somewhat poorly drained Darmstadt and Hoyleton soils are in the higher landscape positions. Ebbert and Shiloh soils are in depressions. They have a mollic epipedon. Newberry soils are not characterized by an abrupt textural change.

Typical pedon of Cisne silt loam, 50 feet west and 800 feet north of the southeast corner of sec. 29, T. 7 N., R. 3 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E—9 to 17 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium platy structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) and common fine light gray

(10YR 7/2) silt coatings; neutral; clear smooth boundary.

BE—17 to 20 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; few distinct grayish brown (10YR 5/2) organic coatings and many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—20 to 27 inches; light brownish gray (10YR 6/2) silty clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Btg2—27 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Btg3—35 to 41 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg4—41 to 49 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; fine distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

2Btg5—49 to 60 inches; light brownish gray (10YR 6/2) clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few fine rounded accumulations of iron and manganese oxide; neutral.

The solum is more than 60 inches thick. The loess is 45 to 49 inches thick.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 2. In some pedons it has mottles with hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is mottled silty clay loam or silty clay. The 2Btg or 2BCg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. It has mottles with hue of 10YR or 7.5YR, value of 5, and chroma of 8. It is clay loam.

Coffeen Series

The Coffeen series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Coffeen soils commonly are adjacent to Camden, Lawson, Medway, and Wakeland soils. The well drained Camden soils are on terraces above the Coffeen soils. The somewhat poorly drained Lawson soils have a mollic epipedon that is more than 24 inches thick. The moderately well drained Medway soils are on foot slopes above the Coffeen soils. The somewhat poorly drained Wakeland soils are in landscape positions similar to those of the Coffeen soils. They do not have a mollic epipedon.

Typical pedon of Coffeen silt loam, frequently flooded, 180 feet east and 30 feet south of the center of sec. 32, T. 8 N., R. 2 E.

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

Bw1—10 to 15 inches; brown (10YR 5/3) silt loam; common fine faint grayish brown (10YR 4/3) mottles; weak medium prismatic structure; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—15 to 27 inches; grayish brown (10YR 5/2) silt loam; common medium faint dark brown (10YR 4/3) mottles; weak medium prismatic structure; friable; few very fine roots; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bw3—27 to 35 inches; grayish brown (10YR 5/2) silt loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bw4—35 to 60 inches; mottled dark yellowish brown (10YR 4/4), grayish brown (10YR 5/2), and brown (10YR 5/3) silt loam; weak coarse prismatic structure; friable; few very fine roots; few fine rounded accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The mollic epipedon is 10 to 12 inches thick. The control section ranges from 12 to 18 percent clay.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The content of organic carbon is more than 0.3 in the upper 50 inches.

Cowden Series

The Cowden series consists of poorly drained, slowly permeable soils on broad uplands. These soils formed in loess that is 55 to more than 60 inches deep over Illinoian till. They formed under prairie vegetation. Slopes range from 0 to 2 percent.

Cowden soils commonly are adjacent to Chauncey, Oconee, Piasa, and Virden soils. The poorly drained Chauncey soils are in landscape positions similar to those of the Cowden soils. They have a mollic epipedon. The somewhat poorly drained Oconee soils are slightly higher on the landscape than the Cowden soils. The poorly drained Piasa soils are closely intermingled with areas of the Cowden soils. They have a high content of sodium in the subsoil. The poorly drained Virden soils are in slight depressions. They have a mollic epipedon.

Typical pedon of Cowden silt loam, 2,200 feet south and 100 feet west of the northeast corner of sec. 5, T. 8 N., R. 1 W.

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

Eg—7 to 12 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; few fine distinct yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; common very fine roots; common distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Btg1—12 to 27 inches; dark grayish brown (10YR 4/2) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—27 to 36 inches; gray (10YR 5/1) silty clay; common medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg3—36 to 47 inches; light olive gray (5Y 6/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

BCg—47 to 57 inches; light gray (5Y 6/1) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few distinct gray (5Y 5/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

2Ab—57 to 69 inches; dominantly dark gray (5Y 4/1) silty clay loam with some gray (5Y 5/1); common fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine rounded accumulations of iron and manganese oxide; strongly acid.

The solum is 57 to more than 60 inches thick. The loess is 55 to more than 60 inches thick.

Some pedons have a BE horizon. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The BC horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2.

Darmstadt Series

The Darmstadt series consists of somewhat poorly drained, very slowly permeable soils that have a high content of sodium. These soils formed in loess on uplands. They formed under forest vegetation. Slopes range from 0 to 5 percent.

Darmstadt soils commonly are adjacent to Cisne, Hoyleton, Huey, and Oconee soils. The poorly drained Cisne and somewhat poorly drained Hoyleton and Oconee soils have less clay than the Darmstadt soils, have a dark surface layer, and do not have a concentration of sodium in the subsoil. The poorly drained Huey soils are in the lower landscape positions.

Typical pedon of Darmstadt silt loam, 0 to 2 percent slopes, 20 feet west and 1,600 feet north of the southeast corner of sec. 20, T. 7 N., R. 3 E.

Ap1—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; very few very fine roots; neutral; abrupt smooth boundary.

Ap2—5 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium platy structure; friable; very few very fine roots; neutral; clear smooth boundary.

E—10 to 16 inches; grayish brown (10YR 5/2) silt loam; moderate medium platy structure; friable; very few very fine roots; common distinct light gray (10YR 7/3) silt coatings on faces of peds; a light gray (10YR 7/2) silt band between depths of 15 and 16 inches; few fine rounded accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

Bt—16 to 24 inches; pale brown (10YR 6/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; friable; very few very fine roots; common distinct dark gray (10YR 4/1) clay films in root channels; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btng1—24 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; friable; very few very fine roots; common distinct dark gray (10YR 4/1) clay films in root channels; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

Btng2—30 to 36 inches; light brownish gray (10YR 6/2) silty clay loam; many fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

Btng3—36 to 47 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

2Cng1—47 to 52 inches; light brownish gray (2.5Y 6/2) clay loam; fine medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; fine distinct grayish brown (2.5Y 5/2) clay films along cleavage planes; few fine rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

2Cng2—52 to 60 inches; light gray (5Y 6/1) clay loam; few medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; few fine rounded accumulations of iron and manganese oxide; moderately alkaline.

The thickness of the solum ranges from 35 to 60 inches. The thickness of the loess ranges from 35 to 48 inches. The solum ranges from very strongly acid to moderately alkaline.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is slightly acid or neutral. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 2. It is strongly acid to neutral. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is slightly acid to moderately alkaline. The lower part of the Bt horizon has more than 15 percent exchangeable sodium. Some pedons have a 2Bt or 2BC horizon. The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 6 or 7, and chroma of 1 or 2. It is mildly alkaline or moderately alkaline.

Douglas Series

The Douglas series consists of well drained, moderately permeable soils on side slopes and ridges in the uplands. These soils formed in 40 to 60 inches of loess and in the underlying Illinoian drift. Slopes range from 0 to 5 percent.

Douglas soils commonly are adjacent to Harrison and Parke soils. The moderately well drained Harrison soils are on the lower parts of the landscape. The well drained Parke soils do not have a mollic epipedon and have less than 40 inches of loess in the upper part of the solum.

Typical pedon of Douglas silt loam, 2 to 5 percent slopes, 400 feet west and 1,452 feet south of the northeast corner of sec. 7, T. 8 N., R. 2 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

Bt1—11 to 21 inches; dark yellowish brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—21 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; friable; common very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—31 to 38 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt4—38 to 48 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films faces of peds; strongly acid; clear smooth boundary.

2Bt5—48 to 57 inches; strong brown (7.5YR 5/6) clay loam; weak medium prismatic structure parting to weak medium subangular blocky; few very fine roots; few distinct very dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt6—57 to 69 inches; reddish brown (5YR 4/4) clay loam; weak coarse prismatic structure; few distinct dark reddish brown (5YR 3/4) clay films on faces of peds; medium acid.

The thickness of the solum ranges from 65 to 80 inches. The thickness of the loess ranges from 45 to 55 inches. The mollic epipedon is 11 to 14 inches thick. The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6.

Ebbert Series

The Ebbert series consists of poorly drained, slowly permeable soils in depressions on uplands. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Ebbert soils commonly are adjacent to Cisne, Newberry, Piasa, Shiloh, and Virden soils. Cisne soils are higher on the landscape than the Ebbert soils. They do not have a mollic epipedon. Newberry, Piasa, Shiloh, and Virden soils are in landscape positions similar to those of the Ebbert soils. Newberry soils do not have a mollic epipedon. Piasa soils have a high content of sodium in the subsoil. Shiloh soils have a mollic epipedon that is more than 24 inches thick. Virden soils have a higher content of clay in the subsoil than the Ebbert soils.

Typical pedon of Ebbert silt loam, 2,620 feet east and 25 feet south of the northwest corner of sec. 26, T. 5 N., R. 4 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E—10 to 15 inches; dark gray (10YR 4/1) silt loam, light brownish gray (10YR 6/2) dry; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few very fine roots; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine black (10YR 2/1) accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—15 to 19 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium platy structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Btg2—19 to 31 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine black (10YR 2/1) accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg3—31 to 38 inches; grayish brown (2.5YR 5/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few black (10YR 2/1) accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Btg4—38 to 45 inches; gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/4) and prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few distinct dark gray (10YR 4/1) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine black (10YR 2/1) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BC—45 to 60 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coatings on faces of peds; few fine black (10YR 2/1) accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The loess is more than 60 inches thick. The mollic epipedon typically is about 10 inches thick.

The A horizon commonly is silt loam but is silty clay loam in some pedons. The Bt horizon has hue of 10YR or 2.5Y. It has value of 3 to 5 and chroma of 1 in the upper part and value of 4 or 5 chroma of 2 in the lower part. It is dominantly silty clay loam, but in some pedons it has subhorizons of silt loam. Some pedons do not have a BC horizon. Some have a Cg horizon. This horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silty clay loam or silt loam.

Harrison Series

The Harrison series consists of moderately well drained, moderately permeable soils on low rises on broad uplands. These soils formed in 40 to 60 inches of loess and in the underlying Illinoian drift. Slopes range from 0 to 2 percent.

Harrison soils commonly are adjacent to Douglas and Parke soils. The well drained Douglas soils are on the upper parts of rises. The well drained Parke soils do not have a mollic epipedon and have less than 40 inches of loess in the upper part of the solum.

Typical pedon of Harrison silt loam, 0 to 2 percent slopes, 528 feet west and 1,452 feet south of the northeast corner of sec. 7, T. 8 N., R. 2 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

BA—11 to 15 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure parting to moderate medium subangular blocky; friable; common fine roots; common distinct brown (10YR 5/3) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—15 to 23 inches; brown (10YR 5/3) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—23 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—32 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains of iron and manganese oxide on faces of peds; slightly acid; clear smooth boundary.

Bt4—36 to 45 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct strong brown (7.5YR 4/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few distinct dark grayish brown (10YR 4/2) clay films lining pores; slightly acid; clear smooth boundary.

2BC—45 to 56 inches; strong brown (7.5YR 4/6) silt loam; few fine faint strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; medium acid; abrupt smooth boundary.

2C1—56 to 67 inches; yellowish red (5YR 4/6) loam; few medium prominent yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; friable; few very fine roots; slightly acid; clear smooth boundary.

2C2—67 to 86 inches; yellowish red (5YR 4/6) clay loam; massive; friable; few rounded accumulations of iron and manganese oxide; about 5 percent pebbles; slightly acid.

The thickness of the solum ranges from 50 to 60 inches. The thickness of the loess ranges from 45 to 60 inches. The mollic epipedon is 10 to 12 inches thick. Some pedons do not have a 2C horizon within a depth of 60 inches.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on the side slopes of drainageways. These soils formed in glacial till. Slopes range from 10 to 60 percent.

Hickory soils commonly are adjacent to Atlas, Ava, Bluford, Hosmer, Parke, and Stoy soils. The somewhat poorly drained Atlas soils are on the less steep side slopes. They have a paleosol in the control section. The well drained Parke, moderately well drained Ava and Hosmer, and somewhat poorly drained Bluford and Stoy soils are on broad uplands above the Hickory soils. They formed in loess.

Typical pedon of Hickory loam, 30 to 60 percent slopes, 2,000 feet west and 1,300 feet north of the southeast corner of sec. 6, T. 8 N., R. 1 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; many fine roots; about 1 percent pebbles; neutral; abrupt smooth boundary.

E1—4 to 8 inches; dominantly pale brown (10YR 6/3) loam with some yellowish brown (10YR 5/6); very pale brown (10YR 8/3) dry; moderate fine and medium subangular blocky structure; friable; common fine roots; about 1 percent pebbles; neutral; clear smooth boundary.

E2—8 to 16 inches; yellowish brown (10YR 5/6) loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; about 1 percent pebbles; very strongly acid; clear smooth boundary.

Bt1—16 to 28 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct dark yellowish brown (10YR 4/6) clay films on faces of peds; few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; about 3 percent pebbles; very strongly acid; clear smooth boundary.

Bt2—28 to 33 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent strong brown (7.5YR 5/8) and few fine prominent light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure; friable; few very fine roots; common distinct strong brown (7.5YR 4/6) clay films on faces of peds; about 3 percent pebbles; very strongly acid; clear smooth boundary.

Bt3—33 to 40 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/8), and light brownish gray (2.5Y 6/2) clay loam; moderate medium prismatic structure; friable; few very fine roots; common distinct strong brown (7.5YR 4/6) clay films on faces of peds; about 10 percent pebbles; very strongly acid; clear smooth boundary.

C1—40 to 50 inches; mottled dark yellowish brown (10YR 4/6 and 4/4) and yellowish brown (10YR 5/8) sandy clay loam; massive; friable; few fine roots; about 10 percent pebbles; medium acid; clear smooth boundary.

C2—50 to 60 inches; yellowish brown (10YR 5/6) sandy loam; common coarse distinct yellowish brown (10YR 5/8) and common medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; about 10 percent pebbles; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It has mottles with chroma of 2 to 8. It is commonly clay loam but in some pedons is silty clay loam or loam. Some pedons have a BC horizon, which is mottled loam, clay loam, or sandy loam.

Holton Series

The Holton series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Holton soils are similar to Wirt soils and commonly are adjacent to Birds and Wirt soils. The poorly drained Birds soils are in low areas below the Holton soils. The well drained Wirt soils are closer to stream channels than the Holton soils and are slightly higher on the landscape.

Typical pedon of Holton silt loam, frequently flooded, 1,400 feet west and 167 feet south of the northeast corner of sec. 27, T. 10 N., R. 4 E.

Ap—0 to 11 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; few fine distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; friable; common fine roots; mildly alkaline; clear smooth boundary.

Bw1—11 to 18 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct gray (10YR 5/1), common fine distinct dark brown (7.5YR 3/4), and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; few medium rounded concretions of iron and manganese oxide; about 20 percent sand; neutral; gradual smooth boundary.

Bw2—18 to 29 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct dark brown (7.5YR 3/4) and dark yellowish brown (10YR 4/6) and few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; few medium rounded concretions of iron and manganese oxide;

about 25 percent fine sand; neutral; gradual smooth boundary.

Bw3—29 to 39 inches; grayish brown (10YR 5/2) loam; common fine distinct yellowish brown (10YR 5/8) and few fine distinct dark yellowish brown (10YR 3/4) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few medium rounded concretions of iron and manganese oxide; neutral; gradual smooth boundary.

C1—39 to 47 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 3/6) and common fine distinct yellowish brown (10YR 5/8) mottles; massive; friable; few medium rounded concretions of iron and manganese oxide; neutral; gradual smooth boundary.

C2—47 to 60 inches; grayish brown (10YR 5/2) and brown (10YR 5/3) loam; common fine distinct dark yellowish brown (10YR 3/6) and few fine faint gray (10YR 5/1) mottles; massive; friable; few medium rounded concretions of iron and manganese oxide; neutral.

The solum ranges from 24 to 40 inches in thickness. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 8. It is silt loam, loam, fine sandy loam, or sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 6. It is sandy loam, loam, loamy sand, or loamy fine sand.

Hosmer Series

The Hosmer series consists of moderately well drained soils on convex ridgetops and side slopes in the uplands. These soils formed in loess. They are moderately permeable in the upper part and very slowly permeable in the lower part. Slopes range from 2 to 5 percent.

Hosmer soils commonly are adjacent to Hickory and Stoy soils, which do not have a fragipan. The well drained Hickory soils formed in glacial till on side slopes. The somewhat poorly drained Stoy soils are on broad ridges below the Hosmer soils.

Typical pedon of Hosmer silt loam, 2 to 5 percent slopes, 1,500 feet west and 1,140 feet north of the southeast corner of sec. 20, T. 9 N., R. 1 W.

Ap1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many very fine roots; neutral; abrupt smooth boundary.

Ap2—3 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; common fine faint yellowish brown (10YR 5/4) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine granular structure; friable; many very fine roots; few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

E—6 to 11 inches; yellowish brown (10YR 5/6) silt loam; weak medium platy structure parting to moderate fine subangular blocky; friable; common very fine roots; common distinct dark brown (10YR 4/3) organic coatings on faces of peds; few distinct dark grayish brown (10YR 4/2) organic coatings in root channels; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt1—11 to 17 inches; yellowish brown (10YR 5/6) silt loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt2—17 to 23 inches; yellowish brown (10YR 5/6) silt loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

B/E—23 to 27 inches; yellowish brown (10YR 5/6) silty clay loam (B) and pale brown (10YR 6/3) silt (E), white (10YR 8/2) dry; the E material occurring as many distinct coatings on faces of peds and as fillings between peds; common fine prominent strong brown (7.5YR 5/8) mottles; strong fine and medium subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

B′t—27 to 34 inches; brown (10YR 5/3) silty clay loam; common medium prominent strong brown (7.5YR 5/8) and common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btx1—34 to 45 inches; mottled yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) silty clay loam; weak very coarse prismatic structure; firm; few very fine roots; few distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btx2—45 to 55 inches; mottled yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) silty clay loam; common distinct grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; firm; few very fine roots; few distinct brown (10YR 5/3) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

2C—55 to 66 inches; mottled yellowish brown (10YR 5/4 and 5/8) and light brownish gray (10YR 6/2) loam; massive; friable; few distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid.

The solum is 50 to 55 inches thick. Depth to the fragipan ranges from 28 to 34 inches.

The Bt horizon has hue of 10YR, value of 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The content of clay in this horizon ranges from 27 to 35 percent. The Bx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. The 2C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 8. It is medium acid to very strongly acid.

Hoyleton Series

The Hoyleton series consists of somewhat poorly drained, slowly permeable soils on uplands. These soils formed in loess over Illinoian till. Slopes range from 0 to 5 percent.

Hoyleton soils commonly are adjacent to Chauncey, Cisne, Darmstadt, and Huey soils. The poorly drained Chauncey, Cisne, and Huey soils are lower on the landscape than the Hoyleton soils. Huey and Darmstadt soils have a high content of sodium in the subsoil. The somewhat poorly drained Darmstadt soils are in landscape positions similar to those of the Hoyleton soils.

Typical pedon of Hoyleton silt loam, 0 to 2 percent slopes, 1,300 feet west and 40 feet south of the northeast corner of sec. 20, T. 7 N., R. 3 E.

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

E—9 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate medium platy structure; friable; many fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent strong brown (7.5YR 5/8) and distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; many fine roots; many distinct brown (10YR 5/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent strong brown (7.5YR 4/6 and 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; many very fine roots; many distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—30 to 36 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

2BC—36 to 43 inches; mottled light olive brown (2.5Y 5/4), grayish brown (2.5Y 5/2), and gray (5Y 6/1) silt loam; weak coarse prismatic structure; friable; few fine rounded accumulations of iron and manganese oxide; about 2 percent pebbles; slightly acid; clear smooth boundary.

2C1—43 to 47 inches; grayish brown (2.5Y 5/2) loam; common medium prominent yellowish brown (10YR 5/4 and 5/8) mottles; massive; friable; few fine rounded accumulations of iron and manganese oxide; about 2 percent pebbles; neutral; clear smooth boundary.

2C2—47 to 60 inches; grayish brown (2.5Y 5/2) loam; many medium prominent yellowish brown (10YR 5/8) mottles; friable; few fine rounded accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 43 to more than 60 inches. The thickness of the loess ranges from 34 to 50 inches.

Some pedons have a BE horizon. The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is silty clay loam or silty clay. The 2BC horizon has hue of

10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 4. The 2C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4.

The pH in the Bt horizon is higher than is defined as the range for the series. This difference, however, does not significantly affect use and management.

Huey Series

The Huey series consists of poorly drained, very slowly permeable soils on broad upland plains. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Huey soils commonly are adjacent to Cisne, Darmstadt, and Hoyleton soils. Cisne and Hoyleton soils do not have a natric horizon. The poorly drained Cisne soils are in landscape positions similar to those of the Huey soils. The somewhat poorly drained Darmstadt and Hoyleton soils also are in similar landscape positions or are in the slightly more sloping areas on the higher parts of the landscape.

Typical pedon of Huey silt loam, 340 feet north and 1,560 feet west of the center of sec. 35, T. 9 N., R. 3 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few fine roots; mildly alkaline; abrupt smooth boundary.

E—6 to 10 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few very fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Bt—10 to 15 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; common fine rounded accumulations of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Btn—15 to 27 inches; brown (10YR 5/3) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

Btng1—27 to 36 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few medium rounded accumulations of iron and manganese oxide; few medium rounded nodules; moderately alkaline; clear smooth boundary.

Btng2—36 to 46 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few medium rounded accumulations of iron and manganese oxide; moderately alkaline; clear smooth boundary.

2Btng3—46 to 52 inches; light brownish gray (2.5Y 6/2) clay loam; common medium prominent dark yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; moderately alkaline; clear smooth boundary.

2Cng—52 to 60 inches; dark gray (10YR 4/1) loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; massive; friable; common distinct white (10YR 8/1) silt coatings on faces of peds; moderately alkaline.

The thickness of the solum ranges from 35 to 55 inches. The thickness of the loess ranges from 45 to more than 60 inches.

Some pedons have a BE horizon. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. It has more than 15 percent exchangeable sodium. The content of clay ranges from 35 to 45 percent in the control section.

Huntsville Series

The Huntsville series consists of well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Huntsville soils commonly are adjacent to Beaucoup, Lawson, Raddle, and Tice soils. The poorly drained Beaucoup and somewhat poorly drained Lawson and Tice soils are on the lower parts of the landscape. Tice soils have a mollic epipedon that is less than 24 inches thick. The well drained Raddle soils are on slight rises above the Huntsville soils.

Typical pedon of Huntsville silt loam, 0 to 3 percent slopes, frequently flooded, 640 feet west and 1,300 feet north of the center of sec. 22, T. 9 N., R. 3 E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; few very fine roots; very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A1—4 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—9 to 16 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A3—16 to 28 inches; dark brown (10YR 3/3) silt loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

AC—28 to 40 inches; dark brown (10YR 4/3) silt loam; few fine faint dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; many distinct dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

C1—40 to 51 inches; brown (10YR 4/3) silty clay loam; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; many distinct very dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; clear smooth boundary.

C2—51 to 60 inches; brown (10YR 4/3) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid.

The solum is 40 to 45 inches thick. The mollic epipedon is 28 to 39 inches thick. The soils are silt loam to a depth of at least 40 inches and are silt loam, silty clay loam, or loam below that depth.

Karnak Series

The Karnak series consists of poorly drained, very slowly permeable soils in depressions along major drainageways. These soils formed in alluvial sediments. Slopes range from 0 to 2 percent.

Karnak soils commonly are adjacent to Beaucoup and Petrolia soils. The poorly drained Beaucoup and Petrolia soils have less clay in the subsoil than the Karnak soils.

Typical pedon of Karnak silty clay loam, wet, 1,850 feet west and 200 feet south of the northeast corner of sec. 9, T. 5 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, light brownish gray (10YR 6/2) dry; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine and medium granular structure; friable; common very fine roots; few fine rounded accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

Bg1—9 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint brown (10YR 4/3) and few fine faint gray (10YR 5/1) mottles; moderate fine subangular blocky structure; friable; common very fine roots; pressure faces; few fine rounded accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg2—16 to 22 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to weak fine and medium subangular blocky; friable; few very fine roots; pressure faces; few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bg3—22 to 34 inches; light brownish gray (10YR 6/2) silty clay; common medium prominent strong brown (7.5YR 5/6) and common medium distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; friable; few very fine roots; pressure faces; few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bg4—34 to 39 inches; grayish brown (2.5Y 5/2) silty clay; common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; pressure faces; common fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bg5—39 to 48 inches; grayish brown (2.5Y 5/2) silty clay; common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; pressure faces; common fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bg6—48 to 60 inches; gray (10YR 5/1) silty clay; many medium prominent strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; pressure faces; common fine rounded accumulations of iron and manganese oxide; slightly acid.

The solum is more than 60 inches thick. The control section ranges from 40 to 60 percent clay.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silty clay or silty clay loam.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Lawson soils commonly are adjacent to Beaucoup, Huntsville, Tice, and Wakeland soils. The poorly drained Beaucoup soils are lower on the landscape than the Lawson soils. The well drained Huntsville soils are in the higher landscape positions. The somewhat poorly drained Tice and Wakeland soils are in landscape positions similar to those of the Lawson soils. Tice soils have a mollic epipedon that is less than 24 inches thick. Wakeland soils do not have a mollic epipedon.

Typical pedon of Lawson silt loam, frequently flooded, 1,360 feet east and 1,260 feet south of the northwest corner of sec. 32, T. 9 N., R. 3 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; common distinct very dark brown (10YR 2/2) organic coatings on faces of peds; neutral; clear smooth boundary.

A1—6 to 18 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; few distinct very dark brown (10YR 2/2) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—18 to 28 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

C1—28 to 32 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

C2—32 to 41 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent strong brown (7.5YR 4/6 and 5/6) mottles; moderate medium prismatic structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

C3—41 to 49 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

C4—49 to 60 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid.

The thickness of the solum ranges from 16 to 40 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches. The control section ranges from 18 to 30 percent clay.

The C horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is dominantly silt loam or silty clay loam but has thin strata of loam in some pedons.

Medway Series

The Medway series consists of moderately well drained, moderately permeable soils on foot slopes. These soils formed in loamy outwash. Slopes range from 0 to 3 percent.

Medway soils commonly are adjacent to Camden, Coffeen, Hickory, and Wakeland soils. The well drained Camden soils are on stream terraces. They do not have a mollic epipedon. The somewhat poorly drained Coffeen and Wakeland soils are on flood plains below the Medway soils. The well drained Hickory soils are on steep side slopes above the Medway soils.

Typical pedon of Medway loam, 0 to 3 percent slopes, occasionally flooded, 2,400 feet north and 400 feet east of the center of sec. 10, T. 7 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine roots; about 1 percent pebbles; slightly acid; abrupt smooth boundary.

A—9 to 18 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/4) dry; moderate fine and medium granular structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 1 percent pebbles; slightly acid; clear smooth boundary.

Bw1—18 to 22 inches; brown (10YR 5/3) loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 2 percent pebbles; slightly acid; clear smooth boundary.

Bw2—22 to 33 inches; brown (10YR 5/3) loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; about 2 percent pebbles; neutral; clear smooth boundary.

Bw3—33 to 39 inches; brown (10YR 5/3) loam; common medium distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; common distinct dark gray (10YR 4/1) organic coatings in root channels; few fine rounded accumulations of iron and manganese oxide; about 2 percent pebbles; neutral; clear smooth boundary.

C1—39 to 51 inches; brown (10YR 5/3) loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; friable; many distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; common distinct dark gray (10YR 4/1) organic coatings in root channels; few fine rounded accumulations of iron and manganese oxide; thin strata of coarse sandy loam in the upper 2 inches of the horizon; about 2 percent pebbles; mildly alkaline; clear smooth boundary.

C2—51 to 60 inches; brown (10YR 5/3) loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; common distinct dark gray (10YR 4/1) organic coatings in root channels; few fine rounded accumulations of iron and manganese oxide; about 3 percent pebbles; mildly alkaline.

The thickness of the solum ranges from 39 to 50 inches. The mollic epipedon is 15 to 20 inches thick.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Some pedons have sand and gravel below a depth of 40 inches.

Negley Series

The Negley series consists of well drained, moderately rapidly permeable soils on steep side slopes. These soils formed in glacial outwash. Slopes range from 15 to 60 percent.

Negley soils commonly are adjacent to Hickory and Parke soils. The well drained Parke soils are higher on the landscape than the Negley soils. They formed in loess. The well drained Hickory soils are in landscape positions similar to those of the Negley soils. They have less sand and gravel in the subsoil than the Negley soils.

Typical pedon of Negley loam, 30 to 60 percent slopes, 1,000 feet south and 1,720 feet east of the northwest corner of sec. 21, T. 6 N., R. 1 E.

A—0 to 4 inches; dominantly very dark grayish brown (10YR 3/2) loam with some yellowish brown (10YR 5/4); grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; many very fine roots; about 5 percent gravel; slightly acid; abrupt smooth boundary.

E—4 to 10 inches; yellowish brown (10YR 5/4) sandy loam; moderate very fine and fine granular structure; friable; very few very fine roots; about 5 percent gravel; medium acid; abrupt smooth boundary.

Bt1—10 to 16 inches; strong brown (7.5YR 4/6) sandy clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; few distinct reddish brown (5YR 4/4) clay films on faces of peds; about 7 percent gravel; strongly acid; clear smooth boundary.

Bt2—16 to 25 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky;

friable; few fine roots; many distinct reddish brown (5YR 4/4) clay films on faces of peds; about 15 percent gravel; very strongly acid; clear smooth boundary.

Bt3—25 to 34 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few distinct reddish brown (5YR 5/4) clay films on faces of peds; about 10 percent gravel; very strongly acid; clear smooth boundary.

Bt4—34 to 39 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few distinct reddish brown (5YR 5/4) clay films on faces of peds; about 10 percent gravel; very strongly acid; clear smooth boundary.

Bt5—39 to 60 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium prismatic structure; friable; few very fine roots; few distinct yellowish red (5YR 4/6) clay films on faces of peds; about 5 percent gravel; very strongly acid.

The solum is more than 60 inches thick. The content of rock fragments ranges from 5 to 20 percent in the solum.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 4. The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons the content of clay decreases by more than 20 percent in the upper 60 inches.

Newberry Series

The Newberry series consists of poorly drained, slowly permeable soils on broad upland plains. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Newberry soils commonly are adjacent to Chauncey, Cisne, Ebbert, and Shiloh soils. Chauncey soils are in landscape positions similar to those of the Newberry soils. They have a mollic epipedon. Cisne soils are characterized by an abrupt textural change. Ebbert and Shiloh soils are in depressions. They have a mollic epipedon.

Typical pedon of Newberry silt loam, 300 feet west and 1,540 feet south of the northeast corner of sec. 29, T. 7 N., R. 3 E.

Ap—0 to 8 inches; very dark brown (10YR 3/2) silt loam; moderate fine and medium granular structure; friable; many very fine roots; mildly alkaline; abrupt smooth boundary.

E—8 to 13 inches; dark gray (10YR 4/1) silt loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate thin and medium platy structure; friable; many very fine roots; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

BE—13 to 17 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct yellowish brown (10YR 4/6) mottles; weak medium platy structure parting to moderate fine and medium subangular blocky; friable; common very fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; common fine rounded accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

Btg1—17 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—27 to 42 inches; gray (10YR 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; very few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg3—42 to 49 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few faint grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2BCg—49 to 55 inches; gray (5Y 5/1) silty clay loam; common medium prominent brown (7.5YR 4/4) mottles; massive; friable; very few coarse and few fine black (N 2/0) accumulations of iron and manganese oxide; about 2 percent pebbles; about 15 percent sand; neutral; clear smooth boundary.

2C—55 to 60 inches; mottled strong brown (7.5YR 4/6), gray (10YR 5/1), and light gray (10YR 6/1) silty clay loam; massive; friable; about 15 percent sand; neutral.

The solum is 55 to more than 60 inches thick. The loess is 45 to 50 inches thick. The control section ranges from 27 to 35 percent clay.

Some pedons do not have a BE horizon. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2 and is mottled. The 2BC horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2 and is mottled. The 2C horizon has a range of characteristics similar to that of the 2BC horizon.

The pH in the lower part of the Bt horizon is higher than is defined as the range for the series. This difference, however, does not significantly affect use and management.

Oconee Series

The Oconee series consists of somewhat poorly drained, slowly permeable soils on loess-covered uplands. These soils formed in loess. Slopes range from 0 to 5 percent.

Oconee soils commonly are adjacent to Atlas, Bluford, Cowden, Darmstadt, and Piasa soils. The somewhat poorly drained Atlas soils are on side slopes. They have a paleosol in the control section. The somewhat poorly drained Bluford soils are on broad uplands. They have a surface layer that is lighter colored than that of the Oconee soils. The poorly drained Cowden soils are lower on the landscape than the Oconee soils. The somewhat poorly drained Darmstadt and poorly drained Piasa soils have a high content of sodium in the subsoil.

Typical pedon of Oconee silt loam, 0 to 2 percent slopes, 920 feet east and 1,440 feet south of the center of sec. 29, T. 9 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium granular structure; firm; many fine roots; neutral; abrupt smooth boundary.

E—9 to 13 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; common very fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; abrupt smooth boundary.

BE—13 to 17 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct dark yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—17 to 29 inches; brown (10YR 5/3) silty clay loam; many medium distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; firm; many very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt2—29 to 35 inches; brown (10YR 5/3) silty clay loam; few medium prominent strong brown (7.5YR 5/6), many medium distinct yellowish brown (10YR 5/6), and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—35 to 46 inches; brown (10YR 5/3) silty clay loam; few medium prominent strong brown (7.5YR 5/6), many medium distinct yellowish brown (10YR 5/6), and common fine faint light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; friable; common very fine roots; common distinct dark gray (10YR 4/1) clay films on vertical faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

C—46 to 56 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; massive; friable; few very fine roots; dark gray (10YR 4/1) clay films in root channels; neutral; abrupt smooth boundary.

2Ab—56 to 60 inches; very dark grayish brown (10YR 3/2) silt loam; massive; friable; mildly alkaline.

The solum is 45 to 50 inches thick. The loess is 55 to more than 60 inches thick.

The Bt horizon has hue of 10YR in the upper part and hue of 10YR or 2.5Y in the lower part. It has value of 5 or 6 and chroma of 2 to 4. It ranges from medium acid to very strongly acid in the upper part.

The pH in the lower part of the Bt horizon is higher than defined as the range for the series. This difference, however, does not significantly affect use and management.

Parke Series

The Parke series consists of well drained, moderately permeable soils on ridges and side slopes. These soils formed in loess and glacial drift. Slopes range from 1 to 15 percent.

Parke soils commonly are adjacent to Ava, Bluford, Douglas, Harrison, Hickory, and Negley soils. The moderately well drained Ava soils are in landscape positions similar to those of the Parke soils. They have a fragipan. The somewhat poorly drained Bluford soils are in the broader areas on the lower parts of the landscape. The well drained Douglas and moderately well drained Harrison soils have a mollic epipedon. The well drained Hickory and Negley soils are on side slopes below the Parke soils.

Typical pedon of Parke silt loam, 1 to 5 percent slopes, 360 feet west and 280 feet south of the center of sec. 24, T. 9 N., R. 2 E.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 13 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—13 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure; friable; few fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—20 to 30 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium prismatic structure; friable; few fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt4—30 to 36 inches; strong brown (7.5YR 4/6) silt loam; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Bt5—36 to 54 inches; strong brown (7.5YR 4/6) loam; common fine prominent brown (10YR 5/3) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; very few fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; few distinct very pale brown (10YR 7/3) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

2Bt6—54 to 60 inches; strong brown (7.5YR 4/6) loam; moderate medium prismatic structure; friable; few fine accumulations of iron and manganese oxide; strongly acid.

The solum is more than 60 inches thick. The loess ranges from 24 to 40 inches in thickness.

Some pedons have a BE horizon. The BE and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The Bt horizon is silt loam, silty clay loam, clay loam, loam, sandy clay loam, or sandy loam.

Petrolia Series

The Petrolia series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Petrolia soils commonly are adjacent to Birds, Karnak, Titus, and Wakeland soils. Birds, Karnak, and Titus soils have less clay in the subsoil than the Petrolia soils. The poorly drained Birds soils are in landscape positions similar to those of the Petrolia soils. Karnak and Titus soils are lower on the landscape than the Petrolia soils. The somewhat poorly drained Wakeland soils are higher on the landscape than the Petrolia soils.

Typical pedon of Petrolia silt loam, frequently flooded, 1,820 feet east and 385 feet south of the center of sec. 33, T. 5 N., R. 1 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine distinct yellowish brown (10YR 4/4) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Cg1—9 to 14 inches; gray (10YR 5/1) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few fine rounded black (10YR 2/1) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg2—14 to 21 inches; gray (10YR 5/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few fine rounded black (10YR 2/1) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg3—21 to 36 inches; gray (10YR 5/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; many distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded black (10YR 2/1) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg4—36 to 48 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; few very fine roots; many distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded black (10YR 2/1) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg5—48 to 60 inches; mottled grayish brown (10YR 5/2), gray (10YR 5/1), and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded black (10YR 2/1) accumulations of iron and manganese oxide; neutral.

The control section ranges from 27 to 35 percent clay. It is slightly acid or neutral.

The Cg horizon has few to many mottles with hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is dominantly silty clay loam but has strata of silt loam.

Piasa Series

The Piasa series consists of poorly drained, very slowly permeable soils on broad uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Piasa soils commonly are adjacent to Cowden, Ebbert, Oconee, and Virden soils. The adjacent soils do not have a natric horizon. The poorly drained Cowden soils are in landscape positions similar to those of the Piasa soils. They do not have a mollic epipedon. The somewhat poorly drained Oconee soils are on low ridges.

Typical pedon of Piasa silt loam, 200 feet south and 75 feet west of the northeast corner of sec. 19, T. 9 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; few very fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Eg—8 to 13 inches; dominantly grayish brown (10YR 5/2) silt loam with some very dark grayish brown (10YR 3/2); light gray (10YR 7/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium platy structure; few very fine roots; many faint light brownish gray (10YR 6/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Btng1—13 to 19 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

Btng2—19 to 28 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

Btng3—28 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Btng4—36 to 44 inches; olive gray (5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; many distinct gray (5Y 5/1) clay films on faces of peds; mildly alkaline; clear smooth boundary.

BCg—44 to 56 inches; light gray (5Y 6/1) silt loam; few medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; common distinct gray (5Y 5/1) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2Cng—56 to 60 inches; gray (5Y 5/1) clay loam; few medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; mildly alkaline.

The solum is 56 to more than 60 inches thick. The control section ranges from 35 to 43 percent clay.

The Btng horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2. The content of exchangeable sodium in this horizon ranges from 15 to 35 percent. The BC horizon has the same range of colors as the Btng horizon. The 2C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2.

Raddle Series

The Raddle series consists of well drained, moderately permeable soils on low rises on flood plains.

These soils formed in silty alluvium. Slopes range from 0 to 3 percent.

Raddle soils commonly are adjacent to Huntsville, Tice, and Wakeland soils. The well drained Huntsville soils are in landscape positions similar to those of the Raddle soils. They have a mollic epipedon that is more than 24 inches thick. The somewhat poorly drained Tice and Wakeland soils are lower on the landscape than the Raddle soils. Wakeland soils do not have a dark surface layer.

Typical pedon of Raddle silt loam, 0 to 3 percent slopes, 1,460 feet east and 1,540 feet north of the southwest corner of sec. 12, T. 8 N., R. 2 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; common very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BA—14 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—18 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; common distinct dark brown (10YR 4/3) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—29 to 41 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; common distinct white (10YR 8/2) silt coatings on faces of peds; few distinct dark brown (10YR 4/3) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw3—41 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to weak medium subangular blocky; friable; many distinct white (10YR 8/2) silt coatings on faces of peds; few distinct dark brown (10YR 4/3) organic coatings on faces of peds; medium acid.

The thickness of the solum ranges from 50 to more than 60 inches. The loess is more than 60 inches thick.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Sawmill soils are similar to Tice soils and commonly are adjacent to those soils. The somewhat poorly drained Tice soils are on the slightly higher ridges above the Sawmill soils.

Typical pedon of Sawmill silty clay loam, frequently flooded, 145 feet west and 1,400 feet north of the southeast corner of sec. 14, T. 10 N., R. 3 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak fine granular structure; firm; common fine and very fine roots; neutral; abrupt smooth boundary.

A1—9 to 15 inches; very dark gray (10YR 3/1) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—15 to 20 inches; very dark gray (10YR 3/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6 and 3/4) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg1—20 to 36 inches; very dark gray (10YR 3/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6 and 3/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; common fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—36 to 51 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) coatings on faces of peds; common medium rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg—51 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; common medium rounded concretions of iron and manganese oxide; about 15 percent fine sand; mildly alkaline.

The solum ranges from 36 to 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 or 2. Part of this horizon is clay loam in some pedons. The Cg horizon has strata of silt loam or sandy loam in some pedons.

Shiloh Series

The Shiloh series consists of poorly drained, moderately slowly permeable soils in depressions on uplands. These soils formed in loess over Illinoian till. Slopes range from 0 to 2 percent.

Shiloh soils commonly are adjacent to Cisne, Ebbert, Newberry, and Oconee soils. Cisne and Newberry soils are higher on the landscape than the Shiloh soils. They do not have a mollic epipedon. Ebbert soils are in landscape positions similar to those of the Shiloh soils. They have a mollic epipedon that is less than 24 inches thick. The somewhat poorly drained Oconee soils are on low rises above the Shiloh soils.

Typical pedon of Shiloh silty clay loam, 2,300 feet north and 200 feet west of the center of sec. 32, T. 9 N., R. 1 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam; moderate fine and medium granular structure; firm; common very fine roots; neutral; clear smooth boundary.

Bg1—7 to 22 inches; black (10YR 2/1) silty clay loam; moderate fine and medium angular and subangular blocky structure; firm; common very fine roots; neutral; clear smooth boundary.

Bg2—22 to 28 inches; very dark gray (10YR 3/1) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; neutral; clear smooth boundary.

Bg3—28 to 35 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; common distinct dark gray (5Y 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg4—35 to 45 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common distinct dark gray (5Y 4/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

Bg5—45 to 60 inches; light gray (5Y 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; firm; mildly alkaline.

The thickness of the solum ranges from 42 to more than 60 inches. The loess is more than 60 inches thick. The mollic epipedon is 24 to 28 inches thick. The control section ranges from 35 to 45 percent clay.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 6, and chroma of 1 or 2. It commonly is silty clay but is silty clay loam in some pedons.

Stoy Series

The Stoy series consists of somewhat poorly drained, slowly permeable soils on uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Stoy soils commonly are adjacent to Hickory and Hosmer soils. The well drained Hickory soils formed in glacial till on side slopes. The moderately well drained Hosmer soils are on ridges above the Stoy soils.

Typical pedon of Stoy silt loam, 0 to 2 percent slopes, 560 feet north and 600 feet west of the center of sec. 27, T. 9 N., R. 1 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; few fine roots; few fine accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

E—8 to 13 inches; light yellowish brown (10YR 6/4) silt loam; moderate thin and medium platy structure; friable; few fine roots; many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

BE—13 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt1—17 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt2—30 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent strong brown (7.5YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btx1—37 to 47 inches; brown (10YR 5/3) silty clay loam; few medium faint light brownish gray (10YR 6/2) and few fine prominent strong brown (7.5YR 5/8) mottles; strong medium platy structure parting to moderate fine subangular blocky; firm; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct pale brown (10YR 6/3) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Btx2—47 to 54 inches; yellowish brown (10YR 5/6) silty clay loam; few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; firm; many distinct dark yellowish brown (10YR 5/4) clay films on faces of peds; few distinct pale brown (10YR 6/3) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

2C—54 to 60 inches; yellowish brown (10YR 5/4) loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; few distinct light gray (10YR 7/2) silt coatings on faces of peds; very strongly acid.

The thickness of the solum ranges from 48 to 60 inches. The loess is more than 55 inches thick. Depth to the fragipan ranges from 35 to 45 inches.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Tice soils commonly are adjacent to Beaucoup, Huntsville, Lawson, Raddle, and Titus soils. The poorly drained Beaucoup and Titus soils are on the lower parts of the landscape. Titus soils have less clay in the subsoil than the Tice soils. The well drained Huntsville soils are on the higher parts of the landscape. The somewhat poorly drained Lawson soils have a mollic epipedon that is more than 24 inches thick. The well drained Raddle soils are on low rises above the Tice soils.

Typical pedon of Tice silt loam, frequently flooded, 1,200 feet east and 150 feet south of the center of sec. 6, T. 8 N., R. 3 E.

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

A—8 to 16 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine and medium granular structure; friable; common very fine roots; few distinct grayish brown (10YR 5/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bw1—16 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common very fine roots; few distinct grayish brown (10YR 5/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bw2—23 to 39 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bw3—39 to 49 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bw4—49 to 60 inches; dark brown (10YR 4/3) silty clay loam; many medium faint dark yellowish brown (10YR 4/4) and common fine faint dark grayish brown (10YR 4/2) mottles; moderate coarse prismatic structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; medium acid.

The solum is more than 60 inches thick. The mollic epipedon is 16 to 20 inches thick. The content of organic carbon decreases irregularly with increasing depth. The A horizon is silty clay loam or silt loam.

Titus Series

The Titus series consists of poorly drained, slowly permeable soils in shallow depressions on flood plains.

These soils formed in clayey alluvium. Slopes range from 0 to 2 percent.

Titus soils commonly are adjacent to the poorly drained Beaucoup and Petrolia and somewhat poorly drained Tice soils in the slightly higher landscape positions. The adjacent soils have less clay in the subsoil than the Titus soils.

Typical pedon of Titus silty clay loam, frequently flooded, 130 feet north and 650 feet west of the southeast corner of sec. 35, T. 7 N., R. 1 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure; firm; very few very fine roots; neutral; abrupt smooth boundary.

Bg1—10 to 16 inches; dark gray (10YR 4/1) silty clay; few fine prominent yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown (10YR 3/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—16 to 22 inches; dark gray (10YR 4/1) silty clay; few fine distinct dark yellowish brown (10YR 4/4) and common fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct very pale brown (10YR 7/3) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg3—22 to 28 inches; dark gray (10YR 4/1) silty clay; few fine prominent dark yellowish brown (10YR 4/6) and common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg4—28 to 47 inches; dark gray (10YR 4/1) silty clay; common medium distinct dark yellowish brown (10YR 4/4) and few fine prominent strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg5—47 to 60 inches; dark gray (10YR 4/1) silty clay; common fine distinct brown (10YR 4/3) and common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; few fine rounded concretions of iron and manganese oxide; neutral.

The solum is more than 60 inches thick. The mollic epipedon is 20 to 24 inches thick.

The Ap horizon is silty clay loam or silty clay. The Bg horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

Virden Series

The Virden series consists of poorly drained, moderately slowly permeable soils on broad uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Virden soils commonly are adjacent to Cowden, Ebbert, Piasa, and Shiloh soils. Cowden soils do not have a mollic epipedon. Ebbert and Shiloh soils are lower on the landscape than the Virden soils. Piasa soils have a high content of sodium in the subsoil.

Typical pedon of Virden silty clay loam, 730 feet east and 330 feet south of the center of sec. 13, T. 6 N., R. 1 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

A—8 to 15 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; common very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt1—15 to 23 inches; very dark gray (10YR 3/1) silty clay; common fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine roots; many distinct black (10YR 2/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt2—23 to 33 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and prominent yellowish brown (10YR 5/8) mottles; strong fine and medium prismatic structure parting to strong fine and medium subangular blocky; firm; common very fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt3—33 to 40 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent yellowish brown

(10YR 5/8) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; many fine rounded accumulations of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Bt4—40 to 50 inches; dominantly mottled yellowish brown (10YR 5/6 and 5/8) silty clay loam with some gray (10YR 5/1) and grayish brown (10YR 5/2); weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common distinct gray (10YR 5/1) clay films in root channels; common fine rounded accumulations of iron and manganese oxide; mildly alkaline; abrupt smooth boundary.

Bt5—50 to 60 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; friable; common fine rounded accumulations of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; neutral.

The solum and the loess are more than 60 inches thick. The mollic epipedon typically is about 23 inches thick.

Wakeland Series

The Wakeland series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Wakeland soils commonly are adjacent to Beaucoup, Birds, Camden, Coffeen, Lawson, Petrolia, and Raddle soils. The poorly drained Beaucoup, Birds, and Petrolia soils are lower on the landscape than the Wakeland soils. Beaucoup soils have a mollic epipedon. The well drained Camden soils are on stream terraces above the Wakeland soils. Coffeen, Lawson, and Raddle soils have a mollic epipedon. The somewhat poorly drained Coffeen and Lawson soils are in landscape positions similar to those of the Wakeland soils. The well drained Raddle soils are higher on the landscape than the Wakeland soils.

Typical pedon of Wakeland silt loam, frequently flooded, 790 feet east and 400 feet north of the southwest corner of sec. 24, T. 9 N., R. 1 E.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate very fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

C1—9 to 15 inches; brown (10YR 4/3) silt loam; few fine faint yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; friable; few fine roots; thin strata of coarse textured material; neutral; clear smooth boundary.

C2—15 to 33 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent strong brown (7.5YR 5/6) and few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure; friable; few fine roots; few distinct light gray (10YR 7/2) silt coatings on faces of peds; thin light gray (10YR 7/2) strata; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

C3—33 to 40 inches; stratified grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few fine distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

C4—40 to 46 inches; light brownish gray (2.5Y 6/2), stratified silt loam; common medium prominent yellowish brown (10YR 5/8) and many medium distinct brown (10YR 5/3) mottles; weak coarse prismatic structure; friable; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; dark grayish brown (10YR 4/2) krotovinas; neutral; clear smooth boundary.

C5—46 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam; many medium prominent yellowish brown (10YR 5/8) and many medium distinct brown (10YR 5/3) mottles; weak coarse prismatic structure; friable; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral.

The part of the C horizon within a depth of 30 inches has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. The part between depths of 30 and 60 inches has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 3 and is mottled. This horizon is dominantly silt loam. In many pedons, however, it has strata of loam or sandy loam. Reaction is neutral or medium acid.

Wirt Series

The Wirt series consists of well drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Wirt soils are similar to Huntsville soils and commonly are adjacent to Holton soils. The somewhat poorly drained Holton soils are on the lower parts of the flood plains. Huntsville soils have a mollic epipedon.

Typical pedon of Wirt silt loam, frequently flooded, 1,350 feet north and 660 feet west of the center of sec. 35, T. 8 N., R. 2 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine roots; common faint dark brown (10YR 3/3) coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bw1—7 to 16 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 3/3) coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw2—16 to 27 inches; dark yellowish brown (10YR 4/4) loam; weak medium and coarse subangular blocky structure; friable; few fine roots; common distinct dark brown (10YR 3/3) coatings on faces of peds; neutral; gradual smooth boundary.

Bw3—27 to 40 inches; dark yellowish brown (10YR 4/4) loam; weak coarse subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) coatings on faces of peds; neutral; gradual smooth boundary.

C1—40 to 52 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; thin strata of sandy loam; massive; friable; common distinct dark brown (10YR 3/3) coatings on cleavage planes; neutral; gradual smooth boundary.

C2—52 to 60 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; thin strata of loamy sand; massive; friable; neutral.

The solum ranges from 24 to 40 inches in thickness. The Ap horizon has value of 3 to 5 and chroma of 2 to 4. The Bw and C horizons have value of 3 to 5 and chroma of 3 to 6. They are loam, silt loam, sandy loam, fine sandy loam, or very fine sandy loam.

Wynoose Series

The Wynoose series consists of poorly drained, very slowly permeable soils on uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Wynoose soils are adjacent to the somewhat poorly drained Bluford soils in the slightly higher landscape positions.

Typical pedon of Wynoose silt loam, 1,625 feet east and 75 feet south of the center of sec. 34, T. 8 N., R. 3 E.

Ap—0 to 8 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; common fine distinct dark brown (10YR 4/3) mottles; moderate fine and medium granular structure; friable; common very fine roots; few distinct pale brown (10YR 6/3) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Eg1—8 to 12 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent grayish brown (10YR 5/4) and yellowish brown (10YR 5/8) mottles; moderate medium platy structure; common very fine roots; common distinct light gray (10YR 7/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Eg2—12 to 20 inches; grayish brown (2.5Y 5/2) silt loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium platy structure; friable; common very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—20 to 28 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—28 to 35 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg3—35 to 42 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; few distinct dark grayish brown (10YR 7/2) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg4—42 to 54 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; common fine rounded accumulations of iron and manganese oxide; many distinct light gray (10YR 7/2) silt coatings on faces of peds in the lower 3 inches of the horizon; strongly acid; clear smooth boundary.

2Btg5—54 to 60 inches; gray (10YR 5/1) clay loam; many medium prominent strong brown (7.5YR 4/6) and many medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; few distinct gray (10YR 5/1) clay films in root channels; common fine rounded accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 48 to more than 60 inches. The thickness of the loess ranges from 37 to 55 inches.

The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It has mottles with hue of 2.5Y, 10YR, or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam or silty clay. The 2C horizon, if it occurs, has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 or 2. It is silt loam, silty clay loam, or clay loam. Some pedons have a buried A horizon.

Formation of the Soils

Soil is the result of the interactions of five soil-forming factors. The characteristics of the soil at any given point are determined by parent material, vegetation and animal life, climate, topography, and time.

Parent Material

Parent material is the unconsolidated geologic material in which soils form. It determines the chemical and mineralogical composition of the soils. The soils in Fayette County formed in glacial till, loess, and alluvium. Some of the parent material has been reworked and redeposited by the actions of water and wind. The properties of the material vary greatly, depending on how it was deposited.

Glacial till is material laid down directly by glaciers with a minimum of water action. The last glaciers covered the survey area 200,000 to 250,000 years ago. The glacial till in the county is either one of two members of the Glasford Formation of Illinoian Age—Vandalia till and Hagarstown drift. Vandalia till is of greater extent than Hagarstown drift. This loamy till was transported and deposited by the Illinoian ice sheet. Hickory soils formed in Vandalia till. Hagarstown drift was deposited and reworked by glacial meltwater in crevices of the ice sheet. It commonly overlies the Vandalia till. Many of the prominent, oval and oblong ridges in the county have cores consisting of Hagarstown drift. These ridges consist mainly of sand and gravel. Parke soils formed in Hagarstown drift *(5)*.

After the Vandalia till was deposited by the glaciers, soil-forming factors started to work, producing a paleosol called the Sangamon soil about 75,000 years ago. Windblown Roxana silt from the basins of the Kaskaskia and Mississippi Rivers was deposited on top of the Sangamon soil. The silt is 1½ to 2½ feet thick *(3)*. About 25,000 years ago, the Farmdale soil began to form in the mixture of Roxana silt and Sangamon soil. Atlas soils formed in the old Farmdale soil. The lower part of most of the soils in the county formed in the Farmdale soil. Cisne, Newberry, and Huey are examples of soils that are underlain by the poorly drained Farmdale soil *(5)*.

Most of the modern soils in Fayette County formed partially in windblown silty material called loess. The primary source of the loess in the county is the flood plains along the Mississippi and Missouri Rivers. The thickness of the loess ranges from less than 1 inch on side slopes to more than 60 inches on upland till plains. Ava, Cisne, and Bluford soils formed in about 3 feet of loess and in the underlying paleosol. The Cowden, Oconee, and Hosmer soils in the northwest corner of the county formed in about 5 feet of loess.

On about 15 percent of the acreage in the county, the soils have concentrations of sodium in the subsoil. Sodium in Darmstadt, Huey, and Piasa soils weathered from the sodium-rich feldspars in the loess. The sodium was concentrated through the lateral movement of ground water above the Illinoian till. The lateral movement was caused by a variation in the permeability of the Illinoian till.

Alluvium is material recently deposited by the floodwater of present streams. The texture of the alluvial sediments is determined by the velocity of the water. The soils on the flood plains in Fayette County formed in fine textured to coarse textured alluvium. Titus and Huntsville soils are examples.

Stream terraces are remnants of former flood plains formed as the stream cut deeper into the landscape. The course of the stream shifted back and forth across the valley, leaving terraces at different levels. Parts of these terraces were eroded away. Camden soils are an example of soils that formed partly in alluvium on terraces.

Vegetation and Animal Life

Soils are affected by the vegetation under which they formed. On about 55 percent of the acreage in Fayette County, the soils formed under prairie plants, such as high beardgrass, prairie clover, and milkweed. The many fine and fibrous roots of these plants add large amounts of organic matter to the soils as the plants die and decompose. The accumulation of organic matter results in the thick, dark surface layer in Cisne and Ebbert soils.

On about 45 percent of the acreage in the county, the soils formed under deciduous hardwoods, such as species of oak, hickory, and elm. These soils are in areas near streams where drainage is good. Organic matter accumulated in these soils through the decomposition of leaf litter. Leaf acids destroy organic matter. As a result, the accumulation of organic matter is limited and the soils have a thin, relatively light colored surface layer. Hickory and Wynoose soils formed under forest vegetation.

Living organisms other than trees and grasses have also affected soil formation in Fayette County. These include the micro-organisms, fungi, earthworms, insects, and burrowing animals that live on or in the soil. Earthworms convert raw vegetative matter into humus and mix this humus with the mineral portion of the soil. This activity helps to make the surface layer of many uncultivated soils more friable and granular. Ants and crawfish remove material from the subsoil and deposit it on the surface. Field mice, moles, and shrews also mix a large amount of soil material. The tunnels made by burrowing animals facilitate the growth roots and the movement of water through the soil.

Human activities also affect soil formation. Farming can change the content of organic matter in the surface layer and increase the hazards of runoff and erosion. Building dikes and levees can reduce the frequency of flooding. Installing subsurface drains can lower the water table. The future formation of some soils will be greatly affected by these activities.

Climate

Fayette County has a temperate, humid, continental climate. Climatic differences within the county are too small to have caused any significant differences among the soils.

The soils in the county are classified under the aquic moisture regime or the udic moisture regime. The aquic moisture regime is a reducing regime that is virtually free of dissolved oxygen because the soil is saturated with ground water. The level of the ground water fluctuates with the seasons. It commonly is highest in spring. Cisne and Wynoose are examples of soils that have an aquic moisture regime. The udic moisture regime is in areas where the soil moisture control section is not dry for as many as 90 days in most years. This regime is common in areas where the amount of stored moisture plus rainfall is equal to or exceeds the amount of moisture lost through evapotranspiration. Water moves downward through the soil at some time in most years. Ava and Hickory are examples of soils that have a udic moisture regime.

Fayette County is within the mesic temperature regime. In this temperature regime, the mean annual soil temperature is 47 to 59 degrees F and the difference between the mean summer and mean winter soil temperature is more 9 degrees F at a depth of about 20 inches.

Climate significantly affects soil formation through its effects on weathering, vegetation, and erosion. Temperature and precipitation affect the physical and chemical nature of the soil. The weathering of minerals in the soil accelerates as the temperature increases. As water moves through the soil, soluble salts are dissolved and transported downward and laterally with the water. The water in the soil also transports clay-sized particles from the surface soil to the subsoil. A claypan formed in some of the soils in Fayette County partly as a result of this translocation of clay. Climate also affects soil formation through its interaction with vegetation. The temperature and precipitation in the county favor both prairie and forest vegetation.

Precipitation affects soil formation through its effect on erosion. As the rate of erosion approaches the rate of soil formation, the soil generally exhibits less profile development. Additional information about the climate is available in the section "General Nature of the County."

Topography

Topography tends to modify the effects of the other soil-forming factors. It controls the amount of water in the soil through its influence on surface runoff and infiltration. It also affects the thickness of the solum. Because of accelerated erosion, the solum is thinner in the steeper soils than in the less sloping soils. The slope in Fayette County ranges from 0 percent in some areas of Cisne soils to 60 percent in some areas of Hickory soils.

Differences in natural drainage are generally closely associated with slope or relief. Soils that formed in the more sloping areas on uplands are moderately well drained and have a brown and yellowish brown subsoil. Hickory soils are an example. Soils that formed in low areas, such as shallow depressions, and on broad, nearly level plains are poorly drained and have a grayish subsoil. Ebbert and Newberry soils are examples. Soils that formed in intermediate landscape positions, such as low ridges and gently sloping side slopes, are somewhat poorly drained and have a grayish and brownish, mottled subsoil. Bluford and Hoyleton soils are examples.

Time

Time is necessary for the other soil-forming factors to interact. Soil profiles normally become more strongly expressed with increased exposure to the processes of weathering. The influence of time, however, can be modified by the deposition of material and by topography. Soils on bottom land, such as Huntsville and Beaucoup soils, receive surface deposits each time they are flooded. These weakly developed soils are much younger than the other soils in the county. Bluford and Wynoose soils, which formed in loess or glacial till, are examples of the older, more mature soils in the county.

The soils in nearly level areas commonly are genetically and morphologically older than the soils in the more sloping areas because the slope affects the amount of water that penetrates the surface. If the other soil-forming factors are constant, the degree of profile development generally decreases as the slope increases. In the steeper areas, the rate of geologic erosion is higher and the rate of water infiltration is lower.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Fehrenbacher, J.B., I.J. Jansen, and K.R. Olson. 1986. Loess thickness and its effect on soils in Illinois. Univ. of Illinois Bull. 782.

(4) Fehrenbacher, J.B., R.A. Pope, I.J. Jansen, J.D.Alexander, and B.W. Ray. 1978. Soil productivity in Illinois. Univ. of Illinois, Coll. of Agric., Coop. Ext. Serv. Circ. 1156.

(5) Frye, J.C., and H.B. Willman. 1975. Quaternary system. *In* Handbook of Illinois Stratigraphy. Illinois State Geol. Surv. Bull. 95: 211-239.

(6) Harrington, F.C. 1939. Inventory of the county archives of Illinois. Fayette County archives.

(7) Illinois Cooperative Crop Reporting Service. 1983. Illinois agricultural statistics: Annual summary. Illinois Coop. Crop Rep. Serv. Bull. 83-1.

(8) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210.

(9) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(10) United States Department of Agriculture. 1984 (rev.). Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1.

(11) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

(12) United States Department of Health, Education, and Welfare. 1957. Manual of septic tank practices. Public Health Serv. Publ. 526.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or 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; the air 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 granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (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 moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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 oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, 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 classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

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

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

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 semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

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

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. 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 without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

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 water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

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

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Underlying material. The part of the soil below the solum.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1961-90 at Effingham, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	35.0	17.2	26.1	65	-14	3	1.96	0.73	2.98	4	7.1
February----	40.0	20.9	30.5	68	-8	5	2.34	1.17	3.35	4	5.5
March-------	52.1	32.2	42.1	80	7	51	3.76	2.06	5.27	7	3.2
April-------	65.0	42.9	54.0	87	24	182	3.59	2.06	4.96	7	.2
May---------	75.1	52.0	63.6	91	32	424	4.10	2.31	5.69	7	.0
June--------	84.2	61.2	72.7	97	45	681	4.19	1.96	6.12	6	.0
July--------	87.8	65.3	76.6	99	50	824	4.14	2.18	5.85	6	.0
August------	85.6	62.9	74.3	99	48	752	2.78	1.36	4.01	4	.0
September---	79.4	55.7	67.6	96	37	511	3.10	1.16	4.72	4	.0
October-----	67.3	43.7	55.5	88	24	215	2.79	1.45	3.97	5	.0
November----	53.4	34.3	43.8	77	12	54	3.57	1.65	5.23	6	1.2
December----	39.9	23.0	31.5	67	-6	8	3.61	1.49	5.41	5	4.7
Yearly:											
Average---	63.7	42.6	53.2	---	---	---	---	---	---	---	---
Extreme---	111	-24	---	101	-15	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,710	39.93	33.25	45.13	65	21.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Effingham, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 8	Apr. 14	May 6
2 years in 10 later than--	Apr. 3	Apr. 10	Apr. 30
5 years in 10 later than--	Mar. 24	Apr. 1	Apr. 19
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 26	Oct. 13	Oct. 2
2 years in 10 earlier than--	Oct. 31	Oct. 18	Oct. 7
5 years in 10 earlier than--	Nov. 11	Oct. 29	Oct. 17

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Effingham, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	197	188	156
8 years in 10	204	194	164
5 years in 10	218	205	180
2 years in 10	231	216	196
1 year in 10	238	222	204

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Cisne silt loam	48,678	10.5
3A	Hoyleton silt loam, 0 to 2 percent slopes	30,811	6.6
3B	Hoyleton silt loam, 2 to 5 percent slopes	3,161	0.7
3B2	Hoyleton silt loam, 2 to 5 percent slopes, eroded	3,984	0.9
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	15,100	3.3
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded	13,099	2.8
8F	Hickory loam, 15 to 30 percent slopes	42,901	9.2
8G	Hickory loam, 30 to 60 percent slopes	3,902	0.8
12	Wynoose silt loam	8,327	1.8
13A	Bluford silt loam, 0 to 2 percent slopes	68,305	14.7
13B	Bluford silt loam, 2 to 5 percent slopes	6,225	1.3
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	6,314	1.4
14B	Ava silt loam, 1 to 5 percent slopes	28,363	6.1
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	2,401	0.5
15B	Parke silt loam, 1 to 5 percent slopes	7,852	1.7
15C2	Parke silt loam, 5 to 10 percent slopes, eroded	5,674	1.2
15D2	Parke silt loam, 10 to 15 percent slopes, eroded	2,307	0.5
48	Ebbert silt loam	4,942	1.1
50	Virden silty clay loam	1,045	0.2
112	Cowden silt loam	1,473	0.3
113A	Oconee silt loam, 0 to 2 percent slopes	3,757	0.8
113B	Oconee silt loam, 2 to 5 percent slopes	1,668	0.4
120	Huey silt loam	2,741	0.6
127A	Harrison silt loam, 0 to 2 percent slopes	1,047	0.2
128B	Douglas silt loam, 2 to 5 percent slopes	330	0.1
134B	Camden silt loam, 2 to 5 percent slopes	1,738	0.4
138	Shiloh silty clay loam	2,176	0.5
164A	Stoy silt loam, 0 to 2 percent slopes	1,008	0.2
214B	Hosmer silt loam, 2 to 5 percent slopes	1,320	0.3
218	Newberry silt loam	13,111	2.8
287	Chauncey silt loam	551	0.1
430A	Raddle silt loam, 0 to 3 percent slopes	771	0.2
474	Piasa silt loam	1,626	0.3
585F	Negley loam, 15 to 30 percent slopes	1,007	0.2
585G	Negley loam, 30 to 60 percent slopes	518	0.1
620A	Darmstadt silt loam, 0 to 2 percent slopes	20,330	4.4
620B	Darmstadt silt loam, 2 to 5 percent slopes	4,984	1.1
865	Pits, gravel	206	*
1426	Karnak silty clay loam, wet	763	0.2
3070	Beaucoup silty clay loam, frequently flooded	11,831	2.5
3077A	Huntsville silt loam, 0 to 3 percent slopes, frequently flooded	1,249	0.3
3107	Sawmill silty clay loam, frequently flooded	10	*
3225	Holton silt loam, frequently flooded	10	*
3226	Wirt silt loam, frequently flooded	10	*
3284	Tice silt loam, frequently flooded	2,662	0.6
3288	Petrolia silt loam, frequently flooded	8,058	1.7
3333	Wakeland silt loam, frequently flooded	34,624	7.5
3334	Birds silt loam, frequently flooded	7,890	1.7
3404	Titus silty clay loam, frequently flooded	6,808	1.5
3428	Coffeen silt loam, frequently flooded	3,338	0.7
3451	Lawson silt loam, frequently flooded	3,624	0.8
8682B	Medway loam, 0 to 3 percent slopes, occasionally flooded	1,085	0.2
	Water	18,895	4.0
	Total	464,610	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
2	Cisne silt loam (where drained)
3A	Hoyleton silt loam, 0 to 2 percent slopes
3B	Hoyleton silt loam, 2 to 5 percent slopes
3B2	Hoyleton silt loam, 2 to 5 percent slopes, eroded (where drained)
13A	Bluford silt loam, 0 to 2 percent slopes (where drained)
13B	Bluford silt loam, 2 to 5 percent slopes
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14B	Ava silt loam, 1 to 5 percent slopes
15B	Parke silt loam, 1 to 5 percent slopes
48	Ebbert silt loam (where drained)
50	Virden silty clay loam (where drained)
112	Cowden silt loam (where drained)
113A	Oconee silt loam, 0 to 2 percent slopes (where drained)
113B	Oconee silt loam, 2 to 5 percent slopes
127A	Harrison silt loam, 0 to 2 percent slopes
128B	Douglas silt loam, 2 to 5 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
138	Shiloh silty clay loam (where drained)
164A	Stoy silt loam, 0 to 2 precent slopes
214B	Hosmer silt loam, 2 to 5 percent slopes
218	Newberry silt loam (where drained)
287	Chauncey silt loam (where drained)
430A	Raddle silt loam, 0 to 3 percent slopes
3070	Beaucoup silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3077A	Huntsville silt loam, 0 to 3 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3107	Sawmill silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3225	Holton silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3226	Wirt silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3284	Tice silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3288	Petrolia silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3333	Wakeland silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3334	Birds silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3428	Coffeen silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3451	Lawson silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
8682B	Medway loam, 0 to 3 percent slopes, occasionally flooded

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchard-grass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
2-------------- Cisne	IIIw	115	35	52	---	4.5	---
3A------------- Hoyleton	IIw	116	34	53	---	4.7	7.5
3B------------- Hoyleton	IIe	115	34	52	---	4.7	7.4
3B2------------ Hoyleton	IIe	111	33	51	---	4.5	7.2
7C2------------ Atlas	IIIe	52	---	19	44	---	---
8D2------------ Hickory	IIIe	72	23	26	50	2.7	4.5
8F------------- Hickory	VIe	---	---	---	---	2.4	4.0
8G------------- Hickory	VIIe	---	---	---	---	---	3.0
12------------- Wynoose	IIIw	96	33	46	---	---	---
13A------------ Bluford	IIw	103	33	49	---	4.1	---
13B------------ Bluford	IIe	102	33	49	---	4.1	---
13B2----------- Bluford	IIe	99	32	47	---	3.9	---
14B------------ Ava	IIe	97	33	48	---	4.3	---
14C2----------- Ava	IIIe	89	30	44	---	3.9	---
15B------------ Parke	IIe	120	42	48	---	3.8	---
15C2----------- Parke	IIIe	105	37	42	---	3.4	---
15D2----------- Parke	IVe	90	32	36	---	3.0	---
48------------- Ebbert	IIw	130	42	54	---	---	---
50------------- Virden	IIw	138	46	57	72	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchard-grass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
112------------- Cowden	IIw	120	37	53	---	---	---
113A------------ Oconee	IIw	120	36	54	---	5.0	---
113B------------ Oconee	IIe	119	36	53	---	4.9	---
120------------- Huey	IVw	64	23	33	---	2.6	---
127A------------ Harrison	I	136	42	59	76	---	8.5
128B------------ Douglas	IIe	134	42	58	75	5.2	8.7
134B------------ Camden	IIe	124	39	54	71	5.0	8.2
138------------- Shiloh	IIw	139	46	56	70	---	---
164A------------ Stoy	IIw	112	35	52	---	4.5	7.5
214B------------ Hosmer	IIe	105	37	47	---	3.4	---
218------------- Newberry	IIw	118	37	53	---	---	---
287------------- Chauncey	IIw	120	37	53	---	---	---
430A------------ Raddle	I	149	45	59	83	5.8	9.7
474------------- Piasa	IIIw	77	28	37	48	---	5.2
585F------------ Negley	VIe	---	---	---	---	3.8	---
585G------------ Negley	VIIe	---	---	---	---	---	---
620A------------ Darmstadt	IIIw	69	26	36	---	3.0	5.0
620B------------ Darmstadt	IIIe	68	26	36	---	3.0	5.0
865. Pits							
1426------------ Karnak	IVw	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchard-grass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
3070------------ Beaucoup	IIIw	117	39	47	---	---	---
3077A----------- Huntsville	IIw	106	34	45	60	4.1	6.8
3107------------ Sawmill	IIIw	132	42	---	---	---	---
3225------------ Holton	IIIw	75	26	32	---	---	---
3226------------ Wirt	IIw	95	32	42	---	4.0	---
3284------------ Tice	IIIw	110	34	---	---	4.1	6.9
3288------------ Petrolia	IIIw	110	35	40	---	---	---
3333------------ Wakeland	IIw	125	44	50	---	---	---
3334------------ Birds	IIIw	111	38	47	---	---	---
3404------------ Titus	IVw	75	25	31	41	---	---
3428------------ Coffeen	IIw	106	33	40	55	---	---
3451------------ Lawson	IIIw	120	39	---	72	---	---
8682B----------- Medway	IIw	120	40	40	---	5.5	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
2--------------- Cisne	4W	Slight	Severe	Moderate	Moderate	Pin oak-------------	70	4	Pin oak, green ash, water tupelo, red maple.
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Bitternut hickory---	---	---	
3A, 3B, 3B2----- Hoyleton	4A	Slight	Slight	Slight	Slight	White oak-----------	70	4	Shortleaf pine, white oak, eastern white pine, eastern cottonwood, northern red oak, green ash.
						Northern red oak----	70	4	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
7C2------------- Atlas	4C	Slight	Slight	Moderate	Moderate	White oak-----------	70	4	Green ash, pin oak, red maple, Austrian pine.
						Northern red oak----	70	4	
						Bur oak-------------	70	4	
						Green ash-----------	---	---	
8D2------------- Hickory	5A	Slight	Slight	Slight	Slight	White oak-----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8F-------------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak-----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8G-------------- Hickory	5R	Severe	Severe	Slight	Slight	White oak-----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
12-------------- Wynoose	4W	Slight	Severe	Moderate	Moderate	Pin oak-------------	70	4	Pin oak, red maple.
						White oak-----------	---	---	
						Black oak-----------	---	---	
13A, 13B, 13B2-- Bluford	4A	Slight	Slight	Slight	Slight	White oak-----------	70	4	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak----	70	4	
						Southern red oak----	70	4	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class[1]	Trees to plant
14B, 14C2 Ava	4A	Slight	Slight	Slight	Slight	White oak	75	4	Black walnut, eastern cottonwood, sweetgum, yellow-poplar, white oak, American sycamore.
						Northern red oak	80	4	
						Yellow-poplar	90	6	
						Black walnut	---	---	
15B Parke	5A	Slight	Slight	Slight	Slight	White oak	90	5	White oak, yellow-poplar, eastern white pine, red pine, black walnut, white ash, black locust, northern red oak, green ash, black cherry, American sycamore, eastern
						Yellow-poplar	98	7	
						Sweetgum	76	5	
15C2, 15D2 Parke	5A	Slight	Slight	Slight	Slight	White oak	90	5	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust, northern red oak, green ash, black cherry, American sycamore, eastern cottonwood,
						Yellow-poplar	98	7	
						Sweetgum	76	5	
120 Huey	3T	Slight	Severe	Severe	Moderate	Green ash	60	3	Eastern redcedar, eastern white pine, green ash, Osage-orange.
						Eastern cottonwood	---	---	
						White oak	---	---	
134B Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar	95	7	Yellow-poplar, green ash, white oak, white ash, black walnut, eastern white pine, red pine, black locust.
						Green ash	76	5	
						White oak	85	5	
						Northern red oak	85	5	
						Sweetgum	80	6	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
164A------------ Stoy	4A	Slight	Slight	Slight	Slight	White oak-----------	70	4	Shortleaf pine, loblolly pine, eastern white pine, Scotch pine, eastern redcedar.
						Southern red oak----	70	4	
						White ash-----------	---	---	
						Bur oak-------------	---	---	
214B------------ Hosmer	4A	Slight	Slight	Slight	Slight	White oak-----------	75	4	Eastern white pine, shortleaf pine, red pine, yellow-poplar, white ash.
						Yellow-poplar-------	90	6	
						Virginia pine-------	75	8	
						Sugar maple---------	75	3	
287------------- Chauncey	4W	Slight	Severe	Moderate	Moderate	Pin oak-------------	80	4	Pin oak, green ash, water tupelo, red maple.
						White oak-----------	---	---	
						Green ash-----------	---	---	
						Yellow-poplar-------	80	5	
585F------------ Negley	5R	Moderate	Moderate	Slight	Slight	Northern red oak----	94	5	Eastern white pine, yellow-poplar, red pine, white ash, white oak, northern red oak.
						Yellow-poplar-------	99	7	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
585G------------ Negley	5R	Severe	Severe	Slight	Slight	Northern red oak----	94	5	Eastern white pine, yellow-poplar, red pine, white ash, white oak, northern red oak.
						Yellow-poplar-------	99	7	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
620A, 620B------ Darmstadt	4T	Slight	Slight	Moderate	Slight	White oak-----------	70	4	Eastern white pine, white oak, green ash, eastern redcedar, Osage-orange.
						Black oak-----------	70	4	
						Pignut hickory------	---	---	
1426------------ Karnak	2W	Slight	Severe	Severe	Severe	Silver maple--------	70	2	Baldcypress, water tupelo, green ash.
						Water tupelo--------	---	---	
						Baldcypress---------	---	---	
						Green ash-----------	---	---	
						Black willow--------	---	---	
3070------------ Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	5	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	9	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
3077A----------- Huntsville	7A	Slight	Slight	Slight	Slight	Yellow-poplar------- Eastern cottonwood-- American sycamore--- Cherrybark oak------ Sweetgum------------ Green ash-----------	98 110 --- --- --- ---	7 11 --- --- --- ---	Eastern cottonwood, American sycamore, green ash, black walnut, red maple, sugar maple, hackberry.
3107------------ Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak------------- Eastern cottonwood-- Sweetgum------------ Cherrybark oak------ American sycamore---	90 --- --- --- ---	5 --- --- --- ---	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
3225------------ Holton	5A	Slight	Slight	Slight	Slight	Pin oak------------- Northern red oak---- Yellow-poplar------- Sugar maple--------- White oak----------- Black walnut-------- Black cherry-------- White ash-----------	85 80 90 80 --- --- --- ---	5 4 6 4 --- --- --- ---	Yellow-poplar, white oak, black walnut, white ash, eastern white pine, red pine.
3226------------ Wirt	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	7	Yellow-poplar, eastern white pine, black walnut.
3284------------ Tice	5A	Slight	Slight	Slight	Slight	Pin oak------------- Sweetgum------------ Yellow-poplar------- Virginia pine------- Eastern cottonwood-- White ash-----------	96 86 90 90 --- ---	5 7 6 9 --- ---	Yellow-poplar, eastern cottonwood, American sycamore, green ash, red maple, cherrybark oak.
3288------------ Petrolia	5W	Slight	Moderate	Moderate	Slight	Pin oak------------- Eastern cottonwood-- Sweetgum------------ Cherrybark oak------ American sycamore---	90 100 --- --- ---	5 9 --- --- ---	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
3333------------ Wakeland	5A	Slight	Slight	Slight	Slight	Pin oak------------- Sweetgum------------ Yellow-poplar------- Virginia pine-------	90 88 90 85	5 7 6 9	Eastern white pine, baldcypress, American sycamore, red maple, white ash.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Potential productivity: Common trees	Site index	Produc-tivity class*	Trees to plant
3334------------ Birds	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	5	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
						Eastern cottonwood--	100	9	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3404------------ Titus	2W	Slight	Severe	Severe	Moderate	Silver maple--------	80	2	Silver maple, eastern cottonwood, pin oak, swamp white oak, green ash, water tupelo, American sycamore, hackberry, red maple.
						Eastern cottonwood--	99	9	
						White ash-----------	51	2	
3428------------ Coffeen	6W	Slight	Moderate	Slight	Slight	Yellow-poplar-------	90	6	Eastern cottonwood, yellow-poplar, pin oak, American sycamore, sweetgum, red maple.
						Eastern cottonwood--	100	---	
						Pin oak-------------	90	5	
3451------------ Lawson	2W	Slight	Moderate	Slight	Slight	Silver maple--------	70	2	White spruce, silver maple, white ash.
						White ash-----------	---	---	
						Red maple-----------	---	---	
8682B----------- Medway	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	5	Eastern white pine, yellow-poplar, black walnut, white ash, red pine, northern red oak, white oak.
						Yellow-poplar-------	96	7	
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash-----------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(Only the soils that are suitable for windbreaks and environmental plantings are listed. The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
2 Cisne	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3A, 3B, 3B2 Hoyleton	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
7C2 Atlas	American cranberrybush, silky dogwood, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8D2, 8F, 8G Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
12 Wynoose	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
13A, 13B, 13B2 Bluford	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
14B, 14C2 Ava	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
15B, 15C2, 15D2 Parke	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
48----------------- Ebbert	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
50----------------- Virden	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
112---------------- Cowden	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, blue spruce, Norway spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
113A, 113B--------- Oconee	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange, northern whitecedar.	Eastern white pine, pin oak.	---
120---------------- Huey	Eastern redcedar, Russian-olive, silky dogwood.	Siberian elm, green ash.	---	---
127A--------------- Harrison	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
128B--------------- Douglas	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
134B--------------- Camden	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Northern whitecedar, white fir, Washington hawthorn, blue spruce.	Austrian pine, Norway spruce.	Eastern white pine, pin oak.
164A--------------- Stoy	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, Amur honeysuckle, arrowwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
214B--------------- Hosmer	Eastern redcedar, arrowwood, Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
218-----Newberry	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
287-----Chauncey	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
430A-----Raddle	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
474-----Piasa	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
585F, 585G-----Negley	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
620A, 620B-----Darmstadt	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
3070-----Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
3077A-----Huntsville	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3107-----Sawmill	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
3225-----Holton	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Austrian pine, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3226-----Wirt	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
3284 Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3288 Petrolia	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, blue spruce, Washington hawthorn, Norway spruce, Austrian pine, northern whitecedar.	Eastern white pine	Pin oak.
3333 Wakeland	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3334 Birds	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3404 Titus	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3451 Lawson	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
8682B Medway	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2: Cisne	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
3A, 3B, 3B2: Hoyleton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
7C2: Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
8D2: Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8F: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8G: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
12: Wynoose	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
13A, 13B, 13B2: Bluford	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
14B: Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
14C2: Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness.
15B: Parke	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
15C2: Parke	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
15D2: Parke	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
48: Ebbert	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
50: Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
112: Cowden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
113A, 113B: Oconee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
120-------------------- Huey	Severe: ponding, percs slowly, excess sodium.	Severe: ponding, excess sodium, percs slowly.	Severe: ponding, percs slowly, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
127A------------------- Harrison	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
128B------------------- Douglas	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
134B------------------- Camden	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
138-------------------- Shiloh	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
164A------------------- Stoy	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
214B------------------- Hosmer	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
218-------------------- Newberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
287-------------------- Chauncey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
430A------------------- Raddle	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
474-------------------- Piasa	Severe: ponding, percs slowly, excess sodium.	Severe: ponding, excess sodium, percs slowly.	Severe: ponding, percs slowly, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
585F------------------- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
585G------------------- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
620A, 620B------------ Darmstadt	Severe: wetness, percs slowly, excess sodium.	Severe: excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Severe: excess sodium.
865. Pits					
1426------------------- Karnak	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3070------------------- Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3077A Huntsville	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
3107 Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3225 Holton	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3226 Wirt	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3284 Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
3288 Petrolia	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3333 Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3334 Birds	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3404 Titus	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3428 Coffeen	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3451 Lawson	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
8682B Medway	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Moderate: wetness.	Moderate: flooding, wetness.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2--------- Cisne	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
3A--------- Hoyleton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3B, 3B2--------- Hoyleton	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
7C2--------- Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8D2--------- Hickory	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8F--------- Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8G--------- Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
12--------- Wynoose	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
13A--------- Bluford	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
13B, 13B2--------- Bluford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B, 14C2--------- Ava	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
15B--------- Parke	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15C2--------- Parke	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15D2--------- Parke	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
48--------- Ebbert	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
50--------- Virden	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
112--------- Cowden	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
113A--------- Oconee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
113B--------- Oconee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
120: Huey	Poor	Poor	Poor	Fair	Fair	Good	Good	Poor	Fair	Good.
127A: Harrison	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
128B: Douglas	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
134B: Camden	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
138: Shiloh	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
164A: Stoy	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
214B: Hosmer	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
218: Newberry	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
287: Chauncey	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
430A: Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
474: Piasa	Poor	Fair	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.
585F: Negley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
585G: Negley	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
620A: Darmstadt	Fair	Good	Poor	Good	Good	Fair	Fair	Fair	Good	Fair.
620B: Darmstadt	Fair	Good	Poor	Good	Good	Fair	Poor	Fair	Good	Poor.
865. Pits										
1426: Karnak	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
3070: Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3077A: Huntsville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3107: Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
3225---------------- Holton	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3226---------------- Wirt	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
3284---------------- Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3288---------------- Petrolia	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3333---------------- Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3334---------------- Birds	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
3404---------------- Titus	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3428---------------- Coffeen	Fair	Fair	Fair	Good	Poor	Fair	Poor	Fair	Good	Poor.
3451---------------- Lawson	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
8682B--------------- Medway	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2----------------- Cisne	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
3A, 3B, 3B2------- Hoyleton	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
7C2--------------- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty.
8D2--------------- Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8F, 8G------------ Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
12---------------- Wynoose	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
13A, 13B, 13B2---- Bluford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
14B--------------- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
14C2-------------- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
15B--------------- Parke	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
15C2-------------- Parke	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
15D2-------------- Parke	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
48---------------- Ebbert	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
50 Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
112 Cowden	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
113A, 113B Oconee	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
120 Huey	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: excess sodium, ponding.
127A Harrison	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
128B Douglas	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
134B Camden	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
138 Shiloh	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
164A Stoy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
214B Hosmer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Moderate: wetness.
218 Newberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
287 Chauncey	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
430A Raddle	Slight	Slight	Slight	Slight	Severe: frost action.	Slight.
474 Piasa	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: excess sodium, ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
585F, 585G-------- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
620A, 620B-------- Darmstadt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Severe: excess sodium.
865. Pits						
1426-------------- Karnak	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding.
3070-------------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3077A------------- Huntsville	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: flooding.
3107-------------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
3225-------------- Holton	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3226-------------- Wirt	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3284-------------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3288-------------- Petrolia	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3333-------------- Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3334-------------- Birds	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3404-------------- Titus	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3428 Coffeen	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3451 Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
8682B Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2: Cisne	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
3A: Hoyleton	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
3B, 3B2: Hoyleton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
7C2: Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2: Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
8F, 8G: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
12: Wynoose	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13A: Bluford	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13B, 13B2: Bluford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
14B: Ava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
14C2: Ava	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
15B: Parke	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
15C2: Parke	Slight	Severe: slope.	Slight	Slight	Good.
15D2: Parke	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
48: Ebbert	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
50: Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
112: Cowden	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
113A: Oconee	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
113B: Oconee	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
120: Huey	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, ponding, excess sodium.
127A: Harrison	Severe: wetness.	Severe: wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
128B: Douglas	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
134B: Camden	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey.
138: Shiloh	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
164A: Stoy	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
214B: Hosmer	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
218: Newberry	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
287: Chauncey	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
430A: Raddle	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
474: Piasa	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
585F, 585G: Negley	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
620A: Darmstadt	Severe: wetness, percs slowly.	Slight	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
620B: Darmstadt	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
865. Pits					
1426: Karnak	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3070: Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3077A: Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
3107: Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3225: Holton	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: large stones, wetness.
3226: Wirt	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
3284: Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3288: Petrolia	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3333: Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3334---------------- Birds	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3404---------------- Titus	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3428---------------- Coffeen	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
3451---------------- Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8682B--------------- Medway	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Fair: wetness.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2 Cisne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3A, 3B, 3B2 Hoyleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
7C2 Atlas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
8D2 Hickory	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
8F Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
8G Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
12 Wynoose	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
13A, 13B, 13B2 Bluford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B, 14C2 Ava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
15B, 15C2 Parke	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
15D2 Parke	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
48 Ebbert	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
50 Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
112 Cowden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
113A, 113B Oconee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
120 Huey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, excess sodium.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
127A------------------ Harrison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
128B------------------ Douglas	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
134B------------------ Camden	Good------------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
138------------------- Shiloh	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
164A------------------ Stoy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
214B------------------ Hosmer	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
218------------------- Newberry	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
287------------------- Chauncey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
430A------------------ Raddle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
474------------------- Piasa	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
585F------------------ Negley	Fair: slope.	Probable-------------	Probable-------------	Poor: small stones, slope.
585G------------------ Negley	Poor: slope.	Probable-------------	Probable-------------	Poor: small stones, slope.
620A, 620B------------ Darmstadt	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium.
865. Pits				
1426------------------ Karnak	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3070------------------ Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3077A Huntsville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3225 Holton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
3226 Wirt	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
3284 Tice	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3288 Petrolia	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3333 Wakeland	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3334 Birds	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3404 Titus	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3428 Coffeen	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3451 Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8682B Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2 Cisne	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3A Hoyleton	Slight	Severe: thin layer, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3B, 3B2 Hoyleton	Moderate: slope.	Severe: thin layer, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
7C2 Atlas	Moderate: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
8D2, 8F, 8G Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
12 Wynoose	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13A Bluford	Slight	Severe: piping.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13B, 13B2 Bluford	Moderate: slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
14B, 14C2 Ava	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
15B, 15C2 Parke	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
15D2 Parke	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
48 Ebbert	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
50 Virden	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
112 Cowden	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113A Oconee	Slight	Severe: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
113B: Oconee	Moderate: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
120: Huey	Slight	Severe: ponding, excess sodium.	Ponding, percs slowly, frost action.	Ponding, droughty, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
127A: Harrison	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
128B: Douglas	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.
134B: Camden	Severe: seepage.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
138: Shiloh	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
164A: Stoy	Slight	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
214B: Hosmer	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
218: Newberry	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
287: Chauncey	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
430A: Raddle	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
474: Piasa	Slight	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
585F, 585G: Negley	Severe: seepage, slope.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.
620A: Darmstadt	Slight	Severe: excess sodium.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, excess sodium.
620B: Darmstadt	Moderate: slope.	Severe: excess sodium.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Wetness, excess sodium.
865. Pits						
1426: Karnak	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding	Ponding, percs slowly.	Wetness, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3070-------------- Beaucoup	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
3077A------------- Huntsville	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Flooding-------	Favorable------	Favorable.
3107-------------- Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
3225-------------- Holton	Moderate: seepage.	Severe: piping, wetness.	Flooding, large stones, frost action.	Wetness, erodes easily, flooding.	Large stones, erodes easily, wetness.	Large stones, wetness, erodes easily.
3226-------------- Wirt	Severe: seepage.	Severe: piping.	Deep to water	Flooding-------	Erodes easily	Erodes easily.
3284-------------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness--------	Favorable.
3288-------------- Petrolia	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
3333-------------- Wakeland	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3334-------------- Birds	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3404-------------- Titus	Slight---------	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
3428-------------- Coffeen	Severe: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
3451-------------- Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
8682B------------- Medway	Severe: seepage.	Severe: piping, wetness.	Frost action, flooding.	Wetness, flooding.	Wetness--------	Favorable.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
2----------- Cisne	0-20	Silt loam-----	CL, CL-ML, ML	A-4	0	0	100	100	90-100	85-100	25-35	5-10
	20-49	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	90-100	90-100	45-60	20-35
	49-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	100	90-100	70-95	50-90	30-50	15-30
3A, 3B-------- Hoyleton	0-13	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	5-15
	13-36	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	36-60	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	20-30
3B2----------- Hoyleton	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	5-15
	4-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	12-34	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	20-30
	34-60	Silt loam, loam, clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	95-100	90-100	70-95	20-45	5-25
7C2----------- Atlas	0-6	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	75-95	25-35	5-15
	6-15	Silty clay loam, clay, clay loam.	CH, CL	A-7, A-6	0	0	95-100	90-100	85-100	70-95	35-70	20-45
	15-60	Clay loam, clay, loam.	CH, CL	A-6, A-7	0	0	95-100	90-100	90-100	65-95	35-55	20-30
8D2----------- Hickory	0-16	Silt loam-----	CL	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	16-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8F------------ Hickory	0-16	Loam----------	CL, ML, CL-ML	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	16-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8G------------ Hickory	0-16	Loam----------	CL, ML, CL-ML	A-6, A-4	0	0-5	95-100	90-100	90-100	60-95	20-35	3-15
	16-40	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	55-80	30-50	15-30
	40-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	50-80	20-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
12------------ Wynoose	0-20	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-95	20-35	5-15
	20-54	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	20-35
	54-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0-1	0-10	95-100	90-100	85-100	70-90	25-45	15-30
13A, 13B------ Bluford	0-13	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	90-100	85-100	20-35	5-15
	13-39	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4	0	0	100	95-100	95-100	90-100	20-30	NP-10
	39-47	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	47-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20
13B2---------- Bluford	0-8	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	20-35	5-15
	8-41	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	41-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20
14B----------- Ava	0-15	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
	15-43	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	43-60	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-90	25-40	5-20
14C2---------- Ava	0-9	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
	9-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	28-60	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-90	25-40	5-20
15B, 15C2----- Parke	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-100	20-35	7-15
	8-30	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	95-100	95-100	90-100	80-100	25-40	7-15
	30-60	Sandy clay loam, loam, sandy loam.	SC, CL	A-2, A-6, A-4	0	0-3	90-100	85-95	55-90	30-60	25-35	7-15
15D2---------- Parke	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-100	20-35	7-15
	7-24	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	95-100	95-100	90-100	80-100	25-40	7-15
	24-60	Sandy clay loam, loam, sandy loam.	SC, CL	A-2, A-6, A-4	0	0-3	90-100	85-95	55-90	30-60	25-35	7-15

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
48----------- Ebbert	0-15	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	30-40	10-15
	15-45	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	7-15
	45-60	Silty clay loam, clay loam, loam.	CL	A-7, A-6	0	0	100	95-100	95-100	80-100	30-50	10-30
50----------- Virden	0-15	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	30-45	10-25
	15-60	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
112----------- Cowden	0-12	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	3-15
	12-50	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
	50-60	Silt loam-----	CL	A-6, A-7-6	0	0	100	100	95-100	95-100	30-45	10-20
113A---------- Oconee	0-9	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	9-13	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	13-56	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	56-60	Silt loam-----	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25
113B---------- Oconee	0-13	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	13-47	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	47-60	Silt loam-----	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25
120----------- Huey	0-6	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	85-95	20-35	3-15
	6-10	Silt, silt loam.	CL, ML, CL-ML	A-6, A-4	0	0	100	100	90-100	85-95	15-30	3-15
	10-46	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-25
	46-52	Silt loam, silty clay loam, silty clay.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-30
	52-60	Loam, silt loam, silty clay loam.	CL	A-6	0	0	95-100	90-100	80-95	65-90	20-35	10-20
127A---------- Harrison	0-15	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	30-40	8-15
	15-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-20
	23-45	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	95-100	85-100	80-85	70-80	30-50	10-25
	45-60	Clay loam, clay, silty clay loam.	CL, CH	A-6, A-7	0-1	0-5	95-100	85-100	80-95	70-90	35-55	15-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
128B----------Douglas	0-11	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	100	25-35	7-15
	11-48	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	100	30-45	10-20
	48-60	Silt loam, clay loam, gravelly sandy loam.	CL-ML, SC-SM, CL, SC	A-4, A-6, A-7	0	0	95-100	80-100	50-90	35-85	20-45	5-25
134B----------Camden	0-12	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	12-37	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	37-60	Loam, sandy loam, silt loam.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10
138-----------Shiloh	0-7	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	15-25
	7-60	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	15-40
164A----------Stoy	0-13	Silt loam-----	ML, CL	A-6	0	0	100	100	95-100	90-100	30-40	10-15
	13-54	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	22-32
	54-60	Silt loam-----	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	13-25
214B----------Hosmer	0-18	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	100	90-100	70-90	<25	3-10
	18-40	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	25-35	5-15
	40-60	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	20-30	5-15
218-----------Newberry	0-13	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	30-40	10-20
	13-60	Silty clay loam, clay loam, loam.	CL	A-7, A-6	---	0-5	95-100	90-100	75-100	50-90	30-45	15-25
287-----------Chauncey	0-30	Silt loam-----	CL, ML	A-6, A-4	0	0	100	100	90-100	90-100	25-35	7-15
	30-60	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	90-100	90-100	40-55	20-35
430A----------Raddle	0-14	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	4-15
	14-60	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	20-35	4-15
474-----------Piasa	0-9	Silt loam-----	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	9-56	Silty clay, silty clay loam.	CL, ML, MH, CH	A-7	0	0	100	100	95-100	95-100	40-55	15-25
	56-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
585F, 585G---- Negley	0-10	Loam----------	ML, CL-ML, CL	A-4, A-6	0	0	85-100	75-100	70-90	55-85	25-40	4-15
	10-60	Gravelly sandy clay loam, sandy clay loam, sandy clay.	SC-SM, SC	A-2, A-4, A-7, A-6	---	0-5	70-95	50-90	40-80	25-50	20-50	5-24
620A---------- Darmstadt	0-16	Silt loam-----	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	95-100	95-100	75-100	25-45	5-20
	16-47	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	47-60	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	0	95-100	95-100	90-100	75-100	20-50	7-30
620B---------- Darmstadt	0-18	Silt loam-----	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	95-100	90-100	75-100	25-45	5-20
	18-38	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	38-60	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	0	95-100	95-100	90-100	75-100	20-50	7-30
865. Pits												
1426---------- Karnak	0-18	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	15-25
	18-60	Silty clay, clay.	CH, MH, CL, ML	A-7	0	0	100	100	95-100	95-100	45-80	20-40
3070---------- Beaucoup	0-7	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	7-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	60-95	20-40	5-20
3077A--------- Huntsville	0-40	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-20
	40-60	Silt loam, loam, silty clay loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0	95-100	90-100	85-95	30-85	20-35	5-20
3107---------- Sawmill	0-15	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	15-36	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	36-51	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	0	100	100	85-100	70-95	25-50	8-25
	51-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
3225---------- Holton	0-11	Silt loam-----	CL, CL-ML, ML	A-4	0-1	0-20	90-100	85-100	80-100	60-90	<25	2-10
	11-39	Fine sandy loam, loam, loamy sand.	CL-ML, CL, SC-SM, SC	A-4, A-2, A-6	0-1	0-20	90-100	85-100	60-95	30-75	<25	4-12
	39-60	Stratified loamy fine sand to sandy clay loam.	SC, SC-SM, CL, CL-ML	A-4, A-2, A-6	0-2	0-40	75-100	60-100	55-90	30-55	<25	2-14
3226---------- Wirt	0-7	Silt loam-----	CL-ML, ML	A-4	0	0	95-100	80-100	80-100	65-90	<25	3-7
	7-40	Silt loam, loam.	CL-ML, ML	A-4	0	0	95-100	80-100	75-100	55-90	<25	3-7
	40-60	Sandy loam, loam, gravelly sandy loam.	SM, SC-SM, ML, CL-ML	A-4, A-2, A-1-b	0	0-5	85-95	50-85	40-75	20-55	<25	NP-7
3284---------- Tice	0-8	Silt loam-----	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	8-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	0	100	100	60-95	55-80	25-45	5-20
3288---------- Petrolia	0-9	Silt loam-----	CL	A-6	0	0	100	95-100	80-95	75-90	30-40	10-20
	9-14	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-45	15-25
	14-60	Silty clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	95-100	80-100	60-100	20-45	8-20
3333---------- Wakeland	0-9	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
	9-60	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
3334---------- Birds	0-60	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
3404---------- Titus	0-10	Silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
	10-60	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
3428---------- Coffeen	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	25-40	5-20
	12-36	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	100	90-100	80-95	20-35	3-10
	36-60	Stratified silt loam to sandy loam.	ML, SM, SC, CL	A-4, A-2	0	0	100	90-100	85-100	30-85	15-30	NP-10
3451---------- Lawson	0-28	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	28-32	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	32-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
8682B--------- Medway	0-18	Loam----------	ML, CL, CL-ML	A-4, A-6	0	0	100	100	85-100	70-90	20-40	3-15
	18-38	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	0	95-100	80-95	75-90	70-90	20-45	4-20
	38-42	Stratified sandy loam to silty clay loam.	ML, CL, SC-SM, SM	A-4, A-2, A-6	0	0	90-100	75-100	45-95	25-75	15-30	NP-15
	42-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL, SM, SC	A-2, A-4, A-6, A-1-b	---	0-5	80-100	50-100	30-95	15-75	15-30	NP-15

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2	0-20	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.8	Low	0.37	3	6	1-3
Cisne	20-49	35-45	1.40-1.60	<0.06	0.09-0.15	4.5-6.0	High	0.37			
	49-60	25-37	1.50-1.70	<0.06	0.08-0.14	5.1-7.3	Moderate	0.37			
3A, 3B	0-13	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.32	3	6	1-3
Hoyleton	13-36	15-27	1.35-1.60	0.2-0.6	0.16-0.18	4.5-6.5	Low	0.43			
	36-60	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High	0.43			
3B2	0-4	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.32	3	6	1-3
Hoyleton	4-12	15-27	1.35-1.60	0.2-0.6	0.16-0.18	4.5-6.5	Low	0.43			
	12-34	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High	0.43			
	34-60	15-33	1.35-1.70	0.06-0.2	0.17-0.22	5.1-7.3	Moderate	0.43			
7C2	0-6	20-27	1.30-1.50	0.2-0.6	0.20-0.25	4.5-7.3	Moderate	0.43	3	6	1-3
Atlas	6-15	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High	0.32			
	15-60	20-30	1.35-1.60	0.06-0.2	0.07-0.18	6.1-7.8	Moderate	0.32			
8D2, 8F	0-16	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
Hickory	16-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.28			
8G	0-16	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
Hickory	16-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate	0.28			
	40-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.28			
12	0-20	15-25	1.25-1.45	0.6-2.0	0.22-0.24	4.5-7.8	Low	0.43	3	6	.5-2
Wynoose	20-54	35-42	1.40-1.60	<0.06	0.09-0.13	3.6-6.0	High	0.43			
	54-60	20-35	1.60-1.80	0.06-0.2	0.10-0.16	4.5-7.3	Moderate	0.32			
13A, 13B	0-13	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.43	3	6	1-3
Bluford	13-39	15-30	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low	0.43			
	39-47	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate	0.43			
	47-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate	0.43			
13B2	0-8	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.43	3	6	1-3
Bluford	8-41	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate	0.43			
	41-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate	0.43			
14B	0-15	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.43	4	6	.5-2
Ava	15-43	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate	0.43			
	43-60	20-30	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.43			
14C2	0-9	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.43	4	6	.5-2
Ava	9-28	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate	0.43			
	28-60	20-30	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.43			
15B, 15C2	0-8	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	6	.5-2
Parke	8-30	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37			
	30-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.28			
15D2	0-7	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.37	5	6	.5-2
Parke	7-24	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37			
	24-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.28			
48	0-15	20-27	1.20-1.40	0.2-0.6	0.22-0.24	5.1-7.3	Low	0.32	5	6	2-3
Ebbert	15-45	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-6.0	Low	0.43			
	45-60	22-33	1.50-1.70	0.06-0.2	0.14-0.20	5.6-7.3	Moderate	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
50---------------- Virden	0-15	27-30	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28	5	7	4-6
	15-60	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.28			
112--------------- Cowden	0-12	17-27	1.30-1.50	0.6-2.0	0.22-0.25	5.6-7.3	Low----------	0.37	3	6	2-3
	12-50	35-42	1.35-1.60	0.06-0.2	0.12-0.20	4.5-7.3	High---------	0.37			
	50-60	20-27	1.50-1.70	0.2-0.6	0.17-0.22	5.6-7.8	Moderate-----	0.37			
113A-------------- Oconee	0-9	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3	6	2-3
	9-13	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	13-56	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	56-60	17-27	1.40-1.60	0.06-0.2	0.20-0.22	5.6-8.4	Moderate-----	0.43			
113B-------------- Oconee	0-13	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3	6	2-3
	13-47	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	47-60	17-27	1.40-1.60	0.06-0.2	0.20-0.22	5.6-8.4	Moderate-----	0.43			
120--------------- Huey	0-6	15-27	1.35-1.50	0.2-0.6	0.22-0.24	5.1-7.8	Low----------	0.43	3	6	1-3
	6-10	11-25	1.40-1.55	0.06-0.2	0.20-0.22	5.1-7.8	Low----------	0.43			
	10-46	20-35	1.40-1.60	0.06-0.2	0.10-0.18	5.6-8.4	Moderate-----	0.43			
	46-52	25-35	1.45-1.65	<0.06	0.05-0.08	7.4-9.0	Moderate-----	0.43			
	52-60	18-35	1.55-1.75	0.06-0.2	0.10-0.15	6.6-8.4	Moderate-----	0.43			
127A-------------- Harrison	0-15	20-27	1.15-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	2-4
	15-23	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	23-45	20-35	1.30-1.45	0.6-2.0	0.14-0.20	5.6-7.3	Moderate-----	0.43			
	45-60	30-50	1.50-1.70	0.06-0.2	0.10-0.19	5.1-7.8	High---------	0.43			
128B-------------- Douglas	0-11	14-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	2-4
	11-48	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	48-60	10-30	1.45-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Moderate-----	0.43			
134B-------------- Camden	0-12	14-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low----------	0.37	5	6	1-2
	12-37	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	37-60	10-22	1.55-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Low----------	0.32			
138--------------- Shiloh	0-7	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.1-7.3	High---------	0.28	5	7	4-6
	7-60	35-45	1.35-1.55	0.2-0.6	0.09-0.18	6.1-7.8	High---------	0.28			
164A-------------- Stoy	0-13	20-27	1.20-1.40	0.2-0.6	0.22-0.24	4.5-6.5	Low----------	0.43	5	6	1-2
	13-54	27-35	1.35-1.55	0.06-0.2	0.18-0.20	4.5-5.5	Moderate-----	0.43			
	54-60	20-27	1.55-1.75	0.06-0.2	0.10-0.15	4.5-6.0	Low----------	0.43			
214B-------------- Hosmer	0-18	10-17	1.20-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low----------	0.43	4	5	1-2
	18-40	24-30	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Moderate-----	0.43			
	40-60	16-26	1.60-1.70	<0.06	0.06-0.08	4.5-6.0	Low----------	0.43			
218--------------- Newberry	0-13	20-27	1.25-1.50	0.2-0.6	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	2-3
	13-60	22-33	1.50-1.70	0.06-0.2	0.14-0.20	4.5-7.3	Moderate-----	0.37			
287--------------- Chauncey	0-30	15-22	1.30-1.50	0.6-2.0	0.22-0.25	4.5-6.5	Low----------	0.37	4	6	2-4
	30-60	35-42	1.35-1.60	0.06-0.2	0.11-0.15	4.5-6.0	High---------	0.37			
430A-------------- Raddle	0-14	18-24	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
	14-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.43			
474--------------- Piasa	0-9	18-27	1.25-1.45	0.2-0.6	0.22-0.24	5.1-7.8	Moderate-----	0.37	3	6	2-4
	9-56	35-43	1.35-1.55	<0.06	0.09-0.10	6.1-9.0	High---------	0.37			
	56-60	20-35	1.50-1.70	0.06-0.2	0.10-0.12	7.4-9.0	Moderate-----	0.37			
585F, 585G-------- Negley	0-10	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low----------	0.32	5	5	1-3
	10-60	22-38	1.20-1.60	0.6-2.0	0.06-0.14	4.5-6.0	Low----------	0.32			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
620A------------- Darmstadt	0-16	10-27	1.30-1.50	0.06-0.2	0.22-0.24	5.1-7.3	Low-----------	0.43	3	6	.5-2
	16-47	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	47-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low-----------	0.43			
620B------------- Darmstadt	0-18	10-27	1.30-1.50	0.06-0.2	0.22-0.24	5.1-7.3	Low-----------	0.43	3	6	.5-2
	18-38	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	38-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low-----------	0.43			
865. Pits											
1426------------- Karnak	0-18	27-40	1.20-1.40	0.06-0.2	0.18-0.20	5.6-6.0	High----------	0.32	5	7	2-3
	18-60	40-60	1.30-1.50	<0.2	0.09-0.13	5.6-7.3	High----------	0.32			
3070------------- Beaucoup	0-7	27-35	1.15-1.35	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.32	5	7	5-6
	7-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
3077A------------ Huntsville	0-40	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.28	5	6	3-4
	40-60	10-30	1.20-1.50	0.6-2.0	0.17-0.21	5.6-7.8	Low-----------	0.28			
3107------------- Sawmill	0-15	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	15-36	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	36-51	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	51-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
3225------------- Holton	0-11	5-18	1.20-1.45	0.6-2.0	0.15-0.20	5.6-7.3	Low-----------	0.37	5	5	1-3
	11-39	5-18	1.25-1.45	0.6-2.0	0.13-0.17	5.6-7.3	Low-----------	0.24			
	39-60	5-20	1.25-1.45	0.6-2.0	0.07-0.16	5.6-7.3	Low-----------	0.24			
3226------------- Wirt	0-7	10-18	1.30-1.45	0.6-2.0	0.17-0.20	5.6-7.3	Low-----------	0.37	5	5	.5-3
	7-40	10-18	1.40-1.55	0.6-2.0	0.15-0.20	5.6-7.3	Low-----------	0.24			
	40-60	8-18	1.45-1.60	2.0-6.0	0.07-0.17	5.6-7.3	Low-----------	0.24			
3284------------- Tice	0-8	22-27	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	6	2-3
	8-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
3288------------- Petrolia	0-9	20-27	1.25-1.45	0.2-0.6	0.22-0.24	5.6-8.4	Low-----------	0.32	5	6	2-3
	9-14	27-35	1.35-1.45	0.2-0.6	0.18-0.20	6.1-7.3	Moderate-----	0.32			
	14-60	20-35	1.40-1.60	0.2-0.6	0.18-0.20	4.5-7.8	Moderate-----	0.32			
3333------------- Wakeland	0-9	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	5	1-3
	9-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
3334------------- Birds	0-60	15-25	1.30-1.50	0.2-0.6	0.21-0.25	5.6-7.8	Low-----------	0.43	5	6	1-3
3404------------- Titus	0-10	35-40	1.30-1.50	0.06-0.2	0.18-0.22	6.1-7.3	High----------	0.32	5	4	2-4
	10-60	35-45	1.30-1.60	0.06-0.2	0.11-0.22	6.1-7.8	High----------	0.32			
3428------------- Coffeen	0-12	15-27	1.35-1.55	0.6-2.0	0.22-0.25	5.6-7.8	Low-----------	0.32	5	6	2-3
	12-36	10-18	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.32			
	36-60	5-15	1.50-1.70	0.6-6.0	0.11-0.19	5.6-7.3	Low-----------	0.32			
3451------------- Lawson	0-28	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low-----------	0.28	5	5	3-7
	28-32	10-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low-----------	0.28			
	32-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
8682B------------ Medway	0-18	18-27	1.20-1.45	0.6-2.0	0.20-0.24	6.1-7.8	Low-----------	0.28	5	6	3-6
	18-38	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low-----------	0.32			
	38-42	5-30	1.20-1.60	0.6-6.0	0.11-0.15	6.1-8.4	Low-----------	0.32			
	42-60	5-30	1.20-1.60	0.6-6.0	0.08-0.15	6.1-8.4	Low-----------	0.32			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding," "water table," and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
2----------------- Cisne	D	None---------	---	---	0-2.0	Perched	Mar-Jun	High-----	High-----	Moderate.
3A, 3B, 3B2------- Hoyleton	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	High.
7C2--------------- Atlas	D	None---------	---	---	1.0-2.0	Perched	Apr-Jun	High-----	High-----	Moderate.
8D2, 8F, 8G------- Hickory	C	None---------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
12---------------- Wynoose	D	None---------	---	---	0-2.0	Apparent	Mar-Jun	High-----	High-----	High.
13A, 13B, 13B2---- Bluford	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	High.
14B, 14C2--------- Ava	C	None---------	---	---	1.5-3.5	Perched	Mar-Jun	High-----	Moderate	High.
15B, 15C2, 15D2--- Parke	B	None---------	---	---	>6.0	---	---	High-----	Moderate	High.
48---------------- Ebbert	C/D	None---------	---	---	+.5-2.0	Apparent	Apr-Jul	High-----	High-----	Moderate.
50---------------- Virden	B/D	None---------	---	---	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
112--------------- Cowden	D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
113A, 113B-------- Oconee	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	High.
120--------------- Huey	D	None---------	---	---	+.5-2.0	Perched	Mar-Jun	High-----	High-----	Low.
127A-------------- Harrison	B	None---------	---	---	3.0-6.0	Apparent	Feb-May	High-----	High-----	Moderate.
128B-------------- Douglas	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
134B-------------- Camden	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Low------	Moderate.
138--------------- Shiloh	B/D	None---------	---	---	+1-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
164A-------------- Stoy	C	None---------	---	---	1.0-3.0	Apparent	Feb-Apr	High-----	High-----	High.
214B-------------- Hosmer	C	None---------	---	---	1.5-3.0	Perched	Mar-Apr	High-----	Moderate	High.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
218---------------- Newberry	C	None--------	---	---	0-2.0	Apparent	Mar-Jun	High-----	High-----	High.
287---------------- Chauncey	C	None--------	---	---	0-2.0	Perched	Feb-Jun	High-----	High-----	High.
430A--------------- Raddle	B	Rare--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
474---------------- Piasa	D	None--------	---	---	0-2.0	Perched	Feb-May	High-----	High-----	Low.
585F, 585G--------- Negley	B	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
620A, 620B--------- Darmstadt	D	None--------	---	---	1.0-3.0	Perched	Mar-Jun	High-----	High-----	High.
865. Pits										
1426--------------- Karnak	D	Frequent----	Long------	Jan-Dec	+3-1.0	Apparent	Jan-Dec	High-----	High-----	Moderate.
3070--------------- Beaucoup	B/D	Frequent----	Brief-----	Mar-Jun	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	Low.
3077A-------------- Huntsville	B	Occasional	Brief-----	Apr-Jun	4.0-6.0	Apparent	Mar-Jun	High-----	Low------	Low.
3107--------------- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
3225--------------- Holton	C	Frequent----	Brief-----	Nov-Jun	1.0-3.0	Apparent	Nov-Jun	High-----	Moderate	High.
3226--------------- Wirt	B	Frequent----	Brief-----	Nov-Jun	>6.0	---	---	Moderate	Low------	Moderate.
3284--------------- Tice	B	Frequent----	Brief-----	Jan-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
3288--------------- Petrolia	C/D	Frequent----	Brief to long.	Mar-Jun	+.5-3.0	Apparent	Apr-Jun	High-----	High-----	Low.
3333--------------- Wakeland	C	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
3334--------------- Birds	C/D	Frequent----	Brief-----	Mar-Jun	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
3404--------------- Titus	B/D	Frequent----	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
3428--------------- Coffeen	B	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
3451--------------- Lawson	C	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Nov-May	High-----	Moderate	Low.
8682B-------------- Medway	B	Occasional	Brief-----	Mar-Jun	1.5-3.0	Apparent	Jan-Apr	High-----	High-----	Low.

TABLE 18.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name	Sample number	Horizon designator	Depth	Moisture density: MAX	Moisture density: OPT	Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	LL	PI	Classification: AASHTO	Classification: UN
			In	Lb/ cu ft	Pct					Pct			
Atlas:	86IL-51-97-1	Ap	0-6	106.4	18.9	100.0	99.3	96.5	92.3	34.1	12.4	A-6(12)	CL
	-97-3	2Btg1	16-37	111.7	16.7	96.3	92.9	88.3	71.6	36.3	22.1	A-6(13)	CL
Ava:	85IL-51-43-1	A1	0-5	96.4	21.0	100.0	99.7	98.3	95.1	30.8	6.1	A-4(6)	ML
	-43-6	Btx	33-39	101.3	19.5	---	100.0	99.5	98.6	41.5	19.9	A-7-6(21)	CL
	-43-8	2C	43-60	111.7	15.6	100.0	98.8	95.4	82.5	28.0	11.0	A-6(7)	CL
Bluford:	85IL-51-42-1	Ap	0-7	103.7	16.0	99.8	97.4	92.4	88.6	25.8	6.2	A-4(4)	ML-CL
	-42-3	Bt1	13-25	96.9	24.9	---	100.0	99.0	97.8	51.6	25.5	A-7-6(29)	CH
	-42-6	2C	47-60	116.7	13.2	100.0	99.4	95.0	75.2	27.8	12.7	A-6(7)	CL
Cisne:	86IL-51-101-1	Ap	0-8	109.9	15.9	99.8	99.2	92.9	86.2	27.8	7.8	A-4(6)	CL
	-101-4	Btg1	20-30	94.2	24.3	100.0	99.6	97.9	92.6	52.0	20.0	A-7-5(23)	MH
	-101-7	Btg3	37-49	107.8	17.0	99.7	98.7	95.6	83.9	44.2	28.0	A-7-6(23)	CL
Darmstadt:	85IL-51-32-1	Ap	0-5	114.1	13.8	99.0	98.0	92.1	78.0	23.9	5.0	A-4(2)	ML-CL
	-32-5	Btg1	24-30	118.8	13.5	98.7	96.0	88.9	65.3	30.8	17.0	A-6(8)	CL
	-32-8	2Cg1	47-52	108.7	18.1	99.6	97.7	93.7	85.0	44.4	25.4	A-7-6(22)	CL
Hickory:	86IL-51-64-1	A	0-4	108.0	14.5	98.9	97.7	90.2	60.6	35.3	13.0	A-6(6)	CL
	-64-5	Bt2	28-33	118.6	11.7	96.3	92.9	82.0	53.8	25.4	12.5	A-6(3)	CL
Parke:	86IL-51-98-1	Ap	0-5	107.3	15.8	100.0	99.9	94.6	88.4	30.2	9.0	A-4(7)	CL
	-98-3	Bt1	8-24	101.8	20.2	---	100.0	99.3	92.1	45.0	23.5	A-7-6(25)	CL
	-98-5	2Bt1	33-40	118.1	13.9	99.9	99.4	82.3	62.6	32.0	16.1	A-6(7)	CL
Wynoose:	85IL-51-48-1	Ap	0-8	109.5	16.0	100.0	99.6	96.5	91.1	28.9	8.7	A-4(7)	CL
	-48-5	Btg3	28-35	98.0	22.4	99.7	99.3	98.0	94.5	53.2	32.9	A-7-6(34)	CH
	-48-8	2Cg	54-60	111.9	14.8	99.6	98.8	94.8	79.8	36.8	20.8	A-6(15)	CL

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
*Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Ava	Fine-silty, mixed, mesic Typic Fragiudalfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Bluford	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Chauncey	Fine, montmorillonitic, mesic Typic Argialbolls
Cisne	Fine, montmorillonitic, mesic Mollic Albaqualfs
Coffeen	Coarse-silty, mixed, mesic Fluvaquentic Hapludolls
Cowden	Fine, montmorillonitic, mesic Mollic Albaqualfs
Darmstadt	Fine-silty, mixed, mesic Albic Natraqualfs
Douglas	Fine-silty, mixed, mesic Typic Argiudolls
Ebbert	Fine-silty, mixed, mesic Argiaquic Argialbolls
Harrison	Fine-silty, mixed, mesic Typic Argiudolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Holton	Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Hosmer	Fine-silty, mixed, mesic Typic Fragiudalfs
Hoyleton	Fine, montmorillonitic, mesic Aquollic Hapludalfs
Huey	Fine-silty, mixed, mesic Typic Natraqualfs
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Karnak	Fine, montmorillonitic, nonacid, mesic Vertic Haplaquepts
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Negley	Fine-loamy, mixed, mesic Typic Paleudalfs
Newberry	Fine-silty, mixed, mesic Mollic Ochraqualfs
Oconee	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Parke	Fine-silty, mixed, mesic Ultic Hapludalfs
Petrolia	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Piasa	Fine, montmorillonitic, mesic Mollic Natraqualfs
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Stoy	Fine-silty, mixed, mesic Aquic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Titus	Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Wirt	Coarse-loamy, mixed, nonacid, mesic Typic Udifluvents
Wynoose	Fine, montmorillonitic, mesic Typic Albaqualfs

☆ U.S. GOVERNMENT PRINTING OFFICE : 1997—417-265/40514/NRCS

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.