United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Hancock County, Illinois

How to Use This Soil Survey

General Soil Map

The general soil map, which is a color map, 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.

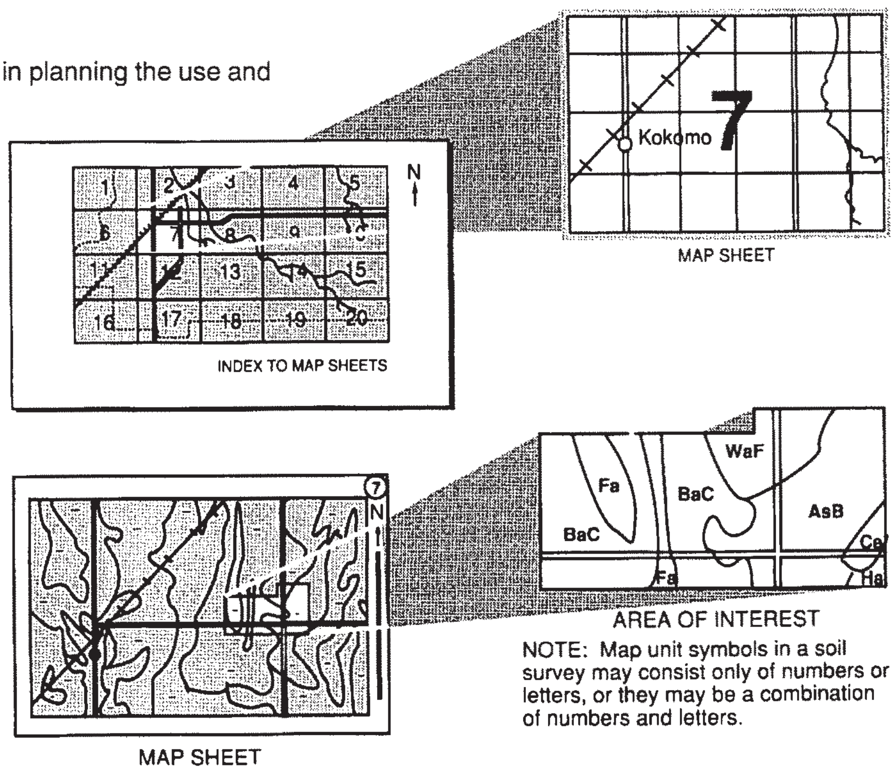
Detailed Soil Maps

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

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

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

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



INDEX TO MAP SHEETS

MAP SHEET

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.

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 has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1993. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. 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 Hancock County Soil and Water Conservation District. Financial assistance was provided by the Hancock County Board and the Illinois Department of Agriculture.

This soil survey is Illinois Agricultural Experiment Station Soil Report 161.

Cover: Row crops, hay, pasture, and woodland are typical land uses in areas of the Rozetta-Hickory-Clarksdale association.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 2001

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, 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.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as 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.

William J. Gradle
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Hancock County, Illinois

By M.B. Walker, Natural Resources Conservation Service

Soils surveyed by S.A. Aszman, H.B. Main, C.E. Wacker, M.J. Walczynski, Asghar A. Chowdhery, and M.B. Walker, Natural Resources Conservation Service, and J.S. Eversoll and D.D. Walker, Hancock County

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

HANCOCK COUNTY is in west-central Illinois (fig. 1). It has an area of 521,220 acres, or about 814 square miles. In 1990, the population of the county was 21,373 and the population of Carthage, the county seat, was 2,657.

This soil survey updates the survey of Hancock County published in 1924 (University of Illinois, 1924). It provides more information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides some general information about the survey area. It describes history and development, physiography and drainage, and climate.

History and Development

The area now known as Hancock County was originally inhabited by Sauk and Fox Indians. These tribes were of Algonquin lineage and had been driven west by the more powerful Iroquois. Major settlements were located on Blackhawk Ridge in Hancock Township and Cedar Bluff north of Plymouth.

The area was viewed by the explorers Father Marquette and Louis Joliet in 1673. It was a possession of Britain after the close of the French and Indian wars. At one time it was part of the Northwest Territories. In 1809, the Territory of Illinois was created. The territory included most of the upper part of the present-day State of Illinois. When this area was divided in 1812, the survey area came under the political control of Madison County. In 1821, it became part of Pike County. Hancock County was organized in 1825 (Blum and others, 1968).

The first permanent settlement was a French fort built between 1754 and 1760 during the French and Indian wars on the site of present-day Warsaw. This fort was abandoned. Another fort, called Fort Edwards after the Governor of Illinois, Ninian Edwards, was built after the War of 1812 (Blum and others, 1968). When the county was organized in 1825, Fort Edwards was the largest community and was established as the county seat. By 1835, however, a more central location for the county seat was desired, and Carthage was platted.

Members of the Church of Jesus Christ of Latter-day Saints, popularly known as Mormons, came to Hancock County in 1839 and established a headquarters city called Nauvoo, a Hebrew word meaning "beautiful place." The city, built by Joseph Smith, founder and prophet of the Mormon faith, grew to 20,000 inhabitants and for a time was the largest city in Illinois. As Joseph Smith gained power and influence and increasing numbers of Mormon converts moved to Nauvoo, opposition among non-Mormon settlers grew steadily. The non-Mormons feared the growing political influence of the Saints at Nauvoo and resented the political power held by Smith's followers in Illinois (Scofield, 1921). In 1844, Joseph Smith was arrested; while in jail at Carthage, he and his brother Hyrum were shot and killed by a group of angry

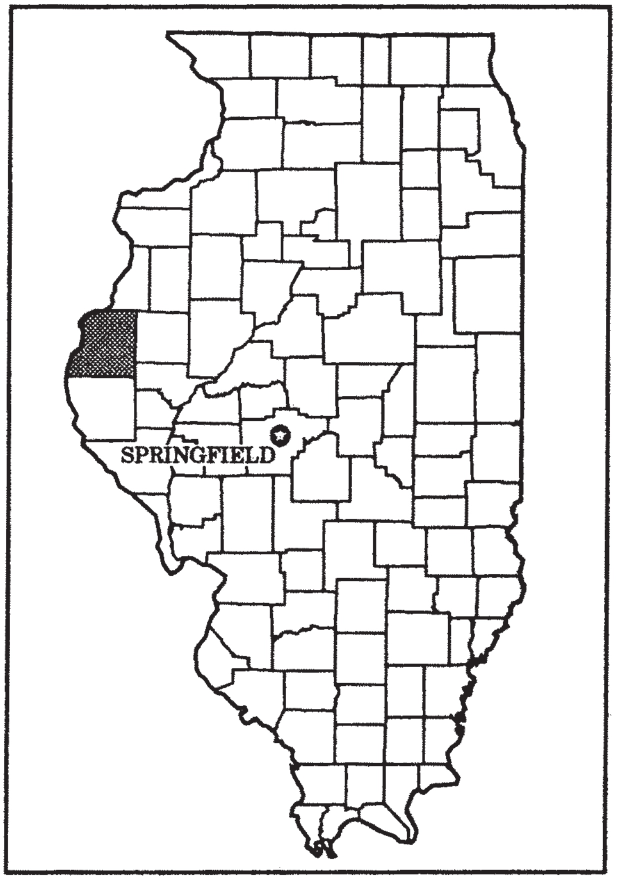


Figure 1.—Location of Hancock County in Illinois.

citizens. The majority of the Mormons left Nauvoo in 1847 under the command of Brigham Young and headed for Salt Lake City, Utah.

In 1849, the deserted city of Nauvoo became the home of a group of French Communists called Icarians (Blum and others, 1968). Although their Utopia lasted only through 1856, the Icarians left a lasting impression through the development of the art of wine making. German immigrants, refugees from the revolution of 1848 in Germany, moved into the area and continued the art of wine making.

On October 22, 1858, Abraham Lincoln spoke to a crowd of 6,000 in the public square in Carthage during the senatorial race against Stephen A. Douglas (Scofield, 1921).

Transportation facilities in the county include six primary State highways and two major railroads. Barge transportation service is available on the Mississippi River.

Physiography and Drainage

Prepared by Jeffrey Crockett, geologist/cartographic aid, Natural Resources Conservation Service.

Physiography has a great effect on soil formation because it affects the rates of runoff and erosion. Drainage, which is largely a result of physiography, affects physical and chemical changes to organic and inorganic material in the soil. Although parent material is the dominant factor in the formation of young soils, chemical weathering processes, which are controlled by drainage, have the most significant long-term effects on soil formation. Soils that are poorly drained tend to be dark because of organic material that has been altered in an oxygen-poor environment. Well drained soils tend to have reddish brown colors resulting from staining by iron oxide. Physiographic positioning affects soil formation through its influence on erosion rates. Erosion tends to be more rapid on soils in sloping areas than on soils in flat areas.

Most of Hancock County consists of flat upland prairies. The upland prairies are eroded by streams and rivers, resulting in terrain characterized by a flat upland fringed by bluffs and valleys near rivers and streams. Hancock County is divided by the watersheds of the Illinois River (via the La Moine River) and the Mississippi River. The La Moine River watershed covers the eastern half of the county. The elevation in the area along the river ranges from 530 feet to 515 feet. The elevation on the upland prairies in the La Moine River watershed is more than 700 feet. The Mississippi River to the west and Bear Creek in the south complete the watershed of Hancock County. The flood plains of the Mississippi River range from 520 feet in elevation near Dallas City to 475 feet in elevation on the southernmost flood plain south of Warsaw. The flood plain of the Mississippi River is very narrow in Hancock County. It is 4 miles wide at its widest point in the southern part of the county.

Pleistocene glaciation has had a significant effect on the physiography of Hancock County. As glaciers receded, an extensive and generally flat plain of glacial till was deposited. The glacial till was covered by loess. This process produced the upland plains that exist today. The Illinoian glaciers did not cover all of Hancock County. In the southwest corner of the county is a terminal moraine that marks the limit of Illinoian glaciation in Hancock County. This terminal moraine stretches from Warsaw to Tioga and forms some of the highest ground in this part of the county with an elevation of more than 740 feet. The terminal moraine also serves as a river bluff and clearly separates the upland prairies from the river flood plains.

The bedrock in Hancock County is primarily Mississippian limestone (Willman and others, 1975). The Burlington-Keokuk limestone formations have been quarried extensively at Hamilton and Plymouth for lime, gravel, and rock. Outcroppings of the Warsaw shale formation are along some streams and rivers. The Warsaw shale is one of the most geode-abundant formations known.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at La Harpe 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 25.8 degrees F and the average daily minimum temperature is 16.1 degrees. The lowest temperature on record, which occurred at La Harpe on February 13, 1905, was -30 degrees. In summer, the average temperature is 73.3 degrees and the average daily maximum temperature is 85.5 degrees. The highest recorded temperature, which occurred at La Harpe on August 9, 1934, was 113 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 (50 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 38.47 inches. Of this, 24.81 inches, or 64 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record was 10.25 inches at La Harpe on June 10, 1905. Thunderstorms occur on about 48 days each year, and most occur between May and August.

The average seasonal snowfall is 24.6 inches. The greatest snow depth at any one time during the period of record was 22 inches recorded on January 14, 1979. On an average, 41 days of the year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was on December 24, 1918.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 67 percent of the time possible in summer and 46 percent in winter. The prevailing wind is from the south. Average windspeed is highest, between 11 and 12 miles per hour, from November to April.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management 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; 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 and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area 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-vegetation-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. Soil taxonomy, 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 and 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 predict 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.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those in the surveys of McDonough and Schuyler Counties. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. These areas are called associations. Each association on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of 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.

1. Ipava-Virden-Herrick Association

Nearly level and gently sloping, somewhat poorly drained and poorly drained, silty soils that have a moderately slowly permeable subsoil and formed in loess; on uplands

This association consists of soils on summits, head slopes, footslopes, and side slopes and in low-lying areas. Slopes range from 0 to 5 percent.

This association makes up about 33 percent of the county. It is about 43 percent Ipava soils, 23 percent Virden soils, 14 percent Herrick soils, and 20 percent soils of minor extent (fig. 2).

Ipava soils are on summits, head slopes, and side slopes. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 5 inches thick. The subsurface layer is black and very dark grayish brown, friable silt loam about 15 inches thick. The subsoil is mottled, friable silty clay loam about 37 inches thick. The upper part is dark grayish brown, the next part is grayish brown, and the lower part is light brownish gray. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Virden soils are in low-lying areas below the Ipava and Herrick soils. They are poorly drained. Typically, the surface soil is black, friable silty clay loam about 8 inches thick. The subsoil is about 48 inches thick. In sequence downward, it is black, firm silty clay loam; dark grayish brown, mottled, firm silty clay loam; grayish brown, mottled, firm silty clay loam; and light gray, mottled, friable silty clay loam. The substratum to a depth of 60 inches or more is light gray, mottled, friable silt loam.

Herrick soils are on the summits of loess-covered till plains. They are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 5 inches thick. The subsurface layer also is very dark gray, friable silt loam. It is about 12 inches thick. The subsoil is about 24 inches thick. It is mottled. In sequence downward, it is brown, firm silty clay loam; grayish brown, firm silty clay loam; light brownish gray, firm silty clay loam; and light brownish gray, firm silt loam. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Of minor extent in this association are Clarksdale, Cowden, Shiloh, and Tama soils. The somewhat poorly drained Clarksdale soils have a thinner surface layer than that of the major soils. The poorly drained Cowden soils do not have a mollic epipedon. The poorly drained Shiloh soils are in depressions below the Virden soils. The moderately well drained or well drained Tama soils are on summits and side slopes.

This association is used mainly for cultivated crops or for pasture and hay. The soils are well suited to these uses. A few areas are used for wheat. Maintaining internal and surface drainage systems is the major management concern in areas of the Ipava and Virden soils. Measures that help to control water erosion and that maintain soil tilth and fertility are management needs in areas of the Ipava and Herrick soils. Rotation grazing or deferred grazing helps to keep pastures in good condition.

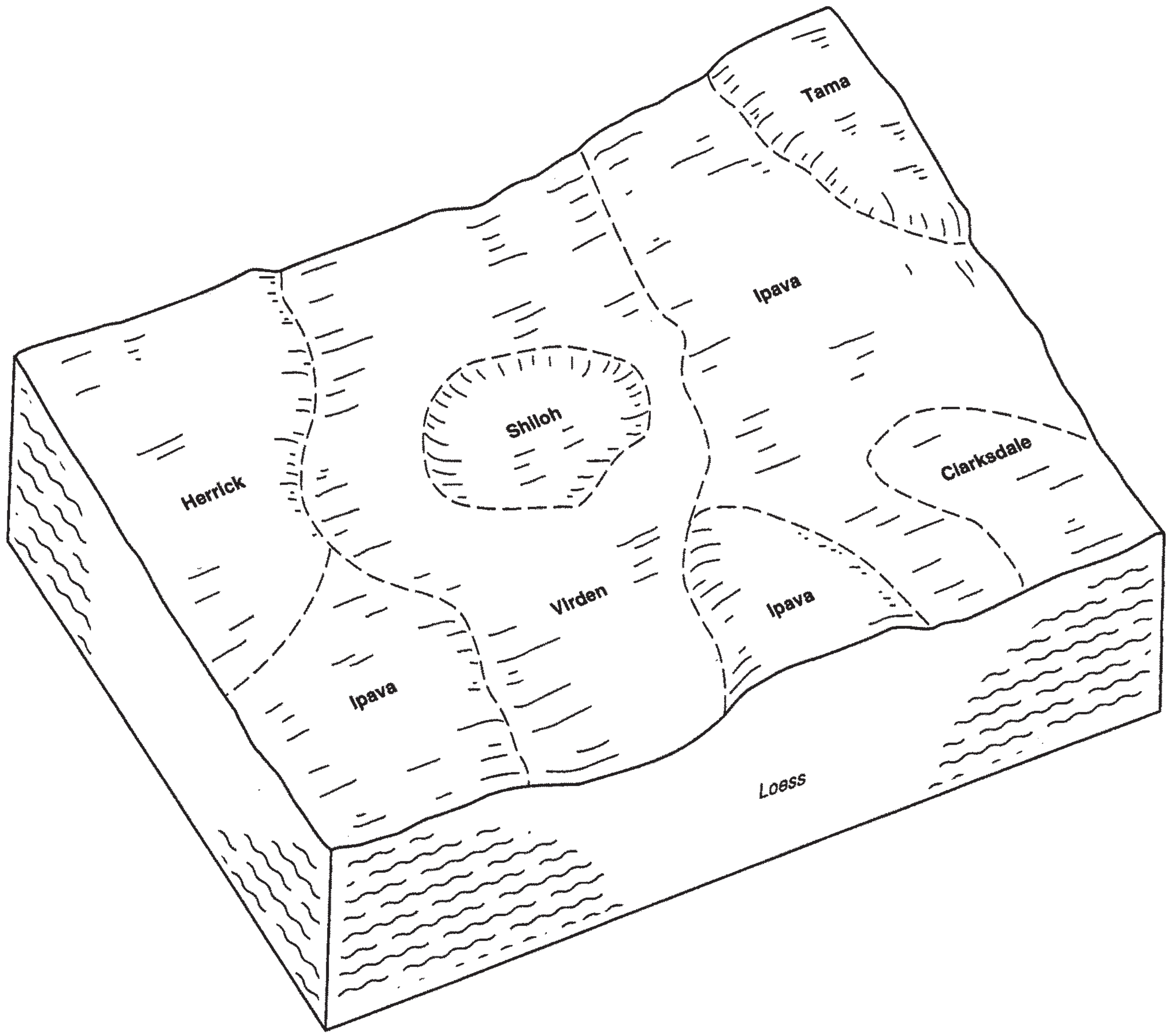


Figure 2.—Typical pattern of soils and parent material in the Ipava-Virden-Herrick association.

If the soils in this association are used as sites for buildings or septic tank absorption fields, the wetness, the shrink-swell potential, and ponding are management concerns. The Virden soils are generally unsuited to these uses because of the ponding.

2. Muscatine-Sable Association

Nearly level and gently sloping, somewhat poorly drained and poorly drained, silty soils that have a moderately permeable subsoil and formed in loess; on uplands

This association consists of soils on broad plains and in shallow drainageways. Slopes range from 0 to 5 percent.

This association makes up about 9 percent of the county. It is about 60 percent Muscatine soils, 22 percent Sable soils, and 18 percent soils of minor extent.

Muscatine soils are on summits, head slopes, and side slopes. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is about 11 inches thick. The upper part is black, friable silt loam. The lower part is very dark gray, friable silty clay loam. The subsoil is about 28 inches thick. It is mottled, friable silty clay loam. The upper part is dark grayish brown and grayish brown, and the lower part is light brownish gray. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Sable soils are in low-lying areas. They are poorly drained. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is friable silty clay loam about 12 inches thick. The upper part is black, and the lower part is very dark gray and is mottled. The subsoil is mottled, friable silty clay loam about 38 inches thick. The upper part is dark grayish brown, the next part is grayish brown, and the lower part is light brownish gray. The substratum to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Of minor extent in this association are Atterberry, Shiloh, and Tama soils. The somewhat poorly drained Atterberry soils have a thinner dark surface layer than that of the Muscatine soils. The poorly drained, moderately slowly permeable Shiloh soils are in shallow depressions. The moderately well drained or well drained Tama soils are on summits and side slopes.

This association is used mainly for cultivated crops or for pasture and hay. These soils are well suited to these uses. The main management needs are measures that improve or maintain the drainage system and measures that help to control erosion. Rotation grazing or deferred grazing helps to keep pastures in good condition.

If the soils in this association are used as sites for buildings or septic tank absorption fields, the wetness, the shrink-swell potential, and ponding are management concerns. The Sable soils are generally unsuited to these uses because of the ponding.

3. Fishhook-Elco-Atlas Association

Moderately sloping and strongly sloping, somewhat poorly drained and moderately well drained, silty soils that are moderately permeable or very slowly permeable in the upper part of the subsoil and moderately slowly permeable or very slowly permeable in the lower part of the subsoil and formed in loess and the underlying glacial till; on uplands

This association consists of soils on head slopes and side slopes of loess-covered till plains. Slopes range from 5 to 10 percent.

This association makes up about 10 percent of the county. It is about 41 percent Fishhook soils, 23 percent Elco soils, 16 percent Atlas soils, and 20 percent soils of minor extent (fig. 3).

Fishhook soils are on head slopes and side slopes of loess-covered till plains. They are somewhat poorly drained. Typically, the surface layer is dark grayish brown, very friable silt loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is brown, mottled, friable silty clay loam. The next part is light brownish gray, mottled, friable silty clay loam. The lower part is dark grayish brown, mottled, firm and friable clay loam.

Elco soils are on side slopes of loess-covered till plains. They are moderately well drained. Typically, the surface layer is mixed dark grayish brown and yellowish brown, very friable silt loam about 4 inches thick. The subsoil extends to a depth of more than 60 inches. In sequence downward, it is yellowish brown, mottled, friable silty clay loam; yellowish brown, friable silty clay loam; yellowish brown, mottled, friable silty clay loam; and grayish brown and light brownish gray, mottled, firm silty clay loam.

Atlas soils are on head slopes and side slopes of loess-covered till plains. They are somewhat poorly drained. Typically, the surface layer is mixed very dark grayish brown and brown, friable silty clay loam about 5 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is brown, mottled, friable silty clay loam. The next part is grayish brown, mottled, firm silty clay loam and silty clay. The lower part is gray and light gray, mottled, firm silty clay loam.

Of minor extent in this association are Assumption, Keller, and Sawmill soils. The somewhat poorly drained Keller and moderately well drained Assumption soils have a dark surface layer. Also, they have a buried soil at a greater depth than that in the major soils. The poorly drained Sawmill soils are on narrow bottom land.

This association is used as cropland, for pasture and hay, or as forestland. Atlas soils are poorly suited to cultivated crops. Elco and Fishhook soils are moderately suited to cultivated crops. The main management needs are measures that help to control erosion. Conservation tillage or terraces are measures

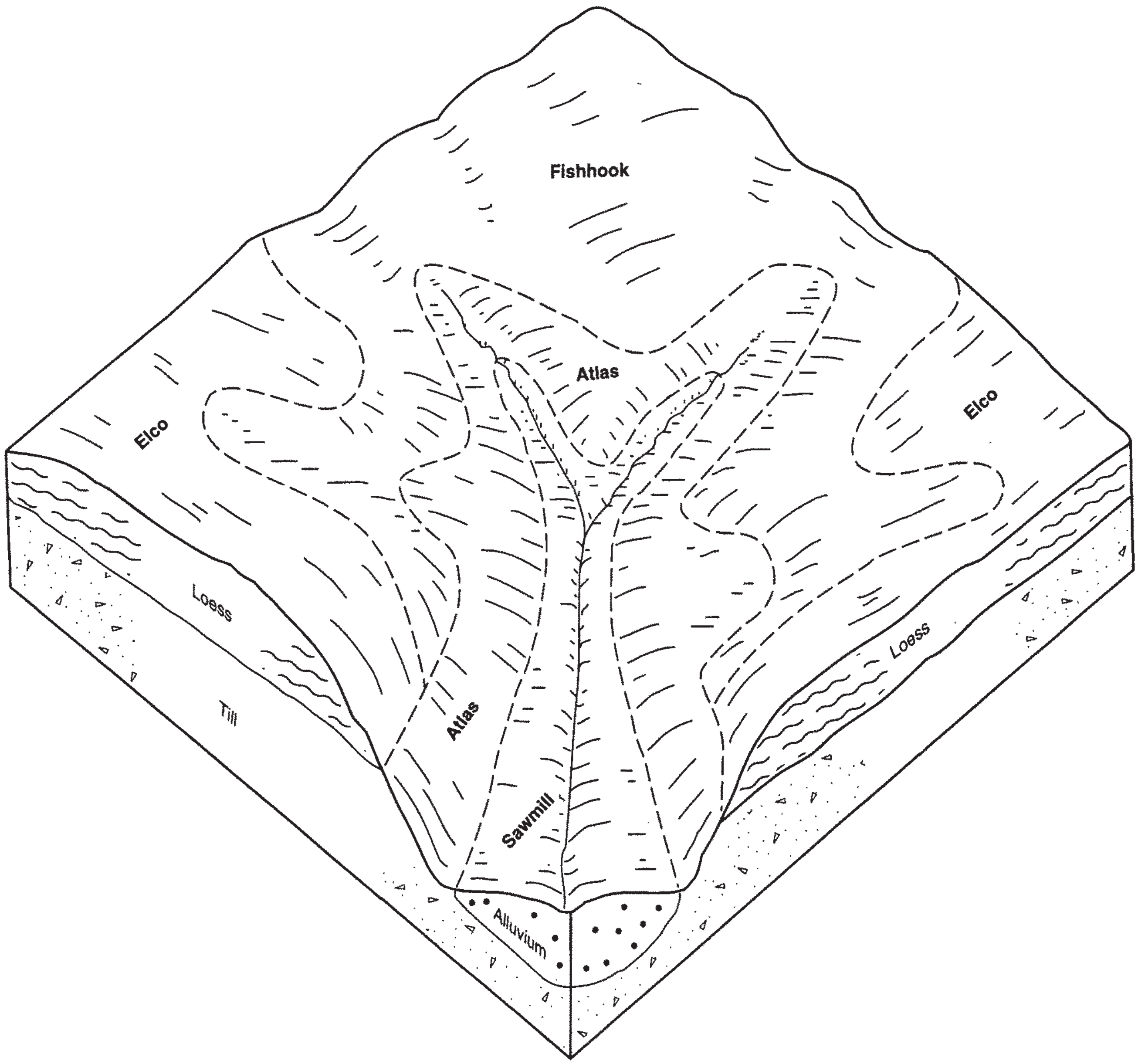


Figure 3.—Typical pattern of soils and parent material in the Fishhook-Elco-Atlas association.

that can be used in sloping areas. Atlas and Elco soils are well suited to pasture and hay. Rotation grazing or deferred grazing helps to keep pastures in good condition. The major soils in this association are well suited to forestland.

The soils in this association are poorly suited to use as sites for dwellings or septic tank absorption fields because of restricted permeability in the subsoil, the shrink-swell potential, a seasonal high water table, and the slope.

4. Rozetta-Hickory-Clarksdale Association

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

This association consists of soils on summits, side slopes, backslopes, and shoulders of loess-covered till plains. Slopes range from 0 to 60 percent.

This association makes up about 38 percent of the county. It is about 25 percent Rozetta soils, 22 percent Hickory soils, 17 percent Clarksdale soils, and 36 percent soils of minor extent (fig. 4).

The moderately well drained Rozetta soils are on summits and side slopes above the Hickory soils. They formed in loess. Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam; and the lower part is brown, mottled, friable silt loam.

The well drained Hickory soils are on the very steep side slopes, back slopes, and shoulders of loess-covered till plains. They formed mainly in glacial till or in glacial till and a thin layer of loess. Typically, the surface layer is very dark grayish brown, friable loam about 5 inches thick. The subsurface layer is brown, mottled, friable loam about 8 inches thick. The subsoil is yellowish brown, mottled, friable clay loam about 42 inches thick. The substratum to a depth of 60 inches or more is yellowish brown, mottled, friable loam.

The somewhat poorly drained Clarksdale soils are on nearly level, broad flats and gently sloping side slopes. They formed in loess. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown, mottled, friable silt loam about 5 inches thick. The subsoil extends to a depth of more than 60

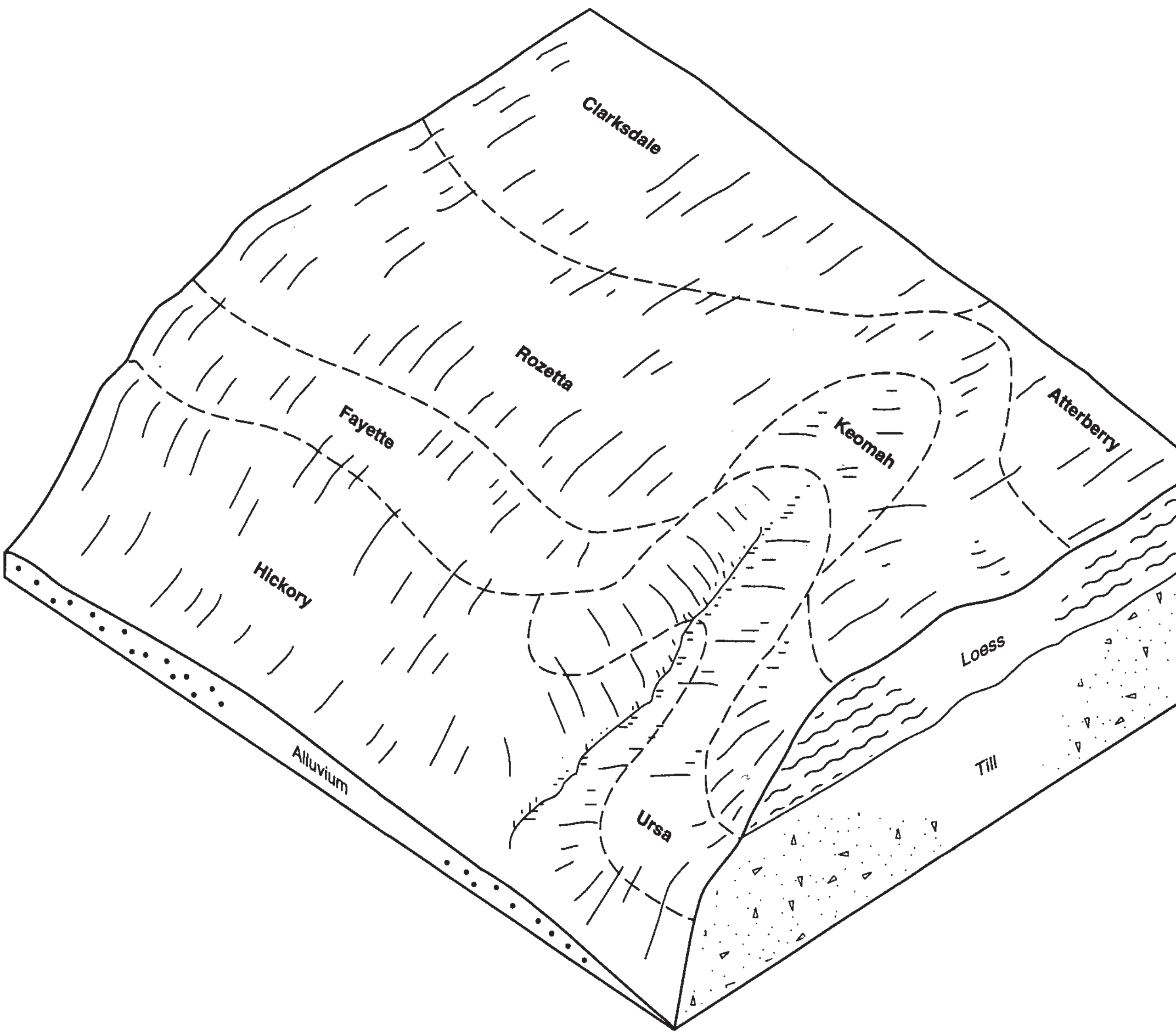


Figure 4.—Typical pattern of soils and parent material in the Rozetta-Hickory-Clarksdale association.

inches. The upper part is dark grayish brown, mottled, friable silt loam. The next part is dark yellowish brown, mottled, friable silty clay loam. The lower part is light brownish gray, mottled, friable and firm silty clay loam.

Of minor extent in this association are Atterberry, Fayette, Keomah, and Ursa soils. The somewhat poorly drained Atterberry soils are in landscape positions similar to those of the Clarksdale soils. They have less clay in the subsoil than the Clarksdale soils. The well drained Fayette soils are on strongly sloping side slopes along drainageways. The somewhat poorly drained Keomah soils are in nearly level areas above the Rozetta soils. They have more clay in the subsoil than the Rozetta soils. The well drained Ursa soils have more clay in the subsoil than the Hickory soils.

This association is used as cropland, for pasture and hay, or as forestland. The nearly level or gently sloping areas are well suited to cultivated crops. The seasonal high water table is a limitation. Maintaining subsurface and surface drainage is the major management concern in the nearly level areas. The hazard of water erosion is a concern in the gently sloping or steeper areas. The moderately sloping and strongly sloping areas of these soils are moderately suited to cultivated crops. The soils are well suited to pasture and hay in the moderately sloping areas and moderately suited to this use in the strongly sloping and moderately steep areas. The very steep areas are generally unsuited to cropland and to pasture and hay. The hazard of erosion is the main concern in these areas. Measures that help to control erosion and that maintain tilth and productivity are needed. Conservation tillage and terraces are suitable measures in sloping areas. Rotation grazing or deferred grazing helps to keep pastures in good condition. The Rozetta and Hickory soils are well suited to forestland.

If the soils in this association are used as sites for buildings or septic tank absorption fields, the shrink-swell potential, the slope, and the wetness are management concerns.

5. Lawson-Coffeen-Wakeland Association

Nearly level, somewhat poorly drained, silty soils that are moderately permeable in the underlying material or in the subsoil and that formed in alluvium; on flood plains

This association consists of soils on bottom land. These soils are frequently flooded for brief periods. They are along the La Moine River and other major streams. Slopes range from 0 to 2 percent.

This association makes up about 6 percent of the county. It is about 36 percent Lawson soils, 25 percent Coffeen soils, 14 percent Wakeland soils, and 25 percent soils of minor extent.

Lawson soils are on meanderbelts of high flood plains. Typically, the surface layer is very dark grayish brown, very friable and friable silt loam about 11 inches thick. The subsurface layer is about 17 inches thick. It is mottled. It is very dark grayish brown and very dark gray, friable silt loam. The substratum to a depth of 60 inches or more is brown, mottled, friable silt loam.

Coffeen soils are on meanderbelts of high flood plains. Typically, the surface layer is very dark gray, friable silt loam about 5 inches thick. The subsurface layer also is very dark gray, friable silt loam. It is about 13 inches thick. The subsoil is friable silt loam about 40 inches thick. It is mottled. The upper part is grayish brown. The lower part is brown and dark grayish brown. Below this is a buried soil of very dark gray, mottled, friable silt loam.

Wakeland soils are on meanderbelts of low flood plains. Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is dark grayish brown and has strata of fine sandy loam. The lower part is grayish brown.

Of minor extent in this association are Beaucoup, Sawmill, and Tice soils. The poorly drained Beaucoup soils have a buried soil and contain less clay in the upper part of the profile than the major soils. They are in the slightly higher landscape positions. The poorly drained Sawmill soils are in the lower positions on the landscape. The somewhat poorly drained Tice soils are slightly higher on the meanderbelts than the major soils. The somewhat poorly drained Wakeland soils have less clay than the major soils and have a lighter colored surface layer. Also, they are higher on the landscape.

This association is used mainly for cultivated crops or for pasture and hay. The soils are moderately suited or well suited to cultivated crops, depending on the frequency of flooding. The flooding is the main management concern. It can delay harvesting or may cause crop damage in some years.

The soils in this association are generally unsuited to use as sites for dwellings or septic tank absorption fields because of the flooding.

6. Titus-Medway Association

Nearly level, poorly drained and moderately well drained, silty and loamy soils that have a slowly *permeable to moderately permeable subsoil and formed in alluvium; on flood plains*

This association consists of soils that formed in alluvium on bottom land. These soils are subject to occasional flooding. They are along the Mississippi River. Slopes range from 0 to 2 percent.

This association makes up about 4 percent of the county. It is about 47 percent Titus and similar soils, 39 percent Medway and similar soils, and 14 percent soils of minor extent (fig. 5).

Titus soils are on meanderbelts of low flood plains and in backswamps of high flood plains. They are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 8 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 7 inches thick. The subsoil is dark gray, mottled, firm silty clay loam about 42 inches thick. The substratum to a depth of 60 inches or more is dark gray, mottled, firm silty clay loam.

Medway soils are on meanderbelts of high flood plains. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable loam about 5 inches thick. The subsurface layer also is very

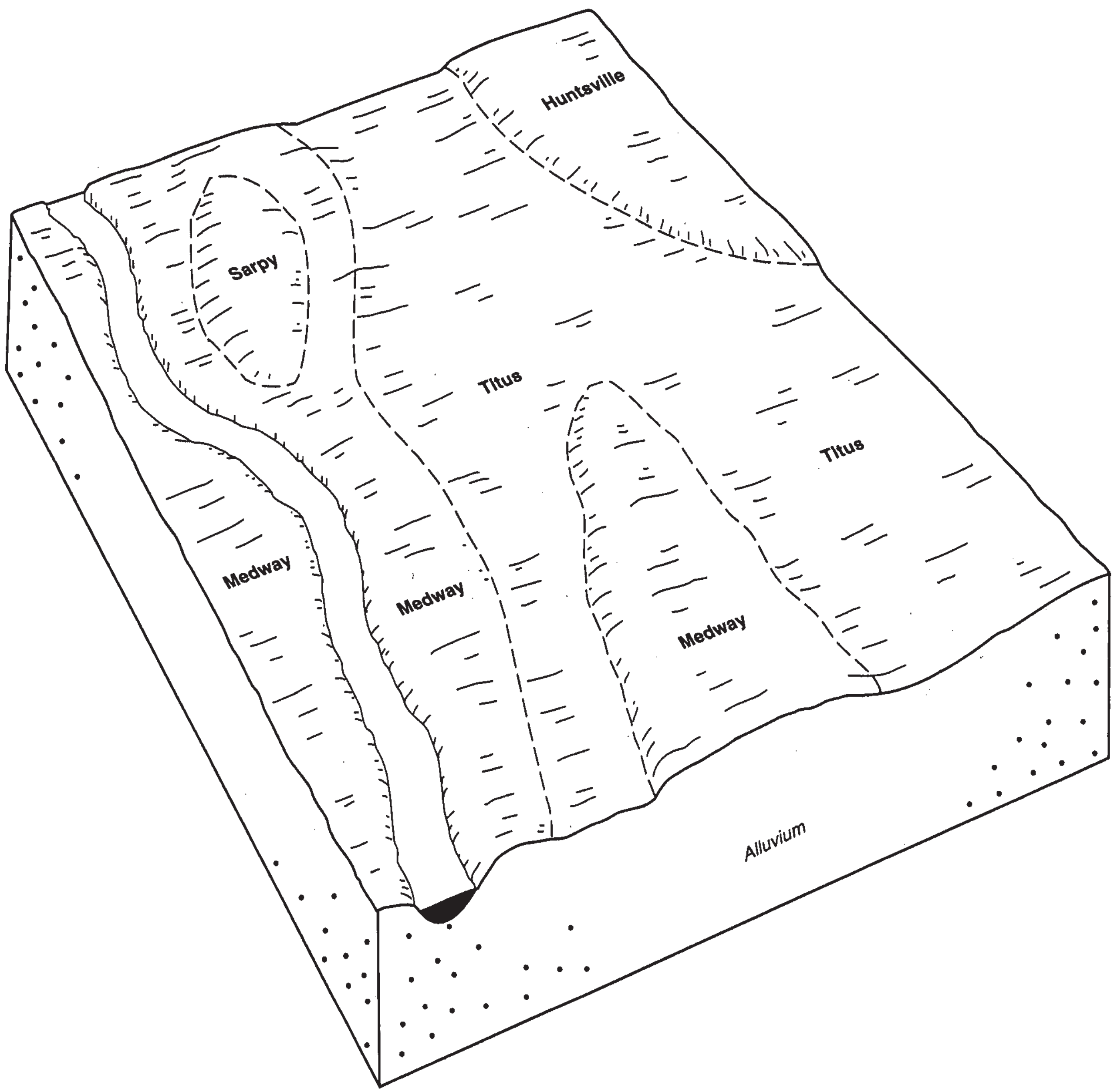


Figure 5.—Typical pattern of soils and parent material in the Titus-Medway association.

dark grayish brown, friable loam. It is about 10 inches thick. The subsoil is about 38 inches thick. It is mottled and friable. The upper part is very dark grayish brown loam, the next part is dark grayish brown loam, and the lower part is stratified brown and grayish brown sandy loam. The substratum to a depth of 60 inches or more is stratified strong brown and grayish brown, mottled, friable loam and sandy loam.

Of minor extent in this association are Huntsville and Sarpy soils. The well drained Huntsville and excessively drained Sarpy soils are above the major soils on the landscape.

This association is used mainly for cultivated crops. The soils are well suited to this use. In areas where wetness is a problem, surface ditches or subsurface drains and outlets improve drainage. Tilling when the soil is too wet causes surface compaction and reduces the rate of water infiltration.

The soils in this association are generally unsuited to use as sites for dwellings or septic tank absorption fields because of the flooding.

Broad Land Use Considerations

The soils of Hancock County are used mainly for farming. Cultivated crops and pasture and hay are the main agricultural uses. Other uses include forestland and urban development. The suitability of the soils for these uses varies significantly.

The major soils in associations 1, 2, 3, 5, and 6 are generally well suited to cultivated crops. The major management concern in associations 1, 2, 5, and 6 is wetness, and the major management concern in associations 3 and 4 is erosion. Most areas in associations 5 and 6 are occasionally or frequently flooded for very brief or brief periods, primarily in early spring. The flooding can delay planting or may cause crop damage.

Most of the pasture and hayland is in associations 3 and 4. The soils in these associations are generally suitable for grasses and legumes. The slope is a limitation, and the hazard of erosion is an additional concern in association 4. Wetness is a limitation in association 3.

Most of the forestland is in association 4. The soils in this association are generally well suited to this use. The major management concerns are plant competition and equipment limitations. Erosion is a hazard during periods when seedlings are becoming established and during logging periods.

Most of the urban areas are in associations 1, 2, 4, and 6. The soils in associations 1 and 2 are generally poorly suited to urban uses because of a seasonal high water table, a high shrink-swell potential, and moderately slow permeability. In general, the soils that are best suited to urban uses are moderately well drained or well drained and are gently sloping or sloping. Examples are Downs, Rozetta, and Elco soils, which occur in associations 3 and 4. Soils on flood plains, such as those in associations 5 and 6, are generally unsuited to use as sites for dwellings or septic tank absorption fields because of the flooding.

The potential for recreational uses depends on the intensity of the expected use and the properties of the soils. The soils in association 4 have the best potential for recreational development. The slope is the main management concern affecting recreational uses in areas of this association.

The potential for wildlife habitat varies throughout the county. All of the associations are well suited to openland wildlife habitat. The best soils for forestland wildlife habitat are in association 4. Some of the soils in associations 1, 2, 5, and 6 are suited to wetland wildlife habitat.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. 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 other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties 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, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit 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, 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, slope, stoniness, salinity, 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, Tama silt loam, 2 to 5 percent slopes, is a phase of the Tama series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Fishhook-Atlas complex, 10 to 15 percent slopes, severely eroded, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other 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 or miscellaneous areas.

6C2—Fishhook silt loam, 5 to 10 percent slopes, eroded

Composition

Fishhook soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops or pasture and hay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess and the underlying glacial till, which has a paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: Perched at a depth of 1 to 3 feet during the spring
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, very friable silt loam

Subsoil:
8 to 23 inches—brown, mottled, friable silty clay loam
23 to 37 inches—light brownish gray, mottled, friable silty clay loam
37 to 54 inches—dark grayish brown, mottled, firm clay loam
54 to 60 inches—dark grayish brown, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The well drained Hickory soils, which have more sand in the subsoil than the Fishhook soil and are lower on the backslopes
• The well drained Ursa soils, which have less silty material overlying the glacial till than the Fishhook soil and are lower on the backslopes

Similar inclusions:
• Soils that have a seasonal high water table within 1 foot of the surface
• Soils that have a buried soil higher in the profile

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• The existing drainage system should be maintained.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Woodland

Suitability: Moderately suited
Management measures:
• Plant competition in the openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and

removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 4C
Windbreak suitability group: 4

7C3—Atlas silty clay loam, 5 to 10 percent slopes, severely eroded

Composition

Atlas soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops or pasture and hay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and the underlying glacial till, which has a paleosol
Runoff rate: Rapid
Available water capacity: Moderate
Seasonal high water table: Perched at a depth of 1 to 3 feet during the spring
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—mixed very dark grayish brown and brown, friable silty clay loam

Subsoil:
5 to 11 inches—brown, mottled, friable silty clay loam
11 to 17 inches—grayish brown, mottled, firm silty clay loam
17 to 35 inches—grayish brown, mottled, firm silty clay
35 to 51 inches—gray, mottled, firm silty clay loam
51 to 60 inches—light gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Elco soils, which are higher on the landscape than the Atlas soil
• The well drained Hickory soils on side slopes below the Atlas soil

Similar inclusions:
• Soils that have a thicker surface layer

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control water erosion and help to maintain productivity and tilth.
• Returning crop residue to the soil and regularly adding other organic material help to maintain fertility and tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to maintain forage production and help to prevent surface compaction, poor tilth, and excessive erosion.
• When a seedbed is prepared in pastured areas, using a no-till method of seeding and farming on the contour help to prevent excessive runoff and erosion.

Woodland

Suitability: Moderately suited
Management measures:
• Plant competition in the openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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.

• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 4e
Woodland ordination symbol: 4C
Windbreak suitability group: 4

8D2—Hickory loam, 10 to 18 percent slopes, eroded

Composition

Hickory soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Pasture and hay or cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin layer of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed very dark grayish brown and dark grayish brown, friable loam

Subsoil:
7 to 50 inches—dark yellowish brown, mottled, friable clay loam

Substratum:
50 to 60 inches—yellowish brown, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which have a thinner surface layer and more clay in the subsoil than the Hickory soil; in the higher positions on the landscape
• The somewhat poorly drained Wakeland soils on bottom land below the Hickory soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have a paleosol
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to prevent surface compaction, excessive runoff, and poor tilth.
• Using a no-till method of pasture renovation and seeding on the contour help to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management measures:
• 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 the reduction or 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 prevent injury to trees and maintain the leaf mulch.

Dwellings

Suitability: Moderately suited
Management measures:
• Land shaping by cutting and filling helps to overcome the slope.
• Extending foundation footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Enlarging the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 5A
Windbreak suitability group: 3

8F—Hickory loam, 18 to 30 percent slopes

Composition

Hickory soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin layer of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable loam

Subsurface layer:
5 to 13 inches—brown, mottled, friable loam

Subsoil:
13 to 55 inches—yellowish brown, mottled, friable clay loam

Substratum:
55 to 60 inches—yellowish brown, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland soils on bottom land below the Hickory soil
• Severely eroded areas where most of the surface soil and subsoil has been removed and small areas of shale or limestone bedrock have been exposed
• The somewhat poorly drained Atlas soils, which have a thinner surface layer and more clay in the subsoil than the Hickory soil; in the higher positions on the landscape

Similar inclusions:
• Soils in which the subsoil has less clay and is calcareous within a depth of 60 inches
• Soils that have more than 20 inches of silty material in the upper part
• Soils that have a paleosol
• Soils that formed in loess; in positions above the Hickory soil on the landscape

Use and Management

Pasture and hay

Suitability: Poorly suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to prevent surface compaction, excessive runoff, and poor tilth.
• Using a no-till method of pasture renovation and seeding on the contour help to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited
Management measures:
• Establishing logging roads and skid trails on or near the contour helps to control erosion.
• On the steeper slopes, logs or trees can be skidded uphill with a winch and cable.
• Grass firebreaks can be used in areas of this soil.
• Seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduces the hazard of erosion.
• The use of machinery is limited to periods when the soil is firm.
• Excluding livestock from the woodland helps to prevent the reduction or 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 prevent injury to trees and maintain the leaf mulch.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: 5R
Windbreak suitability group: 3

8G—Hickory loam, 30 to 60 percent slopes

Composition

Hickory soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin layer of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 2 inches—dark grayish brown, friable loam

Subsurface layer:
2 to 6 inches—dark grayish brown, friable loam

Subsoil:
6 to 21 inches—yellowish brown, friable clay loam
21 to 31 inches—brown, mottled, firm clay loam
31 to 42 inches—yellowish brown, mottled, firm clay loam
42 to 60 inches—brown, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Lawson and Wakeland soils on bottom land below the Hickory soil
• Severely eroded areas where most of the surface soil and subsoil has been removed and small areas of shale or limestone bedrock have been exposed
• The somewhat poorly drained Atlas soils, which have more clay in the subsoil than the Hickory soil; on side slopes above the Hickory soil

Similar inclusions:
• Soils in which the subsoil has less clay and is calcareous within a depth of 60 inches

• Soils that have more than 20 inches of silty material in the upper part
• The moderately well drained Elco soils, which have more clay in the subsoil than the Hickory soil; on side slopes above the Hickory soil
• The well drained Fayette soils, which formed in loess; on the upper part of side slopes above the Hickory soil

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
• Establishing logging roads and skid trails on or near the contour helps to control erosion.
• On the steeper slopes, logs or trees should be skidded uphill with a winch and cable.
• Grass firebreaks can be used in areas of this soil.
• Seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduces the hazard of erosion.
• The use of machinery is limited to periods when the soil is firm.
• Excluding livestock from the woodland helps to prevent the reduction or 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 prevent injury to trees and maintain the leaf mulch.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 5R
Windbreak suitability group: 3

17A—Keomah silt loam, 0 to 2 percent slopes

Composition

Keomah soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow in the upper part of the subsoil and moderately slow in the lower part
Parent material: Loess
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: Moderately low
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—dark grayish brown, very friable silt loam

Subsurface layer:
9 to 16 inches—grayish brown, very friable silt loam

Subsoil:
16 to 20 inches—brown, mottled, friable silty clay loam
20 to 30 inches—brown, mottled, firm silty clay
30 to 46 inches—light brownish gray, mottled, firm silty clay loam
46 to 59 inches—light brownish gray, mottled, friable silty clay loam

Substratum:
59 to 73 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in shallow

depressions and drainageways below the Keomah soil
• The somewhat poorly drained Clarksdale soils, which have a darker surface layer than the Keomah soil; in landscape positions similar to those of the Keomah soil
• The moderately well drained Rozetta soils on side slopes and ridgetops above or below the Keomah soil

Similar inclusions:
• Soils that are better drained
• Soils that have a slightly darker surface layer
• Soils that have less clay in the subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• A drainage system has been installed in most areas. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to maintain forage production and help to prevent surface compaction and poor tilth.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.

Woodland

Suitability: Well suited
Management measures:
• 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.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains and surface ditches help to remove excess water.
• Enlarging the filter field and replacing the soil with more permeable material help to overcome the restricted permeability.
• Cutting and filling or installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 3A
Windbreak suitability group: 1

17B—Keomah silt loam, 2 to 5 percent slopes

Composition

Keomah soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands and terraces
Position on the landform: Head slopes and side slopes of loess-covered till plains and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow in the upper part of the subsoil and moderately slow in the lower part

Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark grayish brown, friable silt loam

Subsoil:
6 to 10 inches—grayish brown, mottled, friable silty clay loam
10 to 45 inches—brown and grayish brown, mottled, firm silty clay loam

Substratum:
45 to 60 inches—light brownish gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in drainageways and depressions below the Keomah soil
• The somewhat poorly drained Clarksdale soils, which have a darker surface layer than the Keomah soil; in landscape positions similar to those of the Keomah soil

Similar inclusions:
• Soils that have a seasonal high water table at a lower depth
• Soils that have less clay in the subsoil
• Soils that have slopes of more than 5 percent
• Soils that have slopes of less than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, help to prevent surface compaction and poor tilth, and help to control runoff and erosion.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Woodland

Suitability: Poorly suited
Management measures:
• Excluding livestock from the woodland helps to prevent the reduction or 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.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to remove excess water.
• Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains help to remove excess water.
• Grading and land shaping also help to remove surface water.
• Enlarging the filter field or replacing the soil with a

more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 3A
Windbreak suitability group: 1

17B2—Keomah silt loam, 2 to 5 percent slopes, eroded

Composition

Keomah soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands and terraces
Position on the landform: Head slopes and side slopes of loess-covered till plains and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow in the upper part of the subsoil and moderately slow in the lower part
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—grayish brown, mottled, friable silt loam

Subsoil:
6 to 13 inches—brown, mottled, friable silty clay loam
13 to 52 inches—grayish brown, mottled, friable silty clay loam

Substratum:
52 to 60 inches—grayish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in shallow depressions and drainageways below the Keomah soil
• The somewhat poorly drained Clarksdale soils, which have a darker surface layer than the Keomah soil; in landscape positions similar to those of the Keomah soil
• The moderately well drained Rozetta soils on side slopes and ridgetops above or below the Keomah soil

Similar inclusions:
• Soils that have a seasonal high water table at a lower depth
• Soils that have less clay in the subsoil
• Soils that have slopes of more than 5 percent
• Soils that have slopes of less than 2 percent
• Soils that have an uneroded surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and increase the rate of water infiltration.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, help to

prevent surface compaction and poor tilth, and help to control runoff and erosion.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Woodland

Suitability: Well suited
Management measures:
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to lower the seasonal high water table.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Enlarging the filter field and replacing the soil with a more permeable material help to overcome the restricted permeability.
• Installing subsurface tile drains around the base of foundations helps to lower the water table.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 3A
Windbreak suitability group: 1

36B—Tama silt loam, 2 to 5 percent slopes

Composition

Tama soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands and terraces
Position on the landform: Summits and side slopes of loess-covered till plains and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, very friable and friable silt loam

Subsurface layer:
7 to 11 inches—very dark grayish brown, friable silt loam
11 to 15 inches—brown, friable silt loam

Subsoil:
15 to 26 inches—dark yellowish brown, friable silty clay loam
26 to 38 inches—dark yellowish brown, mottled, friable silty clay loam
38 to 50 inches—yellowish brown, mottled, friable silty clay loam

Substratum:
50 to 60 inches—yellowish brown, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Virden soils in shallow depressions and drainageways below the Tama soil
• The somewhat poorly drained Ipava soils in nearly level areas

Similar inclusions:
• Soils that have a thinner surface layer
• Soils that have a paleosol within 60 inches of the surface

Use and Management

Cropland

Suitability: Well suited

Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to lower the water table.
• Extending the footings below the subsoil and reinforcing the footings and foundations help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Elevating the absorption field with suitable fill material and installing perimeter drains help to overcome the wetness.
• Subsurface tile drains and surface ditches help to remove excess water.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 3

36B2—Tama silt loam, 2 to 5 percent slopes, eroded

Composition

Tama soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 15 inches—dark yellowish brown, friable silt loam

Subsoil:
15 to 23 inches—dark yellowish brown, friable silty clay loam
23 to 60 inches—dark yellowish brown, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Virden soils in shallow depressions and drainageways below the Tama soil

Similar inclusions:
• The somewhat poorly drained Ipava and Muscatine soils in the less sloping areas above or below the Tama soil
• Soils that have an uneroded surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil and reinforcing the footings and foundations help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains help to remove excess water.
• Elevating the absorption field with suitable fill material and installing perimeter drains also help to overcome the wetness.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 3

37A—Worthen silt loam, 0 to 2 percent slopes

Composition

Worthen soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Summits of fan terraces, footslopes of loess-covered till plains, and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Local alluvium
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silt loam

Subsurface layer:
8 to 16 inches—very dark gray, friable silt loam
16 to 30 inches—very dark grayish brown, friable silt loam

Subsoil:
30 to 42 inches—brown, friable silt loam
42 to 62 inches—dark yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Beaucoup soils and the somewhat poorly drained Orion soils, which formed in alluvium; on flood plains below the Worthen soil
• The well drained Dickinson soils, which formed in loamy material; on the steeper slopes above the Worthen soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have more sand in the subsoil
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition.

Dwellings

Suitability: Well suited
Management measures:
• Leaving as much vegetation on the surface as possible during construction and seeding or sodding disturbed areas help to control erosion.

Septic tank absorption fields

Suitability: Well suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1
Windbreak suitability group: 3

37B—Worthen silt loam, 2 to 5 percent slopes

Composition

Worthen soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Summits of fan terraces, footslopes of loess-covered till plains, and terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Local alluvium
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silt loam

Subsurface layer:
7 to 32 inches—very dark grayish brown, friable silt loam

Subsoil:
32 to 35 inches—dark brown, friable silt loam
35 to 60 inches—brown, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Beaucoup soils and the somewhat poorly drained Orion and Littleton soils, which formed in alluvium; on flood plains below the Worthen soil
• The well drained Dickinson soils, which formed in loamy material; on the steeper slopes above the Worthen soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have more sand or clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.

• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition and help to control erosion.

Dwellings

Suitability: Well suited
Management measures:
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Well suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains higher on the side slope than the absorption field helps to intercept seepage water.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 3

41A—Muscatine silt loam, 0 to 2 percent slopes

Composition

Muscatine soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—black, friable silt loam

Subsurface layer:
8 to 13 inches— black, friable silt loam
13 to 19 inches—very dark gray, friable silty clay loam

Subsoil:
19 to 32 inches—dark grayish brown and grayish brown, mottled, friable silty clay loam
32 to 47 inches—light brownish gray, mottled, friable silty clay loam

Substratum:
47 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained or well drained Tama soils, which have a seasonal high water table more than 4 feet below the surface during spring; in the higher positions on the landscape
• The poorly drained Sable soils, which have a seasonal high water table 0.5 foot above to 2.0 feet below the surface; in shallow depressions and in drainageways

Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that have less clay in the subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and

returning crop residue to the soil help to maintain tilth and fertility.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains and surface ditches help to remove excess water.
• Elevating the absorption field with suitable fill material and installing perimeter drains also help to overcome the wetness.

Interpretive Groups

Land capability classification: 1
Windbreak suitability group: 1

41B2—Muscatine silt loam, 2 to 5 percent slopes, eroded

Composition

Muscatine soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Moderate
Available water capacity: Very high
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable silt loam

Subsurface layer:
5 to 9 inches—dark brown, friable silt loam

Subsoil:
9 to 18 inches—brown, mottled, friable silty clay loam
18 to 26 inches—grayish brown, mottled, friable silty clay loam
26 to 37 inches—light brownish gray, mottled, friable silty clay loam
37 to 56 inches—light brownish gray, mottled, friable silt loam

Substratum:
56 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The very poorly drained Shiloh and poorly drained Sable soils, which are subject to ponding for brief periods; in shallow depressions
• The moderately well drained Tama soils on ridgetops above the Muscatine soil

Similar inclusions:
• Soils that have a thinner surface layer and/or subsurface layer
• Soils that have a seasonal high water table at a depth of more than 4 feet

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management measures:
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of the foundations helps to remove excess water.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains help to remove excess water.
• Grading and land shaping also help to remove surface water.
• Enlarging the filter field and replacing the soil with a more permeable material help to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 1

43A—Ipava silt loam, 0 to 2 percent slopes

Composition

Ipava soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—black, friable silt loam

Subsurface layer:
5 to 13 inches—black, friable silt loam
13 to 20 inches—very dark grayish brown, friable silt loam

Subsoil:
20 to 25 inches—dark grayish brown, mottled, friable silty clay loam
25 to 31 inches—grayish brown, mottled, friable silty clay
31 to 57 inches—light brownish gray, mottled, friable silty clay loam

Substratum:
57 to 66 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Tama soils on ridgetops above the Ipava soil
• The poorly drained Virden soils in shallow depressions below the Ipava soil

Similar inclusions:
• Soils that have more silt and less clay in the subsoil
• Soils that have a surface layer that is thinner or lighter in color
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility (fig. 6).

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.

Figure 6.—A ridge-till planting system and a cover of corn residue help to maintain tilth and fertility in this area of Ipava silt loam, 0 to 2 percent slopes.

• Extending the footings below the subsoil and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Underground drains and surface ditches adjacent to the absorption field help to remove excess water.
• Enlarging the absorption area or replacing the soil with a more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 1
Windbreak suitability group: 1

43B—Ipava silt loam, 2 to 5 percent slopes

Composition

Ipava soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderately slow
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: High
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silt loam

Subsurface layer:
8 to 15 inches—very dark gray, friable silt loam

Subsoil:
15 to 20 inches—brown, mottled, friable silty clay loam
20 to 28 inches—dark grayish brown, mottled, friable silty clay loam
28 to 50 inches—grayish brown, mottled, friable silty clay loam

Substratum:
50 to 60 inches—grayish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Keller soils, which have less clay in the upper part of the subsoil than the Ipava soil; in the more sloping positions on the landscape

Similar inclusions:
• Soils that have a dark surface layer less than 10 inches thick

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Dwellings

Suitability: Poorly suited
Management measures:
• Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains helps to remove excess water.
• Enlarging the filter field or replacing the soil with a more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 1

43B2—Ipava silt loam, 2 to 5 percent slopes, eroded

Composition

Ipava soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: High
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silt loam

Subsoil:
8 to 22 inches—brown, mottled, firm silty clay loam
22 to 31 inches—light brownish gray, mottled, firm silty clay loam
31 to 46 inches—light brownish gray, mottled, friable silt loam

Substratum:
46 to 65 inches—light brownish gray, mottled, friable silt loam
65 to 73 inches—light gray, mottled, friable silt loam
73 to 80 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Tama soils on ridgetops above the Ipava soil
• The poorly drained Virden soils in drainageways below the Ipava soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have a thicker dark surface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting, installing terraces, returning crop residue to the soil, and farming on the contour help to maintain tilth and fertility.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Subsurface tile drains help to lower the water table.
• Grading and land shaping help to remove surface water.
• Enlarging the absorption area or replacing the soil with a more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 1

46A—Herrick silt loam, 0 to 2 percent slopes

Composition

Herrick soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight or none
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark gray, friable silt loam

Subsurface layer:
5 to 17 inches—very dark gray, friable silt loam

Subsoil:
17 to 23 inches—brown, mottled, firm silty clay loam
23 to 27 inches—grayish brown, mottled, firm silty clay loam
27 to 32 inches— light brownish gray, mottled, firm silty clay loam
32 to 41 inches—light brownish gray, mottled, firm silt loam

Substratum:
41 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Clarksdale soils, which have a thinner surface layer than the Herrick soil; in the lower positions on the landscape
• The somewhat poorly drained Ipava soils, which have a thicker surface layer than the Herrick soil
• The moderately well drained Tama soils in the higher positions on the landscape

Similar inclusions:
• Soils that have a thinner and lighter colored surface layer
• Soils that have a seasonal high water table within a depth of 1 foot
• Soils that are ponded

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface and keeping tillage to a minimum help to maintain tilth and productivity and increase the rate of water infiltration.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Subsurface tile drains help to lower the water table.
• Grading and land shaping help to remove surface water.
• Enlarging the absorption area or replacing the soil with a more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 1

50—Virden silty clay loam

Composition

Virden soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Low areas on loess-covered till plains
Slope range: 0 to 2 percent
Ponding: Subject to ponding during the spring
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface during the spring
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—black, friable silty clay loam

Subsoil:
8 to 17 inches—black, firm silty clay loam
17 to 33 inches—dark grayish brown, mottled, firm silty clay loam
33 to 42 inches—grayish brown, mottled, firm silty clay loam
42 to 56 inches—light gray, mottled, friable silty clay loam

Substratum:
56 to 64 inches—light gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The very poorly drained Shiloh soils in depressions below the Virden soil
• The somewhat poorly drained Ipava soils on slight rises above the Virden soil

Similar inclusions:
• Soils that have less clay in the surface layer or subsoil
• Soils that have a thicker surface layer
• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions reduces the extent of the crop damage caused by flooding.
• Subsurface and surface drains help to lower the water table.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 2

61A—Atterberry silt loam, 0 to 2 percent slopes

Composition

Atterberry soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 14 inches—grayish brown, mottled, friable silt loam

Subsoil:
14 to 23 inches—brown, mottled, friable silty clay loam
23 to 31 inches—light brownish gray, mottled, friable silty clay loam

Substratum:
31 to 70 inches—light brownish gray and light olive gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Downs soils on ridgetops and side slopes above or below the Atterberry soil
• The poorly drained Sable soils in shallow depressions and drainageways below the Atterberry soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have a thicker surface layer
• Soils that have more clay in the subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Woodland

Suitability: Well suited
Management measures:
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Curtain drains in the areas adjacent to the absorption field help to remove excess water.

Interpretive Groups

Land capability classification: 1
Woodland ordination symbol: 4A
Windbreak suitability group: 1

61B2—Atterberry silt loam, 2 to 5 percent slopes, eroded

Composition

Atterberry soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silt loam

Subsoil:
8 to 21 inches—brown, mottled, friable silty clay loam
21 to 35 inches—light brownish gray, mottled, friable silty clay loam
35 to 44 inches—light brownish gray, mottled, friable silt loam

Substratum:
44 to 65 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Downs soils on the higher ridges and knolls above the Atterberry soil
• The poorly drained Sable soils on upland flats and in depressions below the Atterberry soil

Similar inclusions:
• Soils that have a slightly darker surface layer
• Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.

- Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:
- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, help to prevent surface compaction and poor tilth, and help to control runoff and erosion.
- Subsurface tile drains help to overcome the wetness.

Woodland

Suitability: Well suited
Management measures:
- Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management measures:
- Installing subsurface tile drains around the base of foundations removes excess water.
- Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
- Curtain drains in the areas adjacent to the absorption field help to remove excess water.
- Diverting water away from the filter field helps to keep the system functioning properly.
- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A
Windbreak suitability group: 1

68—Sable silty clay loam

Composition

Sable soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Low-lying areas on loess-covered till plains
Slope range: 0 to 2 percent
Ponding: Subject to ponding during the spring
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silty clay loam

Subsurface layer:
7 to 12 inches—black, friable silty clay loam
12 to 19 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
19 to 24 inches—dark grayish brown, mottled, friable silty clay loam
24 to 33 inches—grayish brown, mottled, friable silty clay loam
33 to 57 inches—light brownish gray, mottled, friable silty clay loam

Substratum:
57 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Atterberry and Muscatine soils on slight rises above the Sable soil
- The very poorly drained Shiloh soils in depressions and drainageways below the Sable soil

Similar inclusions:
• Soils that have a seasonal high water table more than 2 feet below the surface
• Soils that have more clay in the subsoil
• Soils that have a subsurface layer of silt loam that is lighter in color
• Soils that have a thicker dark surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 2

112—Cowden silt loam

Composition

Cowden soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Low-lying areas on loess-covered till plains
Slope range: 0 to 2 percent
Ponding: Subject to ponding during the spring
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Loess
Runoff rate: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 2.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark gray, friable silt loam

Subsurface layer:
9 to 14 inches—dark gray, friable silt loam
14 to 17 inches—dark grayish brown, mottled, friable silt loam

Subsoil:
17 to 24 inches—grayish brown, mottled, firm silty clay loam
24 to 42 inches—light brownish gray, mottled, firm silty clay loam
42 to 52 inches—light brownish gray, mottled, firm silt loam

Substratum:
52 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Ipava and Clarksdale soils on slight rises above the Cowden soil
• The somewhat poorly drained Keomah soils, which have a lighter colored surface layer than the Cowden soil; on slight rises above the Cowden soil

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have more clay in the surface layer and subsurface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.

• The water table can be lowered by underground drains and surface drains.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 2

119C2—Elco silt loam, 5 to 10 percent slopes, eroded

Composition

Elco soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Major use: Cultivated crops or hay and pasture

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow or slow in the lower part
Parent material: Loess and the underlying glacial till, which has a paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: 2.5 to 4.5 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—mixed dark yellowish brown and yellowish brown, friable silt loam

Subsoil:
4 to 7 inches—yellowish brown, mottled, friable silty clay loam
7 to 22 inches—yellowish brown, friable silty clay loam
22 to 28 inches—yellowish brown, mottled, friable silty clay loam
28 to 44 inches—grayish brown, mottled, firm silty clay loam
44 to 60 inches—light brownish gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which have a very firm subsoil within a depth of 20 inches; on the lower side slopes

Similar inclusions:
• Soils that have a thinner surface layer
• Soils that have a buried soil at a lower depth
• Soils that have a seasonal high water table at a depth of less than 1.5 feet

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Regularly adding organic material helps to maintain productivity and tilth.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, help to prevent surface compaction and poor tilth, and help to control runoff and erosion.
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

Woodland

Suitability: Well suited
Management measures:
• 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Land shaping by cutting and filling helps to overcome the slope.
• Installing subsurface tile drains around the base of foundations helps to lower the seasonal high water table.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.
• Installing subsurface tile drains higher on the side slope than the absorption field helps to intercept seepage water.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 4A
Windbreak suitability group: 3

134B—Camden silt loam, 2 to 5 percent slopes

Composition

Camden soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying loamy outwash
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—mixed brown and yellowish brown, friable silt loam

Subsurface layer:
10 to 13 inches—yellowish brown, friable silt loam

Subsoil:
13 to 20 inches—brown, friable silt loam
20 to 27 inches—brown, friable silty clay loam
27 to 37 inches—brown, mottled, friable, stratified clay loam and loam
37 to 53 inches—yellowish brown, mottled, friable, stratified silt loam and loam

Substratum:
53 to 60 inches—brown and light brownish gray, mottled, friable, stratified silt loam, loam, and sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Clarksdale soils, which have a dark surface layer less than 10 inches thick

Similar inclusions:
• Soils that have a dark surface layer more than 10 inches thick
• Soils that contain more sand in the subsoil
• Soils that have less profile development

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
• Selecting drought-tolerant grasses and legumes for planting can help to maintain or improve forage stands.
• Using a no-till method of seeding or pasture renovation helps to establish forage species and helps to control erosion.

Woodland

Suitability: Well suited
Management measures:
• 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of foundations helps to remove excess water.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains help to remove excess water.
• Enlarging the filter field and replacing the soil with a more permeable material help to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 7A
Windbreak suitability group: 3

134C2—Camden silt loam, 5 to 10 percent slopes, eroded

Composition

Camden soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Terrace treads of stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying loamy outwash
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Medium
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—mixed dark grayish brown and yellowish brown, friable silt loam

Subsoil:
7 to 18 inches—yellowish brown, friable silty clay loam
18 to 25 inches—yellowish brown, mottled, friable silty clay loam
25 to 36 inches—brown, mottled, friable clay loam
36 to 55 inches—brown, mottled, friable loam

Substratum:
55 to 60 inches—dark yellowish brown, mottled, friable, stratified loam and sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Clarksdale soils, which have a dark surface layer less than 10 inches thick

Similar inclusions:
• Soils that have a dark surface layer
• Soils that contain more sand in the subsoil
• Soils that have little profile development

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation that includes 1 or more years of

forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control water erosion and help to maintain productivity and tilth.
• Regular additions of organic material also help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
• Selecting drought-tolerant grasses and legumes for planting can help to maintain or improve forage stands.
• Using a no-till method of seeding or pasture renovation helps to establish forage species and helps to control erosion.

Woodland

Suitability: Well suited
Management measures:
• 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of foundations helps to lower the seasonal high water table.
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 7A
Windbreak suitability group: 3

138—Shiloh silty clay

Composition

Shiloh soil and similar soils: 92 to 98 percent
Contrasting inclusions: 2 to 8 percent

Setting

Landscape: Uplands
Position on the landform: Shallow closed depressions on loess-covered till plains
Slope range: 0 to 2 percent
Ponding: Subject to ponding during the spring
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Very poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Ponded
Available water capacity: High
Seasonal high water table: 1 foot above to 1 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—black, friable silty clay

Subsurface layer:
6 to 11 inches—black, firm silty clay
11 to 22 inches—black, mottled, firm silty clay

Subsoil:
22 to 30 inches—black, mottled, firm silty clay loam
30 to 38 inches—grayish brown, mottled, firm silty clay loam
38 to 48 inches—light olive gray, mottled, friable silty clay loam

Substratum:
48 to 64 inches—light olive gray, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Ipava soils on slight rises above the Shiloh soil

Similar inclusions:
• Soils that are lighter colored in the upper part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions reduces the extent of the crop damage caused by ponding.
• Underground drains and surface drains help to lower the water table.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 2

250D2—Velma loam, 10 to 15 percent slopes, eroded

Composition

Velma soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Pasture and hay or woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—mixed very dark brown and brown, friable loam

Subsoil:
8 to 23 inches—dark yellowish brown, friable clay loam
23 to 51 inches—yellowish brown, mottled, friable clay loam
51 to 60 inches—yellowish brown, mottled, friable sandy clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which have more clay in the subsoil than the Velma soil

Similar inclusions:
• Soils in which the loess is more than 20 inches thick
• Soils that have slopes of more than 15 percent
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation dominated by forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, and stripcropping help to maintain productivity and tilth and help to control erosion.
• Regular additions of organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, help to prevent surface compaction and poor tilth, and help to control runoff and erosion.

Dwellings

Suitability: Moderately suited
Management measures:
• Extending the footings below the subsoil and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Grading and land shaping help to remove excess surface water.
• Installing subsurface tile drains higher on the side slope than the absorption field helps to intercept seepage water.
• Enlarging the filter field or replacing the soil with a more permeable material helps to overcome the restricted permeability.
• Cutting and filling or installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 3e
Windbreak suitability group: 3

257A—Clarksdale silt loam, 0 to 2 percent slopes

Composition

Clarksdale soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight or none
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:
9 to 14 inches—dark grayish brown, mottled, friable silt loam

Subsoil:
14 to 18 inches—dark grayish brown, mottled, friable silt loam
18 to 29 inches—brown, mottled, friable silty clay loam
29 to 42 inches—light brownish gray, mottled, friable silty clay loam
42 to 60 inches—light brownish gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Cowden soils in slight depressions
• The somewhat poorly drained Keomah soils, which have a lighter colored surface layer than the

Clarksdale soil; in the slightly lower positions on the landscape
• The moderately well drained Downs soils, which have a seasonal high water table at a lower depth than that in the Clarksdale soil; in the slightly higher, more sloping landscape positions

Similar inclusions:
• Soils that have a thicker and darker surface layer or subsurface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.
• The seasonal high water table may delay planting in some years.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Woodland

Suitability: Well suited
Management measures:
• Plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains and surface ditches help to remove excess water.
• Grading and land shaping also help to remove surface water.
• Enlarging the filter field and replacing the soil with a more permeable material help to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 1
Woodland ordination symbol: 4A
Windbreak suitability group: 1

257B—Clarksdale silt loam, 2 to 5 percent slopes

Composition

Clarksdale soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsoil:
9 to 13 inches—dark grayish brown, mottled, friable silt loam
13 to 19 inches—brown, mottled, friable silty clay loam
19 to 27 inches—grayish brown, mottled, friable silty clay loam

27 to 41 inches—light brownish gray, mottled, friable silty clay loam
41 to 45 inches—light brownish gray, mottled, friable silt loam

Substratum:
45 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in drainageways
• The poorly drained Rushville soils in depressions
• The moderately well drained Downs soils in the slightly higher positions on the landscape

Similar inclusions:
• Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.
• The existing subsoil drainage system should be maintained.

Pasture and hay

Suitability: Well suited
Suitable species: Bromegrass, orchardgrass, tall fescue, and alfalfa
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.
• Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.

Woodland

Suitability: Well suited
Management measures:
• Plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction and destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundation helps to remove excess water.
• Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains helps to remove excess water.
• Grading and land shaping also help to remove surface water.
• Enlarging the filter field or replacing the soil with a more permeable material helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A
Windbreak suitability group: 1

257B2—Clarksdale silt loam, 2 to 5 percent slopes, eroded

Composition

Clarksdale soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown and brown, friable silt loam

Subsoil:
8 to 12 inches—brown, mottled, friable silty clay loam
12 to 55 inches—grayish brown, mottled, friable silty clay loam

Substratum:
55 to 60 inches—grayish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable soils in drainageways
• The moderately well drained Downs soils in the slightly higher positions on the landscape

Similar inclusions:
• Soils that do not have a grayish subsurface layer
• Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition and help to control erosion.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Woodland

Suitability: Well suited
Management measures:
• Plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction and destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains around the base of foundations removes excess water.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Curtain drains in the areas adjacent to the absorption field help to remove excess water.
• Diverting water away from the filter bed helps to keep the system functioning properly.
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A
Windbreak suitability group: 1

259C2—Assumption silt loam, 5 to 10 percent slopes, eroded

Composition

Assumption soil and similar soils: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and slow or moderately slow in the lower part
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: 2.5 to 4.5 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark gray, friable silt loam

Subsoil:
7 to 13 inches—brown, friable silty clay loam
13 to 30 inches—dark yellowish brown, mottled, friable silty clay loam
30 to 68 inches—light olive brown, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Keller soils on side slopes below the Assumption soil
• The somewhat poorly drained Atlas soils, which contain more clay in the upper part of the subsoil than the Assumption soil; on side slopes below the Assumption soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have more clay in the upper part of the subsoil
• Soils that have less clay in the lower part of the subsoil and in the underlying material
• Soils that have slopes of less than 5 percent

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these measures can help to control further erosion.
• Regularly adding organic material can help to maintain or improve productivity and tilth.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing pasture plants or hay on this soil helps to control further erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production and good tilth, minimize surface compaction, and help to control runoff and erosion.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.
• Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water.
• Grading and land shaping help to remove surface water.
• Enlarging the absorption area or replacing the soil with a more permeable material helps to overcome the restricted permeability.
• Installing the filter lines on the contour or cutting and filling can help to overcome the slope.

Interpretive Groups

Land capability classification: 3e
Windbreak suitability group: 3

268B—Mt. Carroll silt loam, 2 to 5 percent slopes

Composition

Mt. Carroll soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark brown, friable silt loam

Subsurface layer:
8 to 12 inches—brown, friable silt loam

Subsoil:
12 to 32 inches—dark yellowish brown, friable silt loam
32 to 42 inches—dark yellowish brown, mottled, friable silt loam
42 to 51 inches—yellowish brown, mottled, friable silt loam

Substratum:
51 to 70 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Atterberry soils in broad flat areas below the Mt. Carroll soil
- The poorly drained Sable soils, which have a thicker dark surface layer than the Mt. Carroll soil; in shallow depressions and drainageways below the Mt. Carroll soil

Similar inclusions:
- Soils that have a lighter colored surface layer
- Soils that have a thicker dark surface layer
- Soils that contain more clay

Use and Management

Cropland

Suitability: Well suited
Management measures:
- A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
- Returning crop residue to the soil and adding other organic material or including a deep-rooted legume in the crop rotation can help to maintain tilth and fertility and the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Suitable species:
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
- Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
- Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited
Management measures:
- Installing subsurface tile drains around the base of foundations removes excess water.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains adjacent to the absorption field helps to remove excess water.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 6A
Windbreak suitability group: 3

274A—Seaton silt loam, 0 to 2 percent slopes

Composition

Seaton soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits and side slopes
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 3 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—brown, very friable silt loam

Subsurface layer:
10 to 14 inches—brown, very friable silt loam

Subsoil:
14 to 29 inches—brown, friable silt loam
29 to 60 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atterberry soils in broad flat areas above the Seaton soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have more clay in the surface layer and subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum can help to maintain tilth and fertility.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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 prevent injury to trees and maintain the leaf mulch.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water on sites for dwellings with basements.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains and surface ditches help to remove excess water.

Interpretive Groups

Land capability classification: 1
Woodland ordination symbol: 6A
Windbreak suitability group: 3

274B—Seaton silt, 2 to 5 percent slopes

Composition

Seaton soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 3 to 6 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—mixed brown and dark yellowish brown, friable silt

Subsoil:
8 to 23 inches—dark yellowish brown, friable silt loam
23 to 52 inches—dark yellowish brown, mottled, friable silt loam

Substratum:
52 to 73 inches—dark yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atterberry soils in broad flat areas below the Seaton soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that contain more clay in the surface layer and subsoil
• Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Contour farming, terraces, a crop rotation that includes 1 or more years of forage crops, or a combination of these measures can help to keep soil loss within tolerable limits.
• Applying a conservation tillage system 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.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.
• Establishing pasture plants and hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains around the base of foundations helps to remove excess water.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

• Installing subsurface tile drains higher on the side slope than the absorption field helps to intercept seepage water.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 6A
Windbreak suitability group: 3

274C2—Seaton silt loam, 5 to 10 percent slopes, eroded

Composition

Seaton soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Major use: Cultivated crops or pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Deep loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown, friable silt loam

Subsurface layer:
4 to 9 inches—dark grayish brown, mottled, friable silt loam

Subsoil:
9 to 40 inches—dark yellowish brown, friable silt loam
40 to 56 inches—brown, friable silt loam
56 to 60 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland soils, which formed in alluvium; on flood plains below the Seaton soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that contain more clay

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Keeping tillage to a minimum, applying a conservation tillage system that leaves crop residue on the surface after planting, and returning crop residue to the soil help to keep soil loss within tolerable limits, maintain tilth, help to prevent surface compaction, and increase the rate of water infiltration.
• Regular additions of organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Well suited
Management measures:
• There are no limitations that significantly affect the use of this soil for dwellings.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing the filter lines on the contour or cutting and filling can help to overcome the slope.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 6A
Windbreak suitability group: 3

274D3—Seaton silt loam, 10 to 18 percent slopes, severely eroded

Composition

Seaton soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—mixed brown and dark yellowish brown, friable silt loam

Subsoil:
5 to 24 inches—dark yellowish brown, friable silt loam
24 to 44 inches—dark yellowish brown, mottled, friable silt loam

Substratum:
44 to 80 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland soils, which formed in alluvium; on flood plains below the Seaton soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Terraces, contour farming, a crop rotation dominated by forage crops, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain productivity and tilth and help to control erosion.
• Deferred tilling when the soil is wet minimizes surface cloddiness and compaction and helps to control runoff and erosion.
• Regular additions of organic material help to maintain productivity, increase the rate of water infiltration, and help to maintain tilth.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Using no-till farming and tilling on the contour when a seedbed is prepared or the pasture is renovated can help to control erosion. The plants should not be grazed or clipped until they are sufficiently established.

• Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means. Also, older and larger seedlings should be selected for planting.
• Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited
Management measures:
• Cutting, filling, and land shaping can help to overcome the slope.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 4e
Woodland ordination symbol: 6A
Windbreak suitability group: 3

278A—Stronghurst silt loam, 0 to 2 percent slopes

Composition

Stronghurst soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Slight or none
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—grayish brown, friable silt loam

Subsurface layer:
6 to 10 inches—grayish brown, friable silt loam

Subsoil:
10 to 14 inches—brown, mottled, friable silt loam
14 to 18 inches—brown, mottled, friable silty clay loam
18 to 27 inches—grayish brown, mottled, friable silty clay loam
27 to 43 inches—light brownish gray, mottled, firm silty clay loam
43 to 54 inches—light brownish gray, mottled, firm silt loam

Substratum:
54 to 60 inches—light brownish gray, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Rozetta soils in the more sloping positions on the landscape

Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that are subject to ponding
• Soils that have a dark surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

• Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and minimize crusting.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of forage crops. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundation helps to remove excess water.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains helps to lower the seasonal high water table.
• Grading and land shaping help to remove excess surface water.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A
Windbreak suitability group: 1

279B—Rozetta silt loam, 2 to 5 percent slopes

Composition

Rozetta soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands and terraces
Position on the landform: Summits and side slopes of loess-covered till plains and terrace treads of stream terraces
Major use: Cultivated crops or hay and pasture

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—very dark grayish brown, friable silt loam

Subsurface layer:
6 to 12 inches—brown, friable silt loam

Subsoil:
12 to 22 inches—brown, friable silty clay loam
22 to 45 inches—brown, mottled, friable silty clay loam
45 to 60 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sable and Virden soils in drainageways and depressions
• The somewhat poorly drained Clarksdale and

Keomah soils, which have more clay in the subsoil than the Rozetta soil; in the more level areas on the landscape

Similar inclusions:
- Soils that have a darker surface layer
- Soils that have a thicker surface layer
- Soils that have a seasonal high water table at a depth of more than 6 feet

Use and Management

Cropland

Suitability: Well suited
Management measures:
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, minimize surface compaction and crusting, increase the rate of water infiltration, and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
- Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:
- Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
- Plant competition in the openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited
Management measures:
- Installing subsurface tile drains near the foundations helps to remove excess water.
- Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
- Installing underground drains adjacent to the absorption field helps to remove excess water.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A
Windbreak suitability group: 3

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded

Composition

Rozetta soil and similar soils: 90 to 100 percent
Contrasting inclusions: 0 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Major use: Cultivated crops or pasture

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: Very high
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown, friable silt loam

Subsoil:
4 to 19 inches—brown, friable silty clay loam
19 to 43 inches—yellowish brown, mottled, friable silty clay loam
43 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fishhook soils, which have more clay in the subsoil than the Rozetta soil; in the lower positions on the slopes
• The somewhat poorly drained Stronghurst soils on the upper part of side slopes above the Rozetta soil
• The somewhat poorly drained Keomah soils, which have more clay in the subsoil than the Rozetta soil; on slight rises above the Rozetta soil

Similar inclusions:
• Soils that have a higher content of sand in the lower part of the subsoil
• The moderately well drained Elco soils, which have more clay in the subsoil than the Rozetta soil; on the steeper parts of the slopes
• The well drained Fayette soils on side slopes below the Rozetta soil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control further erosion.
• Regular additions of organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Applications of fertilizer are needed.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
• 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 the reduction or 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 prevent injury to trees and help to maintain the leaf mulch.

Dwellings

Suitability: Moderately suited
Management measures:
• Extending the footings below the subsoil and reinforcing the foundations help to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of the foundations lowers the seasonal high water table.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Subsurface tile drains lower the water table.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 4A
Windbreak suitability group: 3

280D2—Fayette silt loam, 10 to 18 percent slopes, eroded

Composition

Fayette soil and similar soils: 90 to 100 percent
Contrasting inclusions: 0 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains

Major use: Pasture or hay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—dark brown, friable silt loam

Subsoil:
4 to 7 inches—brown, friable silt loam
7 to 40 inches—yellowish brown, mottled, friable silty clay loam
40 to 60 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fishhook soils, which have more clay in the subsoil than the Fayette soil; at the head of drainageways above the Fayette soil
• The somewhat poorly drained Atlas soils, which have a thinner surface layer than the Fayette soil and have more clay in the subsurface layer; at the head of drainageways above the Fayette soil

Similar inclusions:
• Soils that have more clay in the subsoil
• Soils that have more gray colors in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Contour farming, terraces, a crop rotation dominated by forage crops, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain productivity and tilth and help to control further erosion.
• Regular additions of organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Using no-till farming or tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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 prevent injury to trees and help to maintain the leaf mulch.

Dwellings

Suitability: Moderately suited
Management measures:
• Extensive land shaping by cutting and filling is needed for building site preparation.
• Extending the footings below the subsoil and reinforcing the foundations help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing the filter lines on the contour or cutting and filling can help to overcome the slope.

Interpretive Groups

Land capability classification: 4e

Woodland ordination symbol: 4A
Windbreak suitability group: 3

379B—Dakota loam, 1 to 5 percent slopes

Composition

Dakota soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Stream terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the underlying sandy deposits
Parent material: Alluvium
Runoff rate: Medium
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—black, friable loam

Subsurface layer:
8 to 15 inches—very dark gray, friable loam

Subsoil:
15 to 26 inches—brown, friable loam
26 to 30 inches—brown, friable gravelly sandy loam

Substratum:
30 to 60 inches—brown, loose very channery loamy sand

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Lawler soils, which have bedrock in the substratum; in the slightly lower positions on stream terraces

Similar inclusions:
• Soils that have more sand in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 6(g)

386B—Downs silt loam, 2 to 5 percent slopes

Composition

Downs soil and similar soils: 90 to 100 percent
Contrasting inclusions: 0 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Summits and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 11 inches—dark grayish brown, friable silt loam

Subsoil:
11 to 27 inches—dark yellowish brown, friable silt loam and silty clay loam
27 to 35 inches—yellowish brown, friable silty clay loam
35 to 44 inches—yellowish brown, mottled, friable silty clay loam
44 to 62 inches— yellowish brown, mottled, friable silt loam

Substratum:
62 to 65 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Clarksdale soils, which contain more clay in the subsoil than the Downs soil; in the slightly lower positions on the landscape
• The somewhat poorly drained Atterberry soils in the slightly lower positions below the Downs soil on the landscape

Similar inclusions:
• Soils that have a thicker surface layer
• Soils that have a lighter colored surface layer
• Soils that have a seasonal high water table at a depth of less than 4 feet

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth, minimize surface compaction and crusting, and help to control erosion.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

Woodland

Suitability: Well suited
Management measures:
• Plant competition affects the seedlings of desirable species. The competition in the openings where timber has been harvested can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Dwellings

Suitability: Moderately suited
Management measures:
• Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of foundations of buildings with basements lowers the seasonal high water table.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Installing subsurface tile drains helps to lower the seasonal high water table.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A
Windbreak suitability group: 3

417G—Derinda silt loam, 30 to 60 percent slopes

Composition

Derinda soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes and backslopes of loess-covered escarpments
Major use: Woodland or woodland wildlife habitat

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow in the upper part and very slow in the lower part
Parent material: Loess and the underlying shale
Runoff rate: Very rapid
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—very dark grayish brown, friable silt loam

Subsoil:
3 to 7 inches—dark yellowish brown, friable silty clay loam
7 to 17 inches— brown, firm silty clay loam
17 to 36 inches—olive gray, mottled, friable silty clay loam

Bedrock:
36 to 60 inches—brown, mottled, soft shale

Inclusions

Contrasting inclusions:
• The well drained Ross soils below the Derinda soil on flood plains
• The well drained Jasper soils below the Derinda soil on terraces

Similar inclusions:
• Soils that are deeper to bedrock
• Soils that have more sand and sandstone in the lower part of the subsoil and in the substratum
• Soils that have a dark surface layer

Use and Management

Woodland

Suitability: Moderately suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Placing logging roads and skid trails on the contour, skidding logs or trees uphill with a cable and winch, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging has been completed help to control erosion.
• 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.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 4R
Windbreak suitability group: 4(1)

440B—Jasper loam, 1 to 5 percent slopes

Composition

Jasper soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Terrace risers of stream terraces and summits and footslopes of fan terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Stratified loamy sediments
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate

Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable loam

Subsurface layer:
8 to 16 inches—dark brown, friable loam

Subsoil:
16 to 51 inches—brown, friable loam
51 to 60 inches—brown, friable, stratified loam and silt loam

Inclusions

Contrasting inclusions:
- The poorly drained Titus soils on flood plains below the Jasper soil
- The well drained Lacrescent soils above the Jasper soil on side slopes

Similar inclusions:
- Soils that have a light colored surface layer
- Soils that have more sand and stones in the substratum
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
- A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
- Grassed waterways can be used to remove excess surface water at a nonerosive rate.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited
Management measures:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Windbreak suitability group: 3

440C2—Jasper fine sandy loam, 5 to 10 percent slopes, eroded

Composition

Jasper soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Terrace risers of stream terraces and summits and footslopes of fan terraces
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Stratified loamy sediments
Runoff rate: Medium
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable fine sandy loam

Subsurface layer:
7 to 13 inches—brown, friable fine sandy loam

Subsoil:
13 to 29 inches—dark yellowish brown, friable sandy clay loam
29 to 38 inches—dark yellowish brown, mottled, friable sandy clay loam
38 to 56 inches—brown, mottled, friable sandy clay loam

Substratum:
56 to 60 inches—brown, mottled, friable sandy loam

Inclusions

Contrasting inclusions:
- The poorly drained Titus soils on flood plains below the Jasper soil
- The well drained Lacrescent soils above the Jasper soil on side slopes

Similar inclusions:
• Soils that have a light colored surface layer
• Soils that have more sand and gravel in the substratum
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain productivity and tilth and help to control erosion.
• Grassed waterways can be used to remove excess surface water at a nonerosive rate.

Dwellings

Suitability: Well suited
Management measures:
• Cutting, filling, and land shaping can help to overcome the slope.

Septic tank absorption fields

Suitability: Well suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Windbreak suitability group: 3

470C2—Keller silt loam, 5 to 12 percent slopes, eroded

Composition

Keller soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsoil:
8 to 21 inches—dark yellowish brown, mottled, friable silty clay loam
21 to 31 inches—light gray, mottled, friable silty clay loam
31 to 62 inches—gray, mottled, very firm silty clay

Inclusions

Contrasting inclusions:
• The moderately well drained Assumption soils on side slopes above the Keller soil
• The moderately well drained Tama soils, which contain less clay in the lower part of the subsoil than the Keller soil; on side slopes above the Keller soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have a thicker surface layer
• Soils that have less clay in the lower part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion and maintain tilth and fertility (fig. 7).
• The existing drainage system should be maintained.
• Grassed waterways can be used to remove excess surface water at a nonerosive rate.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Figure 7.—Terraces in an area of Keller silt loam, 5 to 12 percent slopes, eroded.

Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing tile drains around the base of foundations helps to lower the seasonal high water table.
• Reinforcing the foundations and widening foundation trenches and backfilling them with suitable coarse material can help to prevent the structural damage caused by shrinking and swelling.
• Leaving as much vegetation on the surface as possible during construction and seeding or sodding disturbed areas help to control erosion.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Enlarging the filter field and replacing the soil with a more permeable material help to overcome the restricted permeability.

• Placing the filter lines on the contour helps to prevent the contamination of surface water and the seepage of effluent on side slopes.
• Subsurface drains help to lower the seasonal high water table.

Interpretive Groups

Land capability classification: 3e
Windbreak suitability group: 4(1)

516—Faxon silty clay loam

Composition

Faxon soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Rock-cored terraces
Slope range: 0 to 2 percent
Major use: Cultivated crops

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Poorly drained
Permeability: Moderate
Parent material: Outwash and the underlying limestone bedrock
Runoff rate: Slow
Available water capacity: Low
Seasonal high water table: At the surface to 1 foot below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silty clay loam

Subsurface layer:
7 to 11 inches—black, mottled, friable silty clay loam

Subsoil:
11 to 21 inches—dark gray, mottled, friable gravelly clay loam

Bedrock:
21 inches—limestone

Inclusions

Contrasting inclusions:
• The well drained Dakota soils, which are more than 60 inches deep to bedrock; in the higher positions on stream terraces

Similar inclusions:
• Soils that have a seasonal high water table at a depth of slightly more than 1 foot
• Soils that have bedrock at a depth of slightly more than 40 inches

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions can reduce the extent of crop damage caused by flooding.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Windbreak suitability group: 2

605E3—Ursa clay loam, 15 to 20 percent slopes, severely eroded

Composition

Ursa soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Pasture and hay; woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Parent material: Glacial till that has a strongly developed paleosol
Runoff rate: Rapid
Available water capacity: Moderate

Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 2 inches—mixed dark yellowish brown and very dark grayish brown, friable clay loam

Subsoil:
2 to 12 inches—dark yellowish brown, mottled, firm clay
12 to 39 inches—yellowish brown, mottled, firm clay loam
39 to 56 inches—yellowish brown, mottled, very firm clay loam

Substratum:
56 to 75 inches—yellowish brown, mottled, very firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils on side slopes below the Ursa soil
• The somewhat poorly drained Coffeen soils, which formed in alluvium; on flood plains below the Ursa soil

Similar inclusions:
• Soils that have less clay in the surface layer and subsoil
• Soils that have slopes of less than 15 percent or more than 20 percent

Use and Management

Pasture and hay

Suitability: Poorly suited
Management measures:
• Using a no-till method of pasture renovation or seeding helps to control further erosion.
• The plants should not be grazed until they are sufficiently established.
• Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management measures:
• Measures that protect the woodland from fire and from grazing by livestock are essential.
• Logging roads and skid trails should be established on the contour if possible.
• The seedling mortality rate can be reduced by selecting planting stock that is older and larger than normal.
• Logs or trees can be skidded uphill with a cable and winch.
• Water bars can divert surface water from logging roads and skid trails.
• Grass firebreaks should be established.
• Bare areas created by logging can be seeded to grass or to a grass-legume mixture.
• Using 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 grass cover 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.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: 4R
Windbreak suitability group: 4(1)

647A—Lawler clay loam, bedrock substratum, 0 to 2 percent slopes

Composition

Lawler soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Terraces
Position on the landform: Stream terraces

Major use: Cultivated crops

Soil Properties and Qualities

Depth class: Deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the solum and very rapid in the substratum
Parent material: Alluvium and the underlying coarse textured sediments overlying limestone bedrock
Runoff rate: Slow
Available water capacity: Moderate
Seasonal high water table: 2 to 4 feet below the surface
Organic matter content: High
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—black, friable clay loam

Subsurface layer:
4 to 13 inches—black, friable clay loam

Subsoil:
13 to 33 inches—grayish brown, mottled, friable clay loam

Substratum:
33 to 45 inches—yellowish brown, mottled, loose very gravelly loamy sand

Bedrock:
45 inches—limestone

Inclusions

Contrasting inclusions:
• The poorly drained Faxon soils in the lower positions on the landscape

Similar inclusions:
• Well drained soils in the higher positions on the landscape

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Dwellings

Suitability: Moderately suited
Management measures:
• Adding fill material can raise the foundations of dwellings without basements above the seasonal high water table.
• Extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains around the base of the foundations helps to lower the seasonal high water table.

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2s
Windbreak suitability group: 1

660C3—Coatsburg silty clay loam, 5 to 10 percent slopes, severely eroded

Composition

Coatsburg soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: A thin mantle of loess or other silty material and the underlying glacial till, which has a strongly developed paleosol
Runoff rate: Rapid
Available water capacity: Moderate
Seasonal high water table: Perched at the surface to 1 foot below the surface
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable silty clay loam

Subsoil:
5 to 18 inches—grayish brown, mottled, firm silty clay
18 to 63 inches—grayish brown, mottled, firm clay

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Keller and moderately well drained Assumption soils, which contain less clay in the upper part of the subsoil than the Coatsburg soil

Similar inclusions:
• Soils that have a thicker surface layer
• Soils that have a lighter colored surface layer
• Soils that contain less clay

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Keeping tillage to a minimum, deferring tillage when the soil is wet, returning crop residue to the soil, and regularly adding other organic material help to maintain productivity, help to prevent surface compaction and crusting, and improve tilth.

Pasture and hay

Suitability: Moderately suited
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production; help to prevent surface compaction, poor tilth, and excessive runoff; and help to control erosion.
• Establishing pasture plants or hay on this soil helps to control further erosion. Erosion control is needed when grasses and legumes are established in the pastured areas. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing tile drains around the base of foundations lowers the seasonal high water table.
• Reinforcing foundations and widening foundation trenches and backfilling them with suitable coarse material can help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.
• Specially designed systems that include sand filters are needed to overcome the restricted permeability.
• Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the high water table.

Interpretive Groups

Land capability classification: 4e
Windbreak suitability group: 2

785C—Lacrescent silt loam, 5 to 10 percent slopes

Composition

Lacrescent soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Parent material: Mixture of loess and talus of limestone cobbles
Runoff rate: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—very dark gray, friable silt loam

Subsurface layer:
7 to 15 inches—dark brown, friable silt loam

Subsoil:
15 to 24 inches—brown, friable silt loam
24 to 35 inches—brown, friable cobbly silt loam
35 to 49 inches—brown, friable very cobbly silt loam
49 to 60 inches—brown, friable very cobbly loam

Inclusions

Contrasting inclusions:
• Small areas of limestone escarpments
• The well drained Jasper soils on footslopes and terraces below the Lacrescent soil
• The well drained Ross soils below the Lacrescent soil in the drainageways

Similar inclusions:
• Soils that have a lighter colored surface layer

Use and Management

Woodland

Suitability: Moderately suited
Management measures:
• Plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Measures that protect the woodland from fire and from grazing by livestock are needed.
• Establishing logging roads and skid trails on or near the contour helps to control erosion.
• Machinery should be used only during periods when the soil is firm enough to support the equipment.

Wildlife habitat

Suitability: Moderately suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: 3R
Windbreak suitability group: 6

785G—Lacrescent cobbly silt loam, 30 to 60 percent slopes

Composition

Lacrescent soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes
Slope range: 30 to 60 percent
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Parent material: Mixture of loess and talus of limestone cobbles
Runoff rate: Very rapid
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: High
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown, friable cobbly silt loam

Subsurface layer:
10 to 14 inches—dark brown, mottled, friable cobbly silt loam

Subsoil:
14 to 21 inches—dark yellowish brown, friable very cobbly loam

Substratum:
21 to 60 inches—light olive brown, mottled, friable very cobbly loam

Inclusions

Contrasting inclusions:
• Small areas of limestone escarpments and outcroppings
• The well drained Jasper soils on footslopes and terraces below the Lacrescent soil
• The well drained Ross soils below the Lacrescent soil in the drainageways

Similar inclusions:
• Soils that have a lighter colored surface layer

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
• Establishing logging roads and skid trails on or near the contour helps to control erosion.
• Measures that protect the woodland from fire and from grazing by livestock are needed.
• Machinery should be used only during periods when the soil is firm enough to support the equipment.

Wildlife habitat

Suitability: Moderately suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 3R
Windbreak suitability group: 6

802B—Orthents, loamy, gently sloping

Composition

Orthents and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands, terraces, and flood plains
Position on the landform: Variable
Ponding: Small depressions are subject to ponding during periods of significant rainfall.
Major use: Most areas are used for roadways, landfill, or recreational development; some areas are idle land. Onsite investigation is needed to determine the suitability and limitations of these soils for a specific use.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Soil material that has been drastically altered or manipulated by human activities
Runoff rate: Slow or medium
Available water capacity: Variable
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

0 to 60 inches—mixed yellowish brown and gray, friable and firm silty clay loam and silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Ipava, poorly drained Sable, and moderately well drained Tama soils in undisturbed areas
• The well drained Derinda and Hickory soils in undisturbed areas on the steeper slopes and escarpments along berms, borders, or drainageways

Similar inclusions:
• Soils that have gravel and stones
• Soils that contain more than 15 percent sand

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: Not assigned

802F—Orthents, loamy, steep

Composition

Orthents and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Variable
Ponding: Subject to ponding during periods of significant rainfall
Major use: Most areas are idle sand and gravel pits,

stone quarries, or clay pits. Some of the excavated areas are used for fishing or swimming.

Reclaiming these areas by grading, shaping, and covering barren areas with soil material increases the number of potential uses. The feasibility and extent of reclamation depend upon the desired alternative use and the individual site location and conditions.

Soil Properties and Qualities

Permeability: Variable
Parent material: Soil material that has been drastically altered and manipulated by human activities
Runoff rate: Rapid in the more sloping areas and ponded in depressions
Organic matter content: Low
Erosion hazard: Severe

Typical Profile

Surface layer:
0 to 6 inches—mixed very dark grayish brown, dark grayish brown, and brown, very friable loam

Substratum:
6 to 11 inches—mixed yellowish brown, light gray, brown, and strong brown, friable and firm silty clay loam and clay loam
11 to 40 inches—mixed yellowish brown, gray, and brown, friable and firm silty clay loam and clay loam
40 to 60 inches—mixed brown, yellowish brown, and light gray, firm silt loam and silty clay loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Ipava, poorly drained Sable, and moderately well drained and well drained Tama soils in undisturbed areas
- The well drained Hickory soils on the steeper slopes and escarpments along berms, borders, or drainageways

Similar inclusions:
- Soils that have gravel and stones
- Soils that contain more than 15 percent sand

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: Not assigned

864—Pits, quarries

Composition

Pits, quarries, and disturbed areas around the excavations: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands or terraces
Position on the landform: Variable
Major use: Extraction or stockpiling of limestone bedrock

Soil Properties and Qualities

Permeability: Variable
Parent material: Excavations from which limestone has been removed
Runoff rate: Rapid in the more sloping areas and ponded in depressions
Erosion hazard: None in the level and ponded areas, moderate in the gently sloping disturbed areas, and severe in the more sloping disturbed areas

Inclusions

Contrasting inclusions:
- The well drained Derinda, Hickory, and Fayette soils and the moderately well drained Elco and Rozetta soils on the steeper slopes and escarpments along berms, borders, or drainageways

Similar inclusions:
- Roads used for hauling the quarried materials
- Stockpiles of crushed limestone
- Areas covered with disturbed soil material and debris

Interpretive Groups

Land capability classification: Not assigned
Windbreak suitability group: 3

874F—Dickinson-Hamburg complex, 10 to 60 percent slopes

Composition

Dickinson soil and similar soils: 40 to 50 percent
Hamburg soil and similar soils: 40 to 50 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Terraces
Position on the landform: Footslopes of loess-covered till plains and terrace treads of stream terraces

Slope range: Dickinson—10 to 20 percent; Hamburg—20 to 60 percent
Major use: Woodland or pasture

Soil Properties and Qualities

Dickinson

Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the lower part
Parent material: Glacial or alluvial deposits that have been reworked by wind
Runoff rate: Medium
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Hamburg

Drainage class: Somewhat excessively drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Dickinson

Surface layer:
0 to 8 inches—very dark grayish brown, friable fine sandy loam

Subsurface layer:
8 to 16 inches—very dark grayish brown, friable fine sandy loam

Subsoil:
16 to 30 inches—brown, friable fine sandy loam

Substratum:
30 to 37 inches—brown, loose loamy sand
37 to 60 inches—yellowish brown, loose sand

Hamburg

Surface layer:
0 to 5 inches—dark brown, very friable silt

Substratum:
5 to 74 inches—light yellowish brown, mottled, very friable silt

Inclusions

Contrasting inclusions:
- Soils that have limestone outcrops
- The somewhat poorly drained Wakeland soils, which formed in silty alluvium; on flood plains below the Dickinson soil

Similar inclusions:
- Soils that have a thinner, lighter colored surface layer
- Soils that have hard limestone bedrock or a clayey buried soil within a depth of 60 inches

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
- Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or a grass-legume mixture help to control erosion.
- The use of equipment is limited to periods when the soil is firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- The seedling mortality rate can be reduced by selecting planting stock that is older and larger than normal.

Wildlife habitat

Suitability: Moderately suited to woodland wildlife habitat
Management measures:
- This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
- The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Poorly suited
Management measures:
- Cutting, filling, and land shaping help to overcome the slope.
- Leaving as much vegetation on the surface as possible during construction and seeding or sodding disturbed areas help to control erosion.

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: Dickinson—6e; Hamburg—7e
Woodland ordination symbol: Hamburg—2R
Windbreak suitability group: Dickinson—6(g); Hamburg—8

915D2—Elco-Ursa complex, 10 to 15 percent slopes, eroded

Composition

Elco soil and similar soils: 20 to 45 percent
Ursa soil and similar soils: 40 to 70 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Hay and pasture or cultivated crops

Soil Properties and Qualities

Elco

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow or slow in the lower part
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: 2.5 to 4.5 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Ursa

Drainage class: Well drained
Permeability: Slow
Parent material: Glacial till that has a well developed paleosol
Runoff rate: Rapid
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

Elco

Surface layer:
0 to 7 inches—dark grayish brown, friable silt loam

Subsoil:
7 to 30 inches—dark yellowish brown, friable silty clay loam
30 to 36 inches—dark yellowish brown, mottled, friable silty clay loam
36 to 71 inches—gray, mottled, firm clay loam

Ursa

Surface layer:
0 to 4 inches—mixed dark grayish brown and brown, friable clay loam

Subsoil:
4 to 20 inches—brown, mottled, friable clay loam
20 to 41 inches—yellowish brown, mottled, firm clay loam
41 to 60 inches—strong brown, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which have a very firm subsoil within a depth of 20 inches; in the lower positions on side slopes
• The somewhat poorly drained Lawson and Wakeland soils, which formed in alluvium; in drainageways

Similar inclusions:
• Soils that have less clay
• Soils that have a seasonal high water table at a depth of less than 2.5 feet
• Soils that have a thinner surface layer

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• A crop rotation dominated by forage crops and a combination of contour farming, stripcropping, and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
• Regular additions of organic material help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Suitable species: Bromegrass, orchardgrass, tall fescue, and alfalfa

Management measures:
• Deferred grazing helps to prevent overgrazing, minimizes surface compaction, helps to control runoff, and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

Woodland

Suitability: Well suited
Management measures:
• Plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
• Measures that protect the woodland from fire and from grazing by livestock are needed.

Dwellings

Suitability: Moderately suited
Management measures:
• Land shaping by cutting and filling helps to overcome the slope.
• Installing subsurface tile drains near the foundations helps to overcome the wetness.
• Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: Elco—3e; Ursa—4e
Woodland ordination symbol: Elco—4A; Ursa—4A
Windbreak suitability group: Elco—3; Ursa—4(1)

936F—Fayette-Hickory complex, 15 to 30 percent slopes

Composition

Fayette soil and similar soils: 40 to 50 percent
Hickory soil and similar soils: 35 to 50 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Wildlife habitat

Soil Properties and Qualities

Fayette

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Hickory

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin layer of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Fayette

Surface layer:
0 to 2 inches—very dark grayish brown, very friable silt loam

Subsurface layer:
2 to 8 inches—brown, very friable silt loam

Subsoil:
8 to 44 inches—dark yellowish brown, friable silty clay loam
44 to 60 inches—brown, friable silt loam

Hickory

Surface layer:
0 to 3 inches—very dark grayish brown, friable silt loam

Subsurface layer:
3 to 7 inches—dark grayish brown, friable silt loam

Subsoil:
7 to 16 inches—brown, friable silty clay loam
16 to 41 inches—brown, friable clay loam
41 to 46 inches—brown, mottled, friable clay loam
46 to 60 inches—brown, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Lawson soils, which

formed in silty alluvium; in drainageways below the Fayette and Hickory soils
• The somewhat poorly drained Wakeland soils, which formed in light colored silty alluvium; in drainageways below the Fayette and Hickory soils

Similar inclusions:
• Soils that have a thicker surface layer
• Soils that have more clay in the subsoil
• Soils that have bedrock at a lower depth in the subsoil

Use and Management

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on this soil helps to control erosion and maintain tilth.
• The selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
• Using a no-till system of pasture renovation or seeding on the contour improves forage quality and helps to control erosion.

Woodland

Suitability: Moderately suited
Management measures:
• Placing logging roads and skid trails on the contour, skidding logs or trees uphill with a cable and winch, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging has been completed help to control erosion.
• The use of machinery is limited to periods when the soil is firm.
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Measures that protect the woodland from fire and from grazing by livestock are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: Fayette—4R; Hickory—5R
Windbreak suitability group: Fayette—3; Hickory—3

936G—Fayette-Hickory complex, 30 to 60 percent slopes

Composition

Fayette soil and similar soils: 20 to 45 percent
Hickory soil and similar soils: 45 to 65 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Fayette—side slopes, backslopes, and shoulders of loess-covered till plains above the Hickory soil; Hickory—side slopes, backslopes, and shoulders of loess-covered till plains and escarpments below the Fayette soil
Slope range: Fayette—30 to 45 percent; Hickory—30 to 60 percent
Major use: Wildlife habitat

Soil Properties and Qualities

Fayette

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Hickory

Drainage class: Well drained

Permeability: Moderate
Parent material: Glacial till or glacial till and a thin layer of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Fayette

Surface layer:
0 to 2 inches—dark brown, friable silt loam

Subsurface layer:
2 to 5 inches—brown, friable silt loam

Subsoil:
5 to 26 inches—dark yellowish brown, friable silty clay loam
26 to 45 inches—brown, friable silty clay loam
45 to 58 inches—brown, mottled, firm silty clay loam

Substratum:
58 to 60 inches—brown, mottled, firm silty clay loam

Hickory

Surface layer:
0 to 5 inches—very dark grayish brown, very friable silt loam

Subsurface layer:
5 to 9 inches—dark grayish brown, very friable silt loam

Subsoil:
9 to 17 inches—dark yellowish brown, friable clay loam
17 to 32 inches—yellowish brown, friable clay loam
32 to 60 inches—yellowish brown, mottled, friable and firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Lawson soils, which formed in silty alluvium; in drainageways below the Fayette and Hickory soils
• The somewhat poorly drained Wakeland soils, which formed in light colored silty alluvium; in drainageways below the Fayette and Hickory soils

Similar inclusions:
• Soils that have a thicker surface layer
• Soils that have more clay in the subsoil
• Soils that have bedrock within a depth of 60 inches

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
• Establishing logging roads and skid trails on or near the contour helps to control erosion.
• The use of machinery is limited to periods when the soil is firm.
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Measures that protect the woodland from fire and from grazing by livestock are needed.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• This soil is suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: Fayette—4R; Hickory—5R
Windbreak suitability group: Fayette—3; Hickory—3

937F—Seaton-Hickory complex, 15 to 30 percent slopes

Composition

Seaton soil and similar soils: 20 to 45 percent
Hickory soil and similar soils: 40 to 65 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains

Major use: Wildlife habitat

Soil Properties and Qualities

Seaton

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: High

Hickory

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin mantle of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Seaton

Surface layer:
0 to 4 inches—brown, friable silt loam

Subsurface layer:
4 to 7 inches—dark grayish brown, friable silt loam

Subsoil:
7 to 60 inches—yellowish brown, friable silt loam

Hickory

Surface layer:
0 to 4 inches—dark grayish brown, friable silt loam

Subsurface layer:
4 to 8 inches—brown, mottled, friable silt loam

Subsoil:
8 to 15 inches—yellowish brown, friable silty clay loam
15 to 60 inches—yellowish brown, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils on side slopes above the Seaton and Hickory soils
• The somewhat poorly drained Wakeland soils, which formed in light colored silty alluvium; below the Seaton and Hickory soils on the landscape

Similar inclusions:
• Soils that have a thicker surface layer
• Soils that have more clay in the subsoil
• Soils that have more sand in the subsoil

Use and Management

Pasture and hay

Suitability: Poorly suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Establishing pasture plants or hay on these soils helps to control erosion.
• Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
• Using a no-till system of pasture renovation or seeding on the contour improves forage quality and helps to control erosion.
• The plants should not be grazed until they are sufficiently established.

Woodland

Suitability: Moderately suited
Management measures:
• Placing logging roads and skid trails on the contour, skidding logs or trees uphill with a cable and winch, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging has been completed help to control erosion.
• The use of machinery is limited to periods when the soil is firm.
• Measures that protect the woodland from fire help to prevent injury to trees and maintain the leaf mulch.
• Competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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 help to prevent injury to trees and maintain the leaf mulch.
• The seedling mortality rate can be reduced by selecting planting stock that is older and larger than usual.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• These soils are suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: Seaton—6R; Hickory—5R
Windbreak suitability group: Seaton—3; Hickory—3

937G—Seaton-Hickory complex, 30 to 60 percent slopes

Composition

Seaton soil and similar soils: 40 to 60 percent
Hickory soil and similar soils: 40 to 60 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Major use: Woodland

Soil Properties and Qualities

Seaton

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff rate: Rapid
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: High

Hickory

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till or glacial till and a thin mantle of loess
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Seaton

Surface layer:
0 to 3 inches—dark grayish brown and brown, very friable silt loam

Subsurface layer:
3 to 6 inches—yellowish brown, friable silt loam

Subsoil:
6 to 31 inches—yellowish brown, friable silt loam
31 to 44 inches—brown, friable silt loam

Substratum:
44 to 60 inches—yellowish brown, mottled, friable silt loam

Hickory

Surface layer:
0 to 3 inches—very dark grayish brown, friable silt loam

Subsurface layer:
3 to 7 inches—brown, friable silt loam

Subsoil:
7 to 12 inches—yellowish brown, friable silt loam
12 to 19 inches—yellowish brown, friable silty clay loam
19 to 25 inches—yellowish brown, mottled, friable clay loam
25 to 31 inches—brown, mottled, firm clay loam
31 to 42 inches—dark yellowish brown, mottled, firm clay loam
42 to 60 inches—yellowish brown, mottled, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland soils, which formed in light colored silty alluvium; below the Seaton and Hickory soils on the landscape
• The somewhat poorly drained Atlas soils, which have more clay in the subsoil than the Hickory soil; on side slopes above the Hickory soil

Similar inclusions:
• Soils that have less clay in the subsoil and have free carbonates within a depth of 60 inches
• Soils that have more sand in the subsoil
• Soils that have more clay in the subsoil
• Soils that have bedrock within a depth of 60 inches

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
• The seedling mortality rate can be reduced by selecting planting stock that is older and larger than usual.
• Placing logging roads and skid trails on the contour, skidding logs or trees uphill with a cable and winch, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging has been completed help to control erosion.
• The use of machinery is limited to periods when the soil is firm.
• Competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• These soils are suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: Seaton—6R; Hickory—5R
Windbreak suitability group: Seaton—3; Hickory—3

971D3—Fishhook-Atlas complex, 10 to 15 percent slopes, severely eroded

Composition

Fishhook soil and similar soils: 25 to 40 percent
Atlas soil and similar soils: 40 to 55 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Major use: Cultivated crops; pasture and hay

Soil Properties and Qualities

Fishhook

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Atlas

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Runoff rate: Rapid
Available water capacity: Moderate
Seasonal high water table: 1 to 2 feet below the surface
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Fishhook

Surface layer:

0 to 5 inches—mixed dark grayish brown and brown, friable silty clay loam

Subsoil:

5 to 19 inches—brown, mottled, friable silty clay loam

19 to 23 inches—grayish brown, mottled, friable silty clay loam

23 to 60 inches—dark grayish brown, mottled, firm clay loam

Atlas

Surface layer:

0 to 3 inches—mixed dark brown and brown, friable silty clay loam

Subsoil:

3 to 10 inches—brown, mottled, friable silty clay

10 to 24 inches—grayish brown, mottled, firm clay loam

24 to 43 inches—light brownish gray, mottled, firm clay loam

43 to 60 inches—light gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:

• The well drained Hickory soils, which have less clay in the subsoil than the Fishhook and Atlas soils; on the steeper side slopes

• The moderately well drained Elco and Ursa soils, which formed in silty loess and in the underlying glacial till; on side slopes above the Fishhook soil

Similar inclusions:

• Soils that have less clay and sand in the surface layer and the upper part of the subsoil

• Soils that have less clay throughout the subsoil

• Areas that have slopes of less than 10 percent or more than 15 percent

Use and Management

Pasture and hay

Suitability: Poorly suited

Suitable species:

• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to these soils.

• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Management measures:

• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth.

• Using a no-till method of pasture renovation and seeding on the contour help to prevent further erosion.

• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited

Management measures:

• Excluding livestock from the woodland helps to prevent the reduction or 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.

• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.

• Competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.

• The seedling mortality rate can be reduced by selecting planting stock that is older and larger than usual.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat

Management measures:

• These soils are suitable for wild herbaceous plants, grasses and legumes, grain and seed crops, hardwood trees, and coniferous trees.

• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 6e

Woodland ordination symbol: Fishhook—4C; Atlas—4C

Windbreak suitability group: Fishhook—2; Atlas—4(1)

1070—Beaucoup silty clay loam, undrained

Composition

Beaucoup soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Long
Ponding duration: Long
Major use: Wetland wildlife habitat

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark gray, friable silty clay loam

Subsurface layer:
7 to 10 inches—very dark gray, friable silty clay loam
10 to 14 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
14 to 28 inches—stratified grayish brown and light brownish gray, mottled, friable silty clay loam
28 to 40 inches—grayish brown, mottled, friable silty clay loam

Substratum:
40 to 60 inches—grayish brown, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Coffeen soils in the slightly higher positions above the Beaucoup soil
• The well drained Haymond soils in the higher positions above the Beaucoup soil

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have more sand in the subsoil
• Soils that have more clay in the control section

Use and Management

Woodland

Suitability: Poorly suited
Management measures:
• The use of equipment is limited to periods when the soil is firm and dry.
• The seedling mortality rate can be reduced by selecting planting stock that is older and larger than usual.
• Using harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard.
• The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Measures that protect the woodland from fire and from grazing by livestock are needed.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions (fig. 8).
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 5w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3070—Beaucoup silty clay loam, frequently flooded

Composition

Beaucoup soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Figure 8.—A flooded area of Beaucoup silty clay loam, undrained, near the La Moine River. This map unit provides good habitat for wetland wildlife.

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silty clay loam

Subsurface layer:
8 to 14 inches—very dark gray, friable silty clay loam

Subsoil:
14 to 26 inches—dark gray, mottled, friable silty clay loam
26 to 38 inches—grayish brown, mottled, firm silty clay loam

38 to 60 inches—stratified grayish brown and dark grayish brown, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Coffeen soils in the slightly higher positions above the Beaucoup soil
• The well drained Haymond soils in the higher positions above the Beaucoup soil

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have a light colored surface layer and have more sand in the subsoil
• Soils that have more clay in the control section

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Measures that maintain the drainage system are needed.
• Levees help to minimize the crop damage caused by flooding.
• Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and fertility and increase the rate of water infiltration.

Woodland

Suitability: Poorly suited
Management measures:
• The use of equipment is limited to periods when the soil is firm and dry.
• Planting mature stock and planting on ridges reduce the seedling mortality rate.
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent the reduction or 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 help to prevent injury to trees and maintain the leaf mulch.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced can reduce the windthrow hazard.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• The habitat should be protected from fire and from grazing by livestock.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3073—Ross silt loam, frequently flooded

Composition

Ross soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 4 to 6 feet below the surface
Organic matter content: Moderate
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface soil:
0 to 18 inches—very dark gray, friable silt loam

18 to 27 inches—very dark gray, friable loam

Subsoil:
27 to 32 inches—dark brown, friable loam
32 to 43 inches—brown, friable gravelly loam

Substratum:
43 to 52 inches—dark grayish brown, friable very gravelly sandy loam
52 to 60 inches—stratified brown and dark gray, friable very gravelly sandy loam

Inclusions

Contrasting inclusions:
• The well drained Lacrescent and Derinda soils above the Ross soil on side slopes of uplands

Similar inclusions:
• Soils that have a thinner dark surface layer
• Soils that have more coarse fragments
• Soils that are shallow to bedrock

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Minimizing tillage and returning crop residue to the soil or regularly adding other organic material can help to maintain fertility and tilth.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions can reduce the extent of crop damage caused by flooding.

Pasture and hay

Suitability: Well suited
Suitable species: Tall fescue, alsike clover
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting 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.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5A
Windbreak suitability group: 1

3107—Sawmill silty clay loam, frequently flooded

Composition

Sawmill soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: Very high
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silty clay loam

Subsurface layer:
8 to 22 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
22 to 28 inches—very dark gray, mottled, friable silty clay loam
28 to 35 inches—dark grayish brown, mottled, friable silty clay loam
35 to 49 inches—dark gray, mottled, friable silty clay loam
49 to 60 inches—gray, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils, which have a buried soil and have less clay in the upper part of the profile than the Sawmill soil; in the slightly higher landscape positions
• The somewhat poorly drained Wakeland soils, which have less clay and a lighter colored surface layer than the Sawmill soil; in the higher landscape positions

Similar inclusions:
• Soils that have less clay
• Soils that are better drained

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The existing subsoil tile drainage system should be maintained.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Woodland

Suitability: Moderately suited
Management measures:
• The seasonal high water table limits the use of equipment to periods when the soil is firm and dry.
• Planting mature stock and planting on ridges reduce the seedling mortality rate.
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced can reduce the windthrow hazard.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3284—Tice silty clay loam, frequently flooded

Composition

Tice soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1.5 to 3.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None or slight
Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, friable silty clay loam

Subsurface layer:
8 to 14 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
14 to 20 inches—dark grayish brown, mottled, friable silt loam
20 to 36 inches—grayish brown, mottled, friable silty clay loam
36 to 46 inches—stratified grayish brown and dark grayish brown, mottled, friable silty clay loam

Substratum:
46 to 60 inches—stratified grayish brown and dark grayish brown, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Darwin soils, which have more clay throughout than the Tice soil; in the lower positions on the landscape
• The moderately well drained Raddle soils in the higher positions on the landscape

Similar inclusions:
• Soils that contain more sand
• Soils that contain more clay

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The existing subsoil tile drainage system should be maintained.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• Plant competition in openings created by timber harvesting 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.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 5A
Windbreak suitability group: 1

3331—Haymond silt loam, frequently flooded

Composition

Haymond soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Natural levees of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: None
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface soil:
0 to 2 inches—dark grayish brown, friable silt loam
2 to 6 inches—brown, friable silt loam

Substratum:
6 to 47 inches—brown, friable silt loam
47 to 68 inches—dark brown, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland soils on flood plains below the Haymond soil
• The poorly drained Birds soils on flood plains below the Haymond soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have a dark buried soil within a depth of 40 inches
• Soils in which the subsoil contains more clay than the underlying material

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Keeping tillage to a minimum, deferring tillage when the soil is wet, returning crop residue to the soil, and regularly adding other organic material help to maintain productivity, help to prevent surface compaction and crusting, and improve tilth.
• Levees help to minimize the damage caused by flooding.
• In areas used for corn, soybeans, or small grain, the wetness caused by flooding delays planting in some years.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.

Pasture and hay

Suitability: Well suited
Management measures:
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.
• Measures that maintain the levees are needed.
• Overgrazing when the soil is too wet reduces forage yields and causes surface compaction, excessive runoff, and poor tilth.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting 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.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 8A
Windbreak suitability group: 1

3333—Wakeland silt loam, frequently flooded

Composition

Wakeland soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops or pasture

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Very slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderately low
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown, mottled, friable silt loam

Substratum:
7 to 13 inches—dark grayish brown, mottled, friable silt loam
13 to 31 inches—dark grayish brown, mottled, friable silt loam that has strata of fine sandy loam
31 to 60 inches—grayish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The well drained Haymond soils in the slightly higher positions on the landscape
• The well drained Hickory soils above the Wakeland soil on side slopes

Similar inclusions:
• Soils that have a dark surface layer
• Soils that have a seasonal high water table within a depth of 1 foot

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Keeping tillage to a minimum, deferring tillage when the soil is wet, returning crop residue to the soil, and regularly adding other organic material help to maintain productivity, help to prevent surface compaction and crusting, and improve tilth.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions can reduce the extent of the crop damage caused by flooding.

Pasture and hay

Suitability: Well suited
Suitable species:
• Canarygrass and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland and protecting the woodland from fire help to prevent reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5A
Windbreak suitability group: 1

3334—Birds silt loam, frequently flooded

Composition

Birds soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: Very high
Seasonal high water table: At the surface to 1 foot below the surface
Organic matter content: Moderately low
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown, mottled, friable silt loam

Subsurface layer:
7 to 26 inches—gray, mottled, friable silt loam

Substratum:
26 to 60 inches—gray, mottled, friable, stratified silt loam and loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Coffeen soils, which have a darker surface layer than the Birds soil; in the slightly higher positions on the landscape
- The well drained Haymond soils in the higher positions on the landscape

Similar inclusions:
- Soils that have more clay throughout and have a dark surface layer
- Soils in which the seasonal high water table is at a lower depth
- Soils that have more sand in the surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
- The flooding can delay planting or harvesting and may cause crop damage in some years.
- The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
- Levees and diversions help to control the flooding.
- Selecting crop varieties adapted to a shorter growing season and to wetter conditions reduces the extent of the crop damage caused by flooding.
- Tilling when the soil is wet causes surface cloddiness and compaction.
- Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Suitable species: Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover
Management measures:
- Overgrazing causes surface compaction and poor tilth.
- Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Poorly suited
Management measures:
- Plant competition 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 seasonal high water limits the use of equipment to periods when the soil is firm and dry.

• Planting mature stock and planting on ridges reduce the seedling mortality rate.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced can reduce the windthrow hazard.

Wildlife habitat

Suitability: Well suited to openland, woodland, or wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3415—Orion silt loam, frequently flooded

Composition

Orion soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains and alluvial fans
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderately low
Erosion hazard: None
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—grayish brown, mottled, friable silt loam

Substratum:
8 to 18 inches—mixed dark grayish brown, mottled, friable silt loam
18 to 30 inches—grayish brown, mottled, friable silt loam

Buried soil:
30 to 42 inches—very dark gray, mottled, friable silty clay loam
42 to 57 inches—black, mottled, friable silty clay loam
57 to 62 inches—dark gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils, which have a dark surface layer; on flood plains below the Orion soil
• The well drained Haymond soils, which do not have a buried soil within a depth of 40 inches; on flood plains above the Orion soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that do not have a buried soil within a depth of 40 inches
• Soils that have more clay or more sand

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Measures that maintain the existing subsoil tile drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Woodland

Suitability: Moderately suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.
• The use of equipment is limited to periods when the soil is firm.

Wildlife habitat

Suitability: Well suited to openland, woodland, or wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 2W
Windbreak suitability group: 1

3428—Coffeen silt loam, frequently flooded

Composition

Coffeen soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark gray, friable silt loam

Subsurface layer:
5 to 18 inches—very dark gray, friable silt loam

Subsoil:
18 to 24 inches—grayish brown, mottled, friable silt loam
24 to 44 inches—brown, mottled, friable silt loam
44 to 58 inches—dark grayish brown, mottled, friable silt loam

Buried soil:
58 to 60 inches—very dark gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils, which have a thicker dark surface layer than the Coffeen soil; on flood plains below the Coffeen soil
• The well drained Haymond soils, which have a light colored surface layer and are higher on the landscape than the Coffeen soil

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Suitable species:
• Canarygrass and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.

• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.
• The use of equipment is limited to periods when the soil is firm.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 6W
Windbreak suitability group: 1

3451—Lawson silt loam, frequently flooded

Composition

Lawson soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark grayish brown, very friable and friable silt loam

Subsurface layer:
11 to 20 inches—very dark grayish brown, mottled, friable silt loam
20 to 28 inches—very dark gray, mottled, friable silt loam

Substratum:
28 to 60 inches—brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Birds soils, which have a lighter colored surface layer than the Lawson soil; on the lower parts of the flood plain

Similar inclusions:
• Soils that have a buried soil
• Soils that have more clay throughout

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years (fig. 9).
• The existing subsoil tile drainage system should be maintained.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Canarygrass and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Proper stocking rates, rotation grazing, and restricted use during wet periods help to keep the pasture in good condition.

Figure 9.—Corn in an area of Lawson silt loam, frequently flooded. The trees in the background are adjacent to Long Creek.

• The existing subsurface tile drainage system should be maintained.

Woodland

Suitability: Moderately suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the habitat from fire and from grazing by livestock help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
• The use of equipment is limited to periods when the soil is firm.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 2W
Windbreak suitability group: 1

3452—Riley loam, frequently flooded

Composition

Riley soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Flood plains
Position on the landform: Nearly level flood plains along major streams

Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the solum and rapid in the underlying sediments
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Moderate
Seasonal high water table: 1.5 to 3.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None or slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark gray, friable loam

Subsurface layer:
7 to 13 inches—very dark grayish brown, friable loam

Subsoil:
13 to 19 inches—dark grayish brown, firm silty clay loam
19 to 27 inches—grayish brown, mottled, firm loam

Substratum:
27 to 36 inches—dark brown, mottled, friable loamy sand
36 to 76 inches—brown, loose sand

Inclusions

Contrasting inclusions:
• The poorly drained Gorham soils, which contain less sand in the solum than the Riley soil and are in lower positions on the landscape
• The moderately well drained Landes soils, which contain less clay in the solum than the Riley soil

Similar inclusions:
• Soils that contain less sand in the solum
• Soils that have a higher content of clay

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years. The wetness caused by flooding can be controlled by surface ditches or subsurface drains.
• Measures that maintain the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available.
• 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 fertility and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Windbreak suitability group: 1

3789—Volney silt loam, bedrock substratum, frequently flooded, overwash

Composition

Volney soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Frequent
Flooding duration: Very brief
Major use: Pasture and cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid in the solum and very rapid in the substratum
Parent material: Alluvium over limestone bedrock
Runoff rate: Slow
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately slow
Erosion hazard: None
Shrink-swell potential: Low
Potential for frost action: Low

Typical Profile

Surface soil:
0 to 7 inches—stratified brown and dark grayish brown, friable silt loam
7 to 36 inches—very dark gray, friable very channery loam

Substratum:
36 to 46 inches—very dark grayish brown, friable very channery loam

Bedrock:
46 inches—limestone

Inclusions

Contrasting inclusions:
• The well drained Dakota soils on stream terraces

Similar inclusions:
• Soils that have channery textures at the surface
• Soils that are slightly deeper to limestone fragments and bedrock

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Levees and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Selecting crop varieties adapted to a shorter growing season and wetter conditions reduces the extent of flood damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control soil blowing.
• Selecting drought-tolerant grasses and legumes for planting can maintain or improve forage stands.
• Maintaining a plant cover helps to prevent soil blowing.

Woodland

Suitability: Well suited
Management measures:
• 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 and helps to control erosion.

Wildlife habitat

Suitability: Moderately suited to openland and woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 4s
Woodland ordination symbol: 3A
Windbreak suitability group: 6

7349B—Zumbro loamy fine sand, 1 to 5 percent slopes, rarely flooded

Composition

Zumbro soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces
Position on the landform: Terrace treads and risers
Flooding frequency: Rare
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Rapid
Parent material: Sandy alluvium
Runoff rate: Slow
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: Low

Typical Profile

Surface layer:
0 to 11 inches—black, friable loamy fine sand

Subsurface layer:
11 to 19 inches—very dark brown, friable loamy fine sand

Subsoil:
19 to 23 inches—dark brown, friable loamy fine sand
23 to 31 inches—brown, friable loamy fine sand

Substratum:
31 to 60 inches—brown, loose fine sand

Inclusions

Contrasting inclusions:
• The poorly drained Titus and Gorham soils, which contain more clay in the subsoil than the Zumbro soil and are lower on the landscape

Similar inclusions:
• Soils that have a light colored surface layer
• Soils that contain more clay in the subsoil
• Soils that are moderately well drained and contain finer sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting help to control soil blowing and conserve moisture.
• Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control soil blowing.
• Selecting drought-tolerant grasses and legumes for planting can maintain or improve forage stands.
• Maintaining a plant cover helps to control soil blowing.

Wildlife habitat

Suitability: Well suited to openland and woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3s
Windbreak suitability group: 7

7430—Raddle silt loam, rarely flooded

Composition

Raddle soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Low terraces and natural levees on flood plains
Slope range: 0 to 2 percent
Flooding frequency: Rare
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark gray, friable silt loam

Subsurface layer:
10 to 18 inches—very dark grayish brown, friable silt loam

Subsoil:
18 to 26 inches—dark yellowish brown, friable silt loam
26 to 65 inches—brown, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Darwin soils and the somewhat poorly drained Tice soils, which have more clay throughout than the Raddle soil and are lower on the flood plains
• Areas that are subject to occasional overflow from nearby upland slopes

Similar inclusions:
• Soils that have more sand in the subsoil
• Soils that have steeper slopes

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to maintain forage production, minimize surface compaction, help to prevent poor tilth and excessive runoff, and help to control erosion.

Wildlife habitat

Suitability: Well suited to openland and woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 1
Windbreak suitability group: 1

8070—Beaucoup silty clay loam, occasionally flooded

Composition

Beaucoup soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderately slow
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—very dark gray, friable silty clay loam

Subsurface layer:
6 to 18 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
18 to 45 inches—dark gray, mottled, friable silty clay loam
45 to 52 inches—gray, mottled, friable silty clay loam

Substratum:
52 to 60 inches—stratified gray and dark gray, firm silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Coffeen soils, which have more sand in the subsoil than the Beaucoup soil

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have more sand in the subsoil
• Soils that have more clay in the control section

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years. The drainage system installed in areas of this soil is sufficient in most years for the production of corn, soybeans, and small grain.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Returning crop residue to the soil and minimizing tillage, especially when the soil is wet, help to maintain good tilth and fertility and increase the rate of water infiltration.

Woodland

Suitability: Moderately suited
Management measures:
• The use of equipment is limited to periods when the soil is firm.
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• The competition from undesirable plants in openings created by timber harvesting 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.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard.
• Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited to openland and wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

8071—Darwin silty clay, occasionally flooded

Composition

Darwin soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Backswamps of high and low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Alluvium
Runoff rate: Slow to ponded
Available water capacity: Moderate
Seasonal high water table: 1.0 foot above to 1.5 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Very high
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—very dark gray, mottled, firm silty clay

Subsurface layer:
9 to 17 inches—very dark gray, mottled, firm silty clay

Subsoil:
17 to 39 inches—dark gray, mottled, firm silty clay

Substratum:
39 to 60 inches—gray, mottled, firm silty clay

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Tice soils, which contain less clay in the subsoil than the Darwin soil; on the higher parts of the flood plains

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have less clay in the surface layer
• Soils that have less clay in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and cause crop damage in some years. The wetness can be reduced by surface ditches or subsurface drains.
• A drainage system has been installed in most areas. Measures that maintain the drainage system are needed.
• Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain good tilth and improve the rate of water infiltration.

Woodland

Suitability: Poorly suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than usual, or by mulching. Some replanting may be necessary.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard.
• The use of equipment is limited to periods when the soil is firm and dry.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 4W
Windbreak suitability group: 2

8077—Huntsville silt loam, occasionally flooded

Composition

Huntsville soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown, friable silt loam

Subsurface layer:
10 to 28 inches—very dark grayish brown, friable silt loam

Transitional layer:
28 to 43 inches—brown, very friable silt loam

Substratum:
43 to 60 inches—stratified brown, friable silt loam and sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Orion soils, which have a light colored surface layer over a dark buried soil; in the slightly lower positions on the landscape and farther from the stream than the Huntsville soil
• The poorly drained Sawmill soils, which have a dark surface layer more than 24 inches thick; in the slightly lower positions on the landscape and farther from the stream than the Huntsville soil

Similar inclusions:
• Soils that have a thicker dark surface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Levees and diversions help to control the flooding.
• Selecting crop varieties adapted to a shorter growing season and wetter conditions reduces the extent of flood damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to maintain forage production and help to prevent surface compaction and poor tilth.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting 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 and helps to control erosion.
• The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than usual, or by mulching. Some replanting may be necessary.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 7A
Windbreak suitability group: 1

8092—Sarpy sand, occasionally flooded

Composition

Sarpy soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Natural levees of low flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops or wildlife habitat

Soil Properties and Qualities

Drainage class: Excessively drained
Permeability: Rapid
Parent material: Sandy alluvium
Runoff rate: Slow
Available water capacity: Low
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Low

Typical Profile

Surface layer:
0 to 9 inches—brown, loose sand

Substratum:
9 to 55 inches—stratified brown and pale brown, loose sand
55 to 60 inches—stratified yellowish brown and grayish brown, loose sand

Inclusions

Contrasting inclusions:
• The moderately well drained Medway soils in the lower positions on the landscape
• The somewhat poorly drained Riley soils in the lower positions on the landscape

Similar inclusions:
• Soils that have a higher content of clay in the surface layer

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Levees and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Selecting crop varieties adapted to a shorter growing season and wetter conditions reduces the extent of flood damage.
• Keeping tillage to a minimum and returning crop residue to the soil help to control soil blowing, conserve moisture, and help to maintain tilth and productivity.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control soil blowing.
• Selecting drought-tolerant grasses and legumes for planting can maintain or improve forage stands.
• Maintaining a plant cover helps to prevent soil blowing.

Woodland

Suitability: Well suited
Management measures:
• 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 and helps to control erosion.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 4s
Woodland ordination symbol: 8S
Windbreak suitability group: 1 (L)

8107—Sawmill silty clay loam, occasionally flooded

Composition

Sawmill soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 13 inches—very dark gray, mottled, friable silty clay loam

Subsurface layer:
13 to 33 inches—very dark gray, mottled, friable silty clay loam

Subsoil:
33 to 60 inches—dark gray, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Radford soils, which have a buried soil and contain less clay in the upper part than the Sawmill soil; in the slightly higher positions on the landscape
• The somewhat poorly drained Wakeland soils, which have less clay than the Sawmill soil and have a lighter colored surface layer; in the higher positions on the landscape

Similar inclusions:
• Soils that have less clay
• Soils that are better drained

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Suitable species: Reed canarygrass, alsike clover, and ladino clover
Management measures:
• A drainage system has been installed in most areas. Measures that maintain the drainage system are needed.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to maintain forage production and help to prevent surface compaction and poor tilth.

Woodland

Suitability: Moderately suited
Management measures:
• The seasonal high water table limits the use of equipment to periods when the soil is firm and dry.
• Planting mature stock and planting on ridges reduce the seedling mortality rate.
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard.

Wildlife habitat

Suitability: Well suited to openland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

8162—Gorham silty clay loam, occasionally flooded

Composition

Gorham soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow in the finer textured upper part and rapid in the coarse textured lower part
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: At the surface to 3 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark gray, firm silty clay loam

Subsurface layer:
10 to 13 inches—very dark gray, firm silty clay loam

Subsoil:
13 to 21 inches—dark grayish brown, mottled, firm silty clay loam
21 to 36 inches—dark grayish brown, mottled, friable silty clay that has thin strata of loam
36 to 60 inches—dark gray, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• Soils that have a sandy substratum

Similar inclusions:
• Soils that have a surface layer of clay loam
• Soils that have a thinner subsoil
• Soils that have a substratum of loam or sandy clay loam

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Measures that maintain the drainage system are needed.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Applying a conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Suitable species:
• Canarygrass and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Proper stocking rates, rotation grazing, and deferred

grazing when the soil is wet help to maintain forage production and help to prevent surface compaction and poor tilth.
• Levees and diversions help to control the flooding, and subsurface tile drains help to lower the water table.

Woodland

Suitability: Poorly suited
Management measures:
• The use of equipment is limited to periods when the soil is firm and dry.
• The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than usual, or by mulching. Some replanting may be necessary.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard.
• The competition from undesirable plants in openings created by timber harvesting 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 and helps to control erosion.

Wildlife habitat

Suitability: Moderately suited
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5W
Windbreak suitability group: 2

8284—Tice silt loam, occasionally flooded

Composition

Tice soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1.5 to 3.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 22 inches—very dark grayish brown, friable silt loam

Subsoil:
22 to 53 inches—brown, mottled, friable silt loam
53 to 65 inches—brown, mottled, friable, stratified silt loam and loam

Inclusions

Contrasting inclusions:
• The poorly drained Darwin soils, which have more clay throughout than the Tice soil and are in lower positions on the landscape
• The well drained Raddle soils in the higher positions on the landscape

Similar inclusions:
• Soils that contain more sand
• Soils that contain more clay

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.

• Levees and diversions reduce the extent of the crop damage caused by flooding.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions also reduces the extent of the crop damage caused by flooding.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain. Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Levees and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing reduces forage yields and causes surface compaction and poor tilth.
• Proper stocking rates, rotation grazing, deferred grazing when the soil is wet, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting 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 and helps to control erosion.

Wildlife habitat

Suitability: Well suited to woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5A
Windbreak suitability group: 1

8304—Landes loam, occasionally flooded

Composition

Landes soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the lower part
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Moderate
Seasonal high water table: At a depth of more than 6 feet
Organic matter content: Moderately low
Erosion hazard: None or slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable loam

Subsurface layer:
8 to 14 inches—very dark grayish brown, friable loam

Subsoil:
14 to 21 inches—dark brown, friable fine sandy loam
21 to 33 inches—brown, mottled, friable fine sandy loam
33 to 39 inches—dark yellowish brown and brown, very friable loamy fine sand

Substratum:
39 to 60 inches—yellowish brown, loose fine sand

Inclusions

Contrasting inclusions:
• The poorly drained Titus soils, which have more clay in the subsoil than the Landes soil and are in lower positions on the landscape

Similar inclusions:
• Soils that are better drained and are in higher positions on the flood plains
• Soils that are somewhat poorly drained and that have less sand and more clay in the subsoil
• Soils that have a light colored surface layer and contain coarser sand throughout

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Levees and diversions help to control the flooding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting or regularly adding other organic material to the soil helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Selecting drought-tolerant grasses and legumes for planting can help to maintain or improve forage stands.
• Applying fertilizer frequently and in small amounts helps to prevent the excessive loss of plant nutrients through leaching.
• Proper stocking rates, rotation grazing, and deferred grazing help to keep the pasture in good condition and help to control soil blowing.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting 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 and helps to control erosion.

Wildlife habitat

Suitability: Well suited to openland and woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 7A
Windbreak suitability group: 6(g)

8404—Titus silty clay loam, occasionally flooded

Composition

Titus soil and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, firm silty clay loam

Subsurface layer:
8 to 15 inches—very dark gray, firm silty clay loam

Subsoil:
15 to 57 inches—dark gray, mottled, firm silty clay loam

Substratum:
57 to 60 inches—dark gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The well drained Jasper, Worthen, and Zumbro soils in the higher positions above the Titus soil on the landscape
• The well drained Landes and moderately well drained Medway soils in the slightly higher positions above the Titus soil on the landscape

Similar inclusions:
• Soils that have a dark surface layer more than 24 inches thick
• Soils that have more sand in the subsoil
• Soils that have more clay

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Selecting crop varieties adapted to a shorter growing season and to wetter conditions reduces the extent of the crop damage caused by flooding.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and keeping tillage to a minimum help to maintain tilth and fertility.
• The drainage system installed in most areas of this soil is sufficient for the production of corn, soybeans, and small grain.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Measures that maintain the drainage system are needed.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Canarygrass and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Management measures:
• Ponding can be controlled by lowering the water table with underground drains and by installing surface drains.
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to maintain forage production and help to prevent surface compaction and poor tilth.

Woodland

Suitability: Well suited
Management measures:
• The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
• The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than usual, or by mulching. Some replanting may be necessary.
• Removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland and using harvesting methods that do not leave the remaining trees isolated or widely spaced can reduce the windthrow hazard.
• The use of equipment is limited to periods when the soil is firm and dry.
• 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 and helps to control erosion.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 9W
Windbreak suitability group: 2

8405—Zook silty clay loam, occasionally flooded

Composition

Zook soil and similar soils: 92 to 98 percent
Contrasting inclusions: 2 to 8 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: At the surface to 3 feet below the surface
Organic matter content: High
Erosion hazard: None
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark gray, friable silty clay loam

Subsurface layer:
9 to 22 inches—very dark gray, firm silty clay loam

Subsoil:
22 to 49 inches—very dark gray, mottled, firm silty clay loam
49 to 58 inches—dark gray, mottled, firm silty clay loam

Substratum:
58 to 68 inches—dark gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Tice soils, which contain less clay in the subsoil and underlying material than the Zook soil; on slight rises above the Zook soil
• The somewhat poorly drained Orion soils, which have a light colored surface layer and contain less clay in the subsoil and underlying material than the Zook soil; on slight rises above the Zook soil

Similar inclusions:
• Soils in which the upper part of the subsoil is lighter in color
• Soils in which the subsoil contains less clay and more silt or sand

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Where wetness is a problem, surface ditches or subsurface drains and outlets improve drainage.
• 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 help to maintain good tilth and improve the rate of water infiltration.

Wildlife habitat

Suitability: Well suited to wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 2

8415—Orion silt loam, occasionally flooded

Composition

Orion soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains and alluvial fans

Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Very high
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderately low
Erosion hazard: None
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, friable silt loam

Subsurface layer:
8 to 29 inches—stratified dark grayish brown, grayish brown, and brown, friable silt loam

Subsoil:
29 to 36 inches—very dark gray, friable silt loam
36 to 51 inches—black, friable silt loam
51 to 60 inches—very dark gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils, which have a dark surface layer; on flood plains below the Orion soil
• The well drained Haymond soils, which do not have a buried soil within a depth of 40 inches; on flood plains above the Orion soil

Similar inclusions:
• Soils that have a darker surface layer
• Soils that do not have a buried soil within a depth of 40 inches
• Soils that have more clay or more sand

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• Surface and subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed.
• Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil.
• Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
Management measures:
• Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.
• Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion.

Woodland

Suitability: Moderately suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.
• The use of equipment is limited to periods when the soil is firm and dry.

Wildlife habitat

Suitability: Well suited to openland, woodland, or wetland wildlife habitat
Management measures:
• Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in oxbows and depressions.
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 2W
Windbreak suitability group: 1

8451—Lawson silt loam, occasionally flooded

Composition

Lawson soil and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—very dark grayish brown, friable silt loam

Subsurface layer:
6 to 14 inches—very dark grayish brown, mottled, friable silt loam
14 to 33 inches—very dark gray and very dark grayish brown, mottled, friable silt loam
33 to 42 inches—very dark gray, mottled, friable silt loam

Substratum:
42 to 60 inches—dark gray and dark grayish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Sawmill soils in the lower positions on the landscape

Similar inclusions:
• Soils that have a buried soil
• Soils that have a higher content of clay

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years. The wetness can be reduced by surface ditches or subsurface drains.
• Measures that maintain the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available.
• 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 fertility and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat
Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 2A
Windbreak suitability group: 1

8452—Riley silt loam, occasionally flooded

Composition

Riley soil and similar soils: 92 to 95 percent
Contrasting inclusions: 5 to 8 percent

Setting

Landscape: Flood plains
Position on the landform: Nearly level flood plains along major streams
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cultivated crops

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the solum and rapid in the underlying sediments
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: Moderate
Seasonal high water table: 1.5 to 3.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 11 inches—very dark grayish brown, friable silt loam

Subsoil:
11 to 15 inches—dark grayish brown, mottled, friable silt loam
15 to 25 inches—dark yellowish brown, mottled, friable loam

Substratum:
25 to 37 inches—dark yellowish brown, very friable loamy sand
37 to 60 inches—brown, loose sand

Inclusions

Contrasting inclusions:
• The poorly drained Gorham soils, which contain less sand in the solum than the Riley soil and are lower on the landscape
• The well drained Landes soils, which contain less clay in the solum than the Riley soil

Similar inclusions:
• Soils that contain less sand in the solum
• Soils that have a higher content of clay

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years. The wetness can be reduced by surface ditches or subsurface drains.
• Measures that maintain the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available.
• 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 fertility and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat

Management measures:
• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Windbreak suitability group: 1

8682—Medway loam, occasionally flooded

Composition

Medway soil and similar soils: 80 to 95 percent
Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Slope range: 0 to 2 percent
Flooding frequency: Occasional
Flooding duration: Brief
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Alluvium
Runoff rate: Slow
Available water capacity: High
Seasonal high water table: 1.5 to 3.0 feet below the surface
Organic matter content: Moderate
Erosion hazard: None
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable loam

Subsurface layer:
5 to 15 inches—very dark grayish brown, friable loam

Subsoil:
15 to 20 inches—brown, mottled, friable loam
20 to 44 inches—dark grayish brown, mottled, friable loam
44 to 53 inches—mottled, friable, stratified brown loam and grayish brown sandy loam

Substratum:
53 to 60 inches—mottled, friable, stratified strong brown and grayish brown loam and sandy loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils that are more acid in the subsoil than the Medway soil

Similar inclusions:
• The well drained Ross soils, which have a mollic epipedon more than 24 inches thick; in the higher landscape positions and nearer to the stream channel

Use and Management

Cropland

Suitability: Well suited
Management measures:
• The flooding can delay planting or harvesting and may cause crop damage in some years.
• The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available.
• A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Suitable species:
• Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suited to this soil.
• Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
Management measures:
• Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table.
• Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• Excluding livestock from the woodland helps to prevent reduction or 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 prevent injury to trees and maintain the leaf mulch.

Wildlife habitat

Suitability: Well suited to openland or woodland wildlife habitat

Management measures:

• Measures that protect the habitat from fire and from grazing by livestock are needed.

Dwellings

Suitability: Generally unsuited

Septic tank absorption fields

Suitability: Generally unsuited

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 5A
Windbreak suitability group: 1

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 land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. 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.

A recent trend in land use in some parts of the survey area 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.

About 360,000 acres in Hancock County, or nearly 69 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans. These crops account for most of the local farm income each year.

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. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

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 all or part of 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

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, and the system of land capability classification used by the Natural Resources Conservation Service is explained.

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.

In 1992, about 357,715 acres in Hancock County was used as cropland. This acreage include 147,644 acres of corn, 138,871 acres of soybeans, and 12,939 acres of wheat. An estimated 59,666 acres was pasture, and 14,456 acres was used as hayland (U.S. Department of Commerce, 1992).

The chief management needs in the county are measures that control water erosion and soil blowing, measures that maintain or improve drainage in wet areas, and measures that maintain tilth and fertility.

Water erosion is a major management concern in Hancock County. The loss of topsoil through sheet and rill erosion results in poor tilth and reduces productivity. As topsoil is lost, part of the subsoil is incorporated into the plow layer. The subsoil typically has a higher content of clay than the surface layer, and incorporating this material into the plow layer has a detrimental effect on tilth. As tilth deteriorates, the potential for cloddiness increases and the rate of water infiltration and the ease of preparing a seedbed decrease. A reduced rate of water infiltration increases the runoff rate and the potential for further water erosion. Also, nutrients valuable to crop production are lost as topsoil is lost.

Water erosion can also result in the sedimentation of waterways, ditches, streams, and rivers. Controlling water erosion helps to minimize the detrimental effects of sedimentation, such as poor water quality, flooding resulting from reduced channel capacity, and the expense of removing sediment.

Information about the design of conservation practices is available from the Hancock County Soil and Water Conservation District.

Most of the nearly level soils in the county are susceptible to soil blowing. Maintaining a plant cover or using a cropping system and tillage system that leave the surface rough and covered with plant residue can help to control soil blowing. Windbreaks also are effective in reducing the hazard of soil blowing.

Many of the soils in the county are artificially drained. Unless an artificial drainage system is provided, wetness can damage crops or delay planting or harvesting. About 15 percent of the soils in Hancock County are poorly drained or very poorly drained. Birds and Sawmill soils on flood plains and Sable and Virden soils on uplands are examples. About 50 percent of the soils in Hancock County are somewhat poorly drained. Lawson soils on flood plains and Clarksdale, Ipava, and Keomah soils on uplands are examples.

The design of drainage systems differs from soil to soil. Tile drains function well in most areas on bottom land if suitable outlets are available. Upland soils that are slowly or very slowly permeable, such as Cowden and Shiloh soils, may require a drainage system other than standard tile lines. Surface ditches or a combination of scattered tile lines and surface inlets may be needed. Information about the drainage system suitable for each kind of soil is available in the local office of the Natural Resources Conservation Service.

During periods of high water demand, an inadequate soil moisture supply is a problem in soils with an unfavorable or root-restricting subsoil, such as Derinda soils.

Natural fertility is high in Ipava, Sable, Lawson, and other soils that have a thick, dark surface layer. Plants respond well to applications of lime and fertilizer. Natural fertility is lower in Keomah, Rozetta, Stronghurst, and other soils with a light-colored surface layer. Also, these soils are generally more acidic. Applying ground limestone (agricultural lime) helps to raise the pH to a level that is optimum for plant growth. Additions of agricultural lime, nitrogen, phosphorus, potassium, or other elements are needed for optimum yields. Applications should be based on the results of soil tests. The Cooperative Extension Service and the Natural Resources Conservation 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, the amount of runoff, and the infiltration of water into the soil. Good tilth is a condition in which the surface soil is granular and porous. A low content of organic matter, a high content of clay, or a combination of these results in poor tilth. Poor tilth is a common problem in areas of the severely eroded Atlas soils. A system of conservation tillage can improve tilth in these areas.

The field crops suited to the soils and climate of the survey area include many that are not commonly grown. The main crops are corn, soybeans, and wheat. Grain sorghum also is grown. Some specialty crops, such as strawberries and sweet corn, are grown in the survey area. Nursery stock is grown in a few areas. There are also several orchards in the county. The climatic conditions and the soils are particularly well suited not only to field crops but also to vegetables and specialty crops.

Suitable pasture and hay plants include several legumes, cool-season grasses, and warm-season, native grasses. Alfalfa and red clover are the common legumes grown for hay. They are also used in mixtures with grasses for hay and pasture.

Warm-season, native grasses suitable in this area include switchgrass, indiangrass, big bluestem, and little bluestem. These grasses grow well in summer. The management techniques needed for the establishment and grazing of these grasses are different from those needed for cool-season grasses (University of Illinois, 1995-96).

Alfalfa is best suited to deep, moderately well drained and well drained soils, such as Elco, Fayette, Hickory, and Rozetta soils. With proper management, other legumes and grasses also grow well on these soils.

Plants with a higher tolerance for wetness are suited to somewhat poorly drained, poorly drained, and very poorly drained soils. Red clover, ladino clover, alsike clover, and birdsfoot trefoil are more water tolerant than alfalfa. Cool-season grasses considered to be relatively water tolerant include orchardgrass, smooth bromegrass, timothy, and reed canarygrass.

Drought tolerance is desirable in plants selected for pasture or hayland established in areas where the soils have only a moderate or lower available water capacity, such as Dakota soils. Legumes that are suitable for planting in areas of droughty soils include alfalfa, red clover, and ladino clover. Cool-season grasses that are considered to be relatively drought tolerant include bromegrass, tall fescue, and orchardgrass.

Well managed stands of forage crops are effective in controlling erosion. Overgrazing and a lack of adequate lime and fertilizer are common concerns. The amount of lime and fertilizer added should be based on the results of soil tests, on the needs of the plants, and on the expected level of yields.

Overgrazing reduces the vigor of pasture plants and forage production. It also results in an increase of weeds and brush. Measures that maintain soil fertility, deferred grazing, rotation grazing, and proper stocking rates help to prevent overgrazing. Deferred grazing rests the pasture, thus allowing the plants to build up reserves of carbohydrates. Rotation grazing among several areas of pasture allows each area a rest period. The information in table 6 can be helpful in estimating the number of animals that can be supported by a pasture.

Many soils in the survey area have a high water table in the spring. Deferred grazing during wet periods helps to minimize surface compaction. Pasture renovation helps to overcome surface compaction where it is a concern. Frost heave of alfalfa and red clover is a hazard on soils that have a high water table. Maintaining a cover of stubble 4 to 6 inches in height during the winter and planting grass-legume mixtures can minimize the damage caused by frost heave.

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 of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are 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. 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 (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 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, 2e. 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 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

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

Woodland Management and Productivity

In the early 19th century, an estimated 38.2 percent of Illinois was forested. At that time, about 50 percent of the survey area was forested. Since the time of early settlement, much of the woodland has been cleared and used for row crops. In 1985, woodland accounted for about 66,300 acres, or 13 percent of the county (Iverson and others, 1989). The majority of this woodland is privately owned and is in areas that are too steep, too wet, or too remote and isolated for cropping. Much of the woodland is in associations 4 and 5, which are described under the heading "General Soil Map Units."

Table 7 can help woodland owners or forest managers plan 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 in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 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; *F*, a high content of rock fragments in the soil; *L*, low strength; and *N*, snowpack. 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, F, L, and N.

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 also are 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.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. 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 *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre 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.

Suggested 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.

At the end of each description under the heading "Detailed Soil Map Units," the soil has been assigned to a windbreak suitability group. These groups are based primarily on the suitability of the soil for the locally adapted species, as is indicated by their growth and vigor. Detailed interpretations for each windbreak suitability group in the county are provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

Hancock County has many areas of scenic, geologic, and historic interest. These areas are used for hiking, camping, sightseeing, picnicking, hunting, fishing, boating, or cycling. Public areas available for recreational uses include Nauvoo State Park, Carthage Lake, access areas along the Mississippi River, and many city parks.

The use of recreational areas in the county has increased in the past years. The potential for the additional development of recreational facilities is good in parts of the county. The areas that have the best potential for recreational development are in associations 3 and 4, which are described under the heading "General Soil Map Units." These areas are characterized by hilly terrain, wooded slopes, and many streams, all of which provide a variety of recreational possibilities.

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 also are important. Soils that are 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 a combination of these.

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 also are considerations. Examples of grain and seed crops are corn, wheat, and oats.

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 also are considerations. Examples of grasses and legumes are fescue, lovegrass, 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 also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

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, and blackberry. 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, 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, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, 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, muskrat, mink, and beaver.

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 kinds 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, or 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.

The table 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. 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.

The table 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 groundwater pollution. Ease of excavation and revegetation should be considered.

The ratings in the table 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; embankments, dikes, and levees; and aquifer-fed excavated ponds. 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.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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 wind erosion 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 wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and 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. 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.

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.

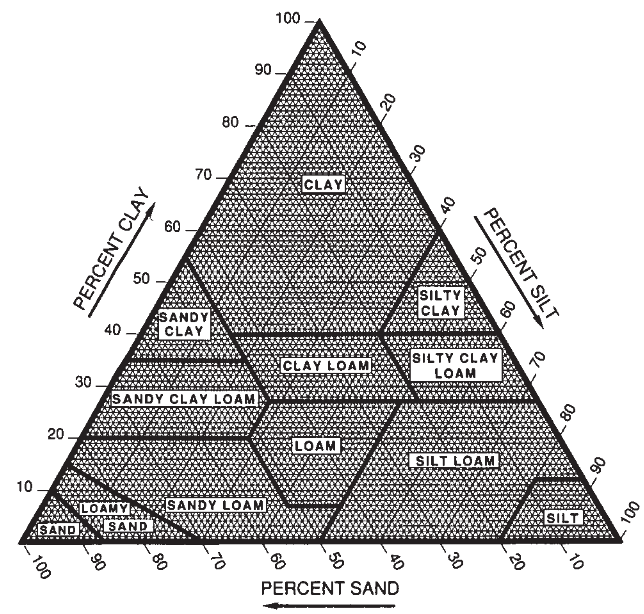


Figure 10.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

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 (fig. 10). "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 (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

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.

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.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the 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 $^1/_3$-bar moisture tension. Weight is determined after the soil is dried at 105 degrees C. In table 16, 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 retention of water and 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.

Cation-exchange capacity is 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. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

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 the basis of 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; *high*, more than 6 percent; and *very high*, greater than 9 percent.

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.

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 0.02 to 0.64. Other factors being equal, 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 of soil to soil blowing. The soils assigned to group 1 are the most susceptible to soil blowing, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

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

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 based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, 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 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 the table, 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, and water standing in swamps and marshes is considered ponding rather than flooding.

The table 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, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (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 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 observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are depth to the seasonal high water table, the kind of water table, 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 the table.

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.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1999). 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 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve 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 Alfisol.

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 Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

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; type of saturation; 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 Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalfs*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. 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 Hapludalfs.

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, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each 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" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1998). Unless otherwise indicated, 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."

Assumption Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and slow or moderately slow in the lower part
Landscape: Uplands

Position on the landform: Side slopes of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 5 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: The Assumption soils in this survey area do not have a mollic epipedon, which is definitive for the series. They are classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Assumption silt loam, 5 to 10 percent slopes, eroded, 210 feet south and 2,400 feet west of the northeast corner of sec. 21, T. 4 N., R. 7 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.
BA—7 to 13 inches; brown (10YR 4/3) silty clay loam; moderate very fine granular structure; friable; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.
Bt1—13 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.
Bt2—25 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent strong brown (7.5YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films and few distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; clear smooth boundary.
2Bt3—30 to 48 inches; light olive brown (2.5Y 5/4) clay loam; common medium prominent red (2.5YR 4/6) and common fine prominent grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; many prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent very dark gray (10YR 3/1) organic coatings lining pores; common prominent very pale brown (10YR 7/3 dry) silt coatings on faces of peds between depths of 30 and 36 inches; few fine rounded concretions (iron and manganese oxides); about 5 percent gravel; slightly acid; diffuse smooth boundary.
2Bt4—48 to 68 inches; light olive brown (2.5Y 5/4) clay loam; many medium prominent strong brown (7.5YR 4/6) and many fine prominent grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; common prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent very dark gray (10YR 3/1) organic coatings lining pores; few fine rounded concretions (iron and manganese oxides); about 5 percent gravel; slightly acid.

Range in Characteristics

Thickness of the loess: 20 to 40 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—2 to 8

Atlas Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Very slow
Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 5 to 15 percent
Taxonomic classification: Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs

Typical Pedon

Atlas silty clay loam, 5 to 10 percent slopes, severely eroded, 1,700 feet east and 1,240 feet south of the northwest corner of sec. 3, T. 5 N., R. 7 W.

Ap—0 to 5 inches; mixed very dark grayish brown (10YR 3/2) and brown (10YR 5/3) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; strongly acid; abrupt smooth boundary.
Bt—5 to 11 inches; brown (10YR 5/3) silty clay loam; few fine prominent strong brown (7.5YR 4/6)

mottles; moderate fine subangular blocky structure; friable; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

2Btg1—11 to 17 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 4/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; many distinct gray (5Y 5/1) clay films on faces of peds; common fine rounded nodules (iron and manganese oxides); about 2 percent gravel; very strongly acid; gradual smooth boundary.

2Btg2—17 to 35 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent strong brown (7.5YR 4/6) and few fine prominent reddish yellow (7.5YR 6/8) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; firm; many distinct gray (5Y 5/1) clay films on faces of peds; common fine rounded nodules (iron and manganese oxides); about 2 percent gravel; very strongly acid; gradual smooth boundary.

2Btg3—35 to 51 inches; gray (5Y 5/1) silty clay loam; common fine prominent reddish yellow (7.5YR 6/8) and few fine prominent strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct light gray (5Y 6/1) clay films on faces of peds; common fine rounded nodules (iron and manganese oxides); about 3 percent gravel; strongly acid; gradual smooth boundary.

2BCg—51 to 60 inches; light gray (5Y 6/1) silty clay loam; common medium prominent reddish yellow (7.5YR 6/8) and few fine prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few faint gray (5Y 5/1) clay films along vertical cleavage planes; common fine rounded concretions (iron and manganese oxides); about 3 percent gravel; strongly acid.

Range in Characteristics

Thickness of the loess: Less than 20 inches

A horizon:
Chroma—2 or 3

Bt or 2Bt horizon:
Value—4 or 5
Chroma—1 to 3

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2

2BCg or 2BC horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 to 3
Texture—silty clay loam or silt loam

Atterberry Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Summits, head slopes, and side slopes of loess-covered till plains
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Udollic Ochraqualfs

Typical Pedon

Atterberry silt loam, 0 to 2 percent slopes, 1,660 feet east and 780 feet north of the southwest corner of sec. 18, T. 3 N., R. 8 W.

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; neutral; abrupt smooth boundary.

E—8 to 14 inches; grayish brown (10YR 5/2) silt loam; many fine faint brown (10YR 5/3) mottles; weak fine subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt—14 to 23 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and many fine distinct grayish brown (2.5Y 5/2) mottles; moderate fine subangular blocky structure; friable; many faint dark grayish brown (10YR 4/2) clay films; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg—23 to 31 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

BCg—31 to 49 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); slightly acid; diffuse smooth boundary.

Cg—49 to 70 inches; light olive gray (5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few prominent very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); neutral.

Range in Characteristics

Ap or A horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 or 3
Chroma—1 or 2

E horizon:
Value—4 or 5
Chroma—1 or 2

Bt and Btg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 or 3
Texture—silt loam or silty clay loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6

Beaucoup Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Fluvaquentic Haplaquolls

Typical Pedon

Beaucoup silty clay loam, occasionally flooded, 2,200 feet west and 120 feet south of the northeast corner of sec. 20, T. 3 N., R. 9 W.

Ap—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; friable; moderately acid; clear smooth boundary.

A—6 to 18 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; moderately acid; gradual smooth boundary.

Bg1—18 to 25 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to weak medium subangular blocky; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bg2—25 to 45 inches; dark gray (10YR 4/1) silty clay loam; many medium prominent dark yellowish brown (10YR 4/6) mottles; weak fine and medium prismatic structure parting to weak medium subangular blocky; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

BCg—45 to 52 inches; gray (10YR 5/1) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Cg—52 to 60 inches; stratified gray (10YR 5/1) and dark gray (10YR 4/1) silty clay loam; massive; firm; few very dark gray (10YR 3/1) krotovinas; few fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Bg horizon:
Hue—10YR, 2.5Y, or neutral
Value—4 to 6
Chroma—0 to 2

Texture—dominantly silty clay loam; strata of silt loam in some pedons

Cg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam with strata of silt loam, loam, sandy loam, fine sandy loam, or very fine sandy loam

Birds Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, nonacid, mesic Typic Fluvaquents

Typical Pedon

Birds silt loam, frequently flooded, 1,660 feet east and 1,640 feet north of the southwest corner of sec. 35, T. 3 N., R. 8 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; many fine and medium faint gray (10YR 5/1) and common fine prominent brown (7.5YR 4/4) mottles; weak medium granular structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds and in pores; common fine rounded concretions (iron and manganese oxides); neutral; clear smooth boundary.

ACg—7 to 26 inches; gray (10YR 5/1) silt loam; many fine and medium faint grayish brown (10YR 5/2) and common fine prominent brown (7.5YR 4/4) mottles; weak medium and coarse granular structure; friable; many fine and medium rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Cg—26 to 60 inches; gray (10YR 6/1) and grayish brown (10YR 5/2), stratified silt loam and loam; many fine and medium faint light brownish gray (10YR 6/2) and common fine prominent brown (7.5YR 4/4) mottles; massive; friable; many fine and medium rounded concretions (iron and manganese oxides); neutral.

Range in Characteristics

A horizon:
Value—4 to 6
Chroma—1 or 2

ACg horizon:
Value—4 or 5
Chroma—1 or 2

Cg horizon:
Value—5 or 6
Chroma—1 or 2
Texture—silt loam; strata of silty clay loam, clay loam, loam, or sandy loam are common

Camden Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Terraces
Position on the landform: Terrace treads of stream terraces
Parent material: Loess and the underlying loamy outwash
Slope range: 2 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Camden silt loam, 2 to 5 percent slopes, 1,420 feet east and 840 feet south of the northwest corner of sec. 9, T. 7 N., R. 7 W.

Ap—0 to 10 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; neutral; abrupt smooth boundary.

E—10 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate thin platy structure; friable; neutral; clear smooth boundary.

Bt1—13 to 20 inches; brown (7.5YR 5/4) silt loam; moderate very fine and fine subangular blocky structure; friable; many prominent light gray (10YR 7/2 dry) silt coatings and few distinct brown (7.5YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—20 to 27 inches; brown (7.5YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; common prominent light gray (10YR 7/2 dry) silt coatings and many distinct brown (7.5YR 4/4) clay films on faces of peds; few fine rounded accumulations (iron and manganese oxides); neutral; clear smooth boundary.

2Bt3—27 to 37 inches; brown (7.5YR 5/4), stratified clay loam and loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many distinct brown (7.5YR 4/4) clay films on faces of peds; few fine rounded accumulations (iron and manganese oxides); about 2 percent gravel; moderately acid; gradual smooth boundary.

2Bt4—37 to 53 inches; yellowish brown (10YR 5/4), stratified silt loam and loam; common fine distinct brown (7.5YR 5/4), common fine faint brown (10YR 5/3), and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common distinct brown (7.5YR 4/4) clay films on faces of peds; few fine rounded accumulations (iron and manganese oxides); about 2 percent gravel; moderately acid; gradual smooth boundary.

2BC—53 to 60 inches; brown (10YR 5/3) and light brownish gray (10YR 6/2), stratified silt loam, loam, and sandy loam; common fine distinct brown (7.5YR 4/4) and few fine prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine rounded accumulations (iron and manganese oxides); about 2 percent gravel; moderately acid.

Range in Characteristics

Thickness of the loess: 24 to 40 inches

Ap or A horizon:
Value—4 or 5
Chroma—2 or 3

E horizon:
Value—4 or 5
Chroma—2 to 4

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 or 4
Texture—stratified; commonly clay loam or loam in the upper part and sandy loam, sandy clay loam, loam, or silt loam that contains noticeable sand in the lower part

Clarksdale Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landscape: Uplands
Position on the landform: Summits, head slopes, and side slopes of loess-covered till plains
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine, montmorillonitic, mesic Udollic Ochraqualfs

Typical Pedon

Clarksdale silt loam, 0 to 2 percent slopes, 1,900 feet north and 1,900 feet west of the southeast corner of sec. 23, T. 5 N., R. 6 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate thin platy structure parting to moderate fine granular; friable; few distinct light brownish gray (10YR 6/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly alkaline; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; common distinct light gray (10YR 7/2 dry) silt coatings and few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

BE—14 to 18 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct light gray (10YR 7/2 dry) silt coatings and few faint organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt—18 to 29 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 4/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/6) clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg1—29 to 35 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common distinct dark gray (10YR 4/1) and many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg2—35 to 42 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; many distinct grayish brown (2.5Y 5/2) and few distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common medium rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

BCg—42 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common distinct grayish brown (2.5Y 5/2) and few distinct dark gray (10YR 4/1) clay films on vertical faces of peds; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common medium rounded concretions (iron and manganese oxides) and common medium irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

E horizon:
Value—4 to 6
Chroma—1 or 2

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4 in the upper part, 1 or 2 in the lower part
Texture—silty clay or silty clay loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4 in the upper part, 1 or 2 in the lower part
Texture—silty clay or silty clay loam

Coatsburg Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Parent material: A thin mantle of loess or other silty material and the underlying glacial till, which has a strongly developed paleosol
Slope range: 5 to 10 percent
Taxonomic classification: Fine, montmorillonitic, mesic, sloping Typic Argiaquolls
Taxadjunct features: The Coatsburg soils in this survey area do not have a mollic epipedon, which is definitive for the series. They are classified as fine, montmorillonitic, mesic, sloping Mollic Haplaquolls.

Typical Pedon

Coatsburg silty clay loam, 5 to 10 percent slopes, severely eroded, 2,600 feet north and 240 feet east of the southwest corner of sec. 10, T. 3 N., R. 8 W.

Ap—0 to 5 inches; very dark grayish brown (2.5Y 3/2) silty clay loam, grayish brown (2.5Y 5/2) dry; weak fine granular structure; friable; about 2 percent gravel; neutral; abrupt smooth boundary.

Btg1—5 to 18 inches; grayish brown (2.5Y 5/2) silty clay; few fine distinct light olive brown (2.5Y 5/4) and many medium distinct gray (10YR 5/1) mottles; moderate very fine subangular blocky structure; firm; common faint gray (10YR 5/1) clay films on faces of peds; few fine rounded concretions (iron and manganese oxides); about 2 percent gravel; slightly acid; diffuse smooth boundary.

Btg2—18 to 37 inches; grayish brown (2.5Y 5/2) clay; few fine distinct light olive brown (2.5Y 5/4) and many medium distinct gray (10YR 5/1) mottles; moderate fine angular and subangular blocky structure; firm; common distinct gray (10YR 5/1) clay films and few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); about 2 percent gravel; slightly acid; diffuse smooth boundary.

Btg3—37 to 63 inches; grayish brown (2.5Y 5/2) clay; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium angular and subangular blocky structure; firm; few distinct gray (10YR 5/1) clay films and common distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; many fine rounded concretions (iron and manganese oxides); about 8 percent gravel; slightly acid.

Range in Characteristics

A horizon:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 or 2

Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—1 or 2
Texture—clay, clay loam, or silty clay loam

Coffeen Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-silty, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Coffeen silt loam, frequently flooded, 100 feet east and 230 feet north of the southwest corner of sec. 33, T. 4 N., R. 7 W.

Ap—0 to 5 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A—5 to 18 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; many fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

BE—18 to 24 inches; grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); slightly acid; diffuse smooth boundary.

Bw—24 to 44 inches; brown (10YR 4/3) silt loam; many fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; diffuse smooth boundary.

BC—44 to 58 inches; dark grayish brown (10YR 4/2) silt loam; many medium distinct very dark gray (10YR 3/1) and common fine distinct gray (10YR 5/1) and dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Ab—58 to 60 inches; very dark gray (10YR 3/1) silt loam; few fine prominent dark gray (2.5Y 4/4) mottles; weak medium subangular blocky structure; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches

Ap or A horizon:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or loam

Bw horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 or 3
Texture—silt loam or loam

Cowden Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landscape: Uplands
Position on the landform: Low-lying areas on loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Mollic Albaqualfs

Typical Pedon

Cowden silt loam, 920 feet east and 1,340 feet south of the northwest corner of sec. 23, T. 5 N., R. 6 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; moderately acid; clear smooth boundary.

Eg1—9 to 14 inches; dark gray (10YR 4/1) silt loam; weak medium platy structure parting to weak fine subangular blocky; friable; common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

Eg2—14 to 17 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium platy structure parting to weak fine subangular blocky; friable; many distinct light gray (10YR 7/2 dry) silt coatings and very few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

Btg1—17 to 24 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium and fine subangular blocky structure; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg2—24 to 37 inches; light brownish gray (10YR 6/2) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to weak medium angular blocky; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg3—37 to 42 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films and common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

BCg—42 to 52 inches; light brownish gray (2.5Y 6/2) silt loam; many fine distinct light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Cg—52 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many fine distinct light olive brown (2.5Y 5/6 and 5/4) mottles; massive; friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores; few fine irregular accumulations (iron and manganese oxides); moderately acid.

Range in Characteristics

Thickness of the loess: Greater than 60 inches

A horizon:
Value—2 or 3
Chroma—1 or 2

E horizon:
Value—4 to 6
Chroma—1 or 2

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam, silty clay, or silt loam

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2

Dakota Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and rapid in the underlying sandy deposit
Landscape: Terraces
Position on the landform: Stream terraces
Parent material: Alluvium
Slope range: 1 to 5 percent
Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls

Typical Pedon

Dakota loam, 1 to 5 percent slopes, 2,180 feet west and 880 feet north of the southeast corner of sec. 35, T. 7 N., R. 9 W.

Ap—0 to 8 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.

A—8 to 15 inches; very dark grayish brown (10YR 3/2) loam, gray (10YR 5/1) dry; weak medium angular blocky structure parting to weak fine granular; friable; neutral; gradual smooth boundary.

Bt1—15 to 20 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings and common distinct dark brown (10YR 3/3) clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—20 to 26 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; many distinct dark brown (10YR 3/3) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 2 percent gravel; neutral; gradual smooth boundary.

2Bt3—26 to 30 inches; brown (10YR 4/3) gravelly sandy loam; weak medium subangular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; about 34 percent gravel; neutral; clear wavy boundary.

2C—30 to 60 inches; brown (10YR 4/3) very channery loamy sand; single grain; loose; about 50 percent gravel and channers; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: Greater than 30 inches
Thickness of the mollic epipedon: 10 to 20 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Value—3 to 5
Chroma—3 or 4
Texture—loam, sandy loam, or the gravelly analogs of these textures

2Bt horizon:
Value—4 or 5
Chroma—3 or 4
Texture—loam, sandy loam, or the gravelly analogs of these textures

2C horizon:
Value—4 or 5
Chroma—2 or 3

Darwin Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Landscape: Flood plains
Position on the landform: Backswamps of low and high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Vertic Haplaquolls

Typical Pedon

Darwin silty clay, occasionally flooded, 475 feet east and 145 feet south of the northwest corner of sec. 4, T. 2 N., R. 9 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine granular structure; firm; neutral; abrupt smooth boundary.

A—9 to 17 inches; very dark gray (10YR 3/1) silty clay, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles: moderate medium angular blocky structure; firm; neutral; clear smooth boundary.

Bg1—17 to 23 inches; dark gray (10YR 4/1) silty clay; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; very few distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—23 to 39 inches; dark gray (5Y 4/1) silty clay; common fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium and coarse subangular blocky structure; firm; neutral; clear smooth boundary.

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

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Hue—10YR, 2.5Y, or neutral
Value— 2 or 3
Chroma—0 to 2

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—3 to 6
Chroma—0 to 2
Texture—dominantly silty clay; subhorizons of clay or clay loam in the lower part in some pedons

Cg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam, silty clay, or clay

Derinda Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate in the loess mantle and slow or very slow in the underlying material, which formed in shale
Landscape: Uplands
Position on the landform: Side slopes and backslopes of loess-covered escarpments
Parent material: Loess over shale
Slope range: 30 to 60 percent
Taxonomic classification: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Derinda silt loam, 30 to 60 percent slopes, 2,200 feet north and 1,300 feet east of the southwest corner of sec. 3, T. 5 N., R. 6 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.
Btk1—3 to 7 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.
Btk2—7 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; about 2 percent weathered shale fragments; neutral; clear smooth boundary.
2Btk3—17 to 31 inches; olive gray (5Y 5/2) silty clay loam; common fine distinct light gray (N 6/0) and common fine prominent brown (10YR 5/3) mottles; weak medium angular and subangular blocky structure; friable; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; about 5 percent weathered shale fragments; common medium irregular concretions (calcium carbonates); slightly effervescent; slightly alkaline; gradual smooth boundary.
2Btk4—31 to 36 inches; olive gray (5Y 5/2) silty clay loam; common fine distinct light gray (N 6/0) and common fine prominent brown (10YR 5/3) mottles; weak medium angular and subangular blocky structure; friable; common faint grayish brown (2.5Y 5/2) clay films on faces of peds; about 13 percent weathered shale fragments; common medium irregular concretions (calcium carbonates); slightly effervescent; slightly alkaline; gradual smooth boundary.
3Cr—36 to 60 inches; brown (10YR 5/3), soft shale; many fine faint yellowish brown (10YR 5/4) streaks and few fine distinct gray (10YR 5/1) mottles; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the loess: 15 to 30 inches

A horizon:
Value—3 or 4
Chroma—2 or 3

Btk horizon:
Value—4 or 5
Chroma—4 or 5

2Btk horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—2 or 3
Texture—silt loam or silty clay loam

3Cr horizon:
Hue—10YR or 5Y
Value—5 or 6
Chroma—2 or 3

Dickinson Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the lower part
Landscape: Terraces
Position on the landform: Footslopes of loess-covered till plains and terrace treads of stream terraces
Parent material: Glacial or alluvial deposits that have been reworked by wind
Slope range: 10 to 20 percent
Taxonomic classification: Coarse-loamy, mixed, mesic Typic Hapludolls

Typical Pedon

Dickinson fine sandy loam, in an area of Dickinson-Hamburg complex, 10 to 60 percent slopes, 2,460 feet west and 2,500 feet south of the northeast corner of sec. 3, T. 4 N., R. 9 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; slightly acid; clear smooth boundary.
A—8 to 16 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate medium subangular

blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw1—16 to 23 inches; brown (10YR 4/3) fine sandy loam; moderate medium subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw2—23 to 30 inches; brown (10YR 4/3) fine sandy loam; weak coarse prismatic structure parting to weak medium angular blocky; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

C1—30 to 37 inches; brown (10YR 5/3) loamy sand; single grain; loose; slightly acid; clear smooth boundary.

C2—37 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; moderately acid.

Range in Characteristics

Depth to carbonates: Greater than 60 inches
Depth to bedrock: Greater than 60 inches
Thickness of the mollic epipedon: 14 to 24 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3
Texture—fine sandy loam, sandy loam, or loam

Bw horizon:
Chroma—3 or 4
Texture—sandy loam or fine sandy loam

C horizon:
Chroma—3 to 5
Texture—loamy sand or sand

Downs Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Summits and side slopes of loess-covered till plains
Parent material: Loess
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Mollic Hapludalfs

Typical Pedon

Downs silt loam, 2 to 5 percent slopes, 2,060 feet north and 200 feet west of the southeast corner of sec. 13, T. 7 N., R. 6 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

E—8 to 11 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to weak very fine granular; friable; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; neutral; abrupt smooth boundary.

BE—11 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine subangular blocky structure; friable; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; slightly acid; gradual smooth boundary.

Bt1—16 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; slightly acid; gradual smooth boundary.

Bt2—27 to 35 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct very pale brown (10YR 7/3 dry) silt coatings and common distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Bt3—35 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common distinct very pale brown (10YR 7/3 dry) silt coatings and common distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

BC—44 to 62 inches; yellowish brown (10YR 5/4) silt loam; many fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; friable; common distinct very pale brown (10YR 7/3 dry) silt coatings and few distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

C—62 to 65 inches; brown (10YR 5/3) silt loam; many fine faint light brownish gray (10YR 6/2) and many fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; common fine irregular concretions (iron and manganese oxides); moderately acid.

Range in Characteristics

Ap or A horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 or 3
Chroma—1 or 2

E horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—2 or 3
Texture—silty clay loam or silt loam

Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam or silt loam

Elco Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow or slow in the lower part
Landscape: Uplands
Position on the landform: Side slopes of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 5 to 15 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Elco silt loam, 5 to 10 percent slopes, eroded, 160 feet west and 1,500 feet south of the northeast corner of sec. 11, T. 3 N., R. 5 W.

Ap—0 to 4 inches; mixed dark yellowish brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; very friable; few fine irregular accumulations (iron and manganese oxides); slightly acid; abrupt smooth boundary.

BE—4 to 7 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium platy structure parting to weak fine subangular blocky; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; clear smooth boundary.

Bt1—7 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct yellowish brown (10YR 5/4) and few distinct strong brown (7.5YR 4/6) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt2—22 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct strong brown (7.5YR 4/6) and few distinct brown (10YR 5/3) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

2Btg1—28 to 44 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent reddish yellow (7.5YR 6/8) and few fine prominent strong brown (7.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct gray (5Y 5/1) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); about 2 percent gravel; strongly acid; gradual smooth boundary.

2Btg2—44 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct light gray (5Y 6/1) clay films on faces of peds; common medium rounded concretions (iron and manganese oxides); about 2 percent gravel; strongly acid.

Range in Characteristics

Thickness of the loess: 20 to 40 inches

Ap or A horizon:
Value—4 or 5
Chroma—2 to 4

E horizon (if it occurs):
Value—4 or 5
Chroma—3 or 4

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam

2Btg horizon:
Hue—10YR, 2.5Y, or 7.5YR
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam, clay loam, or silty clay

Faxon Series

Depth class: Moderately deep
Drainage class: Poorly drained
Permeability: Moderate
Landscape: Terraces
Position on the landform: Rock-cored terraces
Parent material: Outwash and the underlying limestone bedrock
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Haplaquolls

Typical Pedon

Faxon silty clay loam, 2,800 feet west and 1,440 feet south of the northeast corner of sec. 2, T. 6 N., R. 9 W.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; about 3 percent, by volume, gravel, cobbles, channers, and flagstones; neutral; clear smooth boundary.

A—7 to 11 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; common fine distinct dark gray (10YR 4/1) mottles; moderate very fine angular blocky structure; friable; about 5 percent gravel, cobbles, channers, and flagstones; slightly alkaline; clear smooth boundary.

Bg—11 to 21 inches; dark gray (10YR 4/1) gravelly clay loam; common fine prominent brownish yellow (10YR 6/8) mottles; weak medium angular blocky structure; friable; about 30 percent gravel, cobbles, channers, and flagstones; strongly effervescent; slightly alkaline; abrupt wavy boundary.

2R—21 inches; limestone bedrock.

Range in Characteristics

Depth to carbonates: 10 to 20 inches
Depth to bedrock: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 24 inches

A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1

Bg horizon:
Value—4 or 5
Chroma—1 or 2

Fayette Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Uplands
Landscape position: Side slopes, backslopes, and shoulders of loess-covered till plains
Parent material: Loess
Slope range: 10 to 45 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Fayette silt loam, 10 to 18 percent slopes, eroded, 2,600 feet east and 440 feet south of the northwest corner of sec. 4, T. 7 N., R. 6 W.

Ap—0 to 4 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

BE—4 to 7 inches; brown (10YR 4/3) silt loam, yellowish brown (10YR 5/4) dry; moderate thin platy structure; friable; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—7 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate very fine subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films and few distinct dark brown (10YR 3/3) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—16 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—34 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles in the lower 6 inches of the horizon; moderate medium and coarse subangular blocky structure; friable; few distinct brown (10YR 5/3 and 4/3) clay films on faces of peds; few fine rounded nodules (iron and manganese oxides); moderately acid; clear smooth boundary.

BCg—40 to 60 inches; brown (10YR 5/3) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; common fine rounded nodules (iron and manganese oxides); slightly acid.

Range in Characteristics

A or Ap horizon:
Value—2 or 3
Chroma—1 to 3

E horizon:
Value—4 or 5
Chroma—1 to 4

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

Fishhook Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Landscape: Uplands
Position on the landform: Head slopes and side slopes of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 5 to 15 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Fishhook silt loam, 5 to 10 percent slopes, eroded, 520 feet west and 2,520 feet south of the northeast corner of sec. 8, T. 3 N., R. 7 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; very friable; very few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); moderately acid; clear wavy boundary.

Bt1—8 to 15 inches; brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films and common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine and medium irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt2—15 to 23 inches; brown (10YR 5/3) silty clay loam; many fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common medium irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg1—23 to 27 inches; light brownish gray (10YR 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few medium irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

2Btg2—27 to 37 inches; light brownish gray (10YR 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to weak coarse angular blocky; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

2Btg3—37 to 43 inches; dark grayish brown (2.5Y 4/2) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; strong medium prismatic structure parting to strong medium angular blocky; firm; few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); moderately acid; gradual smooth boundary.

2Btg4—43 to 54 inches; dark grayish brown (10YR 4/2) clay loam; many fine and medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); moderately acid; gradual smooth boundary.

2Btg5—54 to 60 inches; dark grayish brown (10YR 4/2) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); moderately acid.

Range in Characteristics

Thickness of the loess: 20 to 40 inches

Ap or A horizon:
Value—3 to 5
Texture—silty clay loam or silt loam

Bt horizon:
Value—4 to 6
Chroma—1 to 4

2Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam or clay loam

Gorham Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow in the finer textured upper part and rapid in the coarser textured lower part
Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Fluvaquentic Haplaquolls

Typical Pedon

Gorham silty clay loam, occasionally flooded, 1,440 feet east and 2,440 feet south of the northwest corner of sec. 33, T. 3 N., R. 9 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; firm; neutral; abrupt smooth boundary.

A—10 to 13 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium angular blocky structure; firm; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bg1—13 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm; many prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bg2—21 to 27 inches; dark grayish brown (2.5Y 4/2) silty clay with thin strata of loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; friable; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bg3—27 to 36 inches; dark grayish brown (2.5Y 4/2) silty clay loam with thin strata of loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; friable; few prominent dark gray (5Y 4/1) clay films and common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

2Bg4—36 to 49 inches; dark gray (5Y 4/1) clay loam; common fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate medium angular blocky structure; friable; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

2Bg5—49 to 60 inches; dark gray (5Y 4/1) clay loam; common fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate medium angular blocky structure; friable; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

A horizon:
Value—2 or 3
Chroma—1 or 2

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—3 to 5
Chroma—0 to 2
Texture—silty clay loam or silty clay in the upper part; sandy clay loam, clay loam, loam, sandy loam, or loamy sand in the lower part, stratified in color or texture or both

Hamburg Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Footslopes
Parent material: Loess
Slope range: 20 to 60 percent
Taxonomic classification: Coarse-silty, mixed (calcareous), mesic Typic Udorthents

Typical Pedon

Hamburg silt, in an area of Dickinson-Hamburg complex, 10 to 60 percent slopes, 1,800 feet south and 640 feet west of the northeast corner of sec. 15, T. 3 N., R. 9 W.

A—0 to 5 inches; dark brown (10YR 3/3) silt, light brownish gray (10YR 6/2) dry; weak very fine and fine granular structure; very friable; very slightly effervescent; slightly alkaline; clear smooth boundary.

C1—5 to 11 inches; light yellowish brown (10YR 6/4) silt; common fine prominent light gray (10YR 6/1) and few fine prominent yellowish brown (10YR 5/6) mottles; massive; very friable; very few faint dark grayish brown (10YR 4/2) organic coatings lining pores; common dark brown (10YR 3/3) wormcasts; few medium and coarse irregular nodules (calcium carbonates); slightly effervescent; slightly alkaline; gradual smooth boundary.

C2—11 to 60 inches; light yellowish brown (10YR 6/4) silt; many medium distinct light gray (10YR 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; very friable; few fine irregular accumulations (iron and manganese oxides); few medium and coarse irregular nodules (calcium carbonates); strongly effervescent; moderately alkaline.

Range in Characteristics

Carbonates: Contains free carbonates throughout

A horizon:
Value—3 or 4
Chroma—2 or 3

C horizon:
Value—4 to 6
Chroma—3 or 4
Texture—silt loam, silt, or very fine sandy loam

Haymond Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Natural levees of low flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-silty, mixed, nonacid, mesic Typic Udifluvents

Typical Pedon

Haymond silt loam, frequently flooded, 260 feet north and 1,060 feet west of the southeast corner of sec. 21, T. 4 N., R. 9 W.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

A2—2 to 6 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); neutral; clear smooth boundary.

C1—6 to 47 inches; brown (10YR 4/3) silt loam with few thin strata of loamy and sandy material; common thin grayish brown (10YR 5/2) and dark brown (10YR 3/3) depositional strata; massive with many weak thin depositional strata; friable; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

C2—47 to 68 inches; dark brown (10YR 3/3) silt loam with few thin strata of loamy and sandy material; common thin grayish brown (10YR 5/2) depositional strata; massive with many weak thin depositional strata; friable; common fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Ap or A horizon:
Value—4 or 5
Chroma—2 to 4

C horizon:
Value—3 to 6

Chroma—3 or 4
Texture—silt loam, loam, or fine sandy loam

Herrick Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Aquic Argiudolls

Typical Pedon

Herrick silt loam, 0 to 2 percent slopes, 72 feet north and 57 feet east of the southwest corner of sec. 4, T. 3 N., R. 6 W.

Ap—0 to 5 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak very fine and fine granular structure with compaction planes; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

A—5 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate coarse granular structure parting to moderate fine granular with compaction planes; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

E—12 to 17 inches; very dark gray (10YR 3/1) silt loam; weak very thick platy structure parting to moderate medium and fine subangular blocky; friable; few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt—17 to 23 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6), common fine distinct pale brown (10YR 6/3) and grayish brown (10YR 5/2), and few fine distinct olive (5Y 5/3) mottles; moderate fine and medium prismatic structure parting to moderate fine angular blocky; firm; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine and medium rounded nodules (iron and manganese oxides); few fine irregular accumulations (iron and manganese oxides); moderately acid; gradual smooth boundary.

Btg1—23 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) and common fine distinct pale brown (10YR 6/3) and pale olive (5Y 6/3) mottles; moderate medium prismatic structure; firm; few prominent very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); few fine rounded nodules (iron and manganese oxides); slightly acid; clear smooth boundary.

Btg2—27 to 32 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent light gray (10YR 6/1) and few medium prominent yellowish brown (10YR 5/6 and 5/4) mottles; moderate medium prismatic structure parting to strong medium angular blocky; firm; few distinct dark grayish brown (2.5Y 4/2) and brown (10YR 4/3) clay films on faces of peds; few prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded nodules (iron and manganese oxides); few fine irregular accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

Btg3—32 to 41 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine and few medium prominent yellowish brown (10YR 5/6) and common fine faint light olive gray (5Y 6/2) mottles; moderate coarse prismatic structure; firm; common prominent dark yellowish brown (10YR 4/4) and grayish brown (10YR 5/2) clay films along vertical cleavage planes; few fine irregular accumulations (iron and manganese oxides); few fine rounded nodules (iron and manganese oxides); slightly acid; clear smooth boundary.

BCg—41 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; few coarse prominent yellowish brown (10YR 5/8) and common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few prominent very dark gray (10YR 3/1) organic coatings lining pores; few distinct brown (10YR 4/3) and grayish brown (10YR 5/2) clay films along vertical cleavage planes; few fine rounded nodules (iron and manganese oxides); few fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon. 10 to 21 inches

A or Ap horizon:
Chroma—1 or 2

E horizon:
Value—3 or 4
Chroma—1 or 2

Bt and Btg horizons:
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silt loam in the lower part

Hickory Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains and escarpments
Parent material: Glacial till or glacial till and a thin layer of loess
Slope range: 10 to 60 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Hickory loam, 18 to 30 percent slopes, 2,560 feet west and 80 feet north of the southeast corner of sec. 36, T. 7 N., R. 5 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

E—5 to 13 inches; brown (10YR 5/3) loam, light gray (10YR 7/2) dry; few medium distinct yellowish brown (10YR 5/6) mottles; moderate thick platy structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; about 2 percent gravel; neutral; clear smooth boundary.

Bt1—13 to 24 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; strong very fine subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 2 percent gravel; moderately acid; clear smooth boundary.

Bt2—24 to 34 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; strong fine subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 2 percent gravel; few fine rounded nodules (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt3—34 to 46 inches; yellowish brown (10YR 5/4) clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; about 5 percent gravel; few fine rounded nodules (iron and manganese oxides); very strongly acid; clear smooth boundary.

BC—46 to 55 inches; yellowish brown (10YR 5/4) clay loam; few medium prominent light brownish gray (2.5Y 6/2) and many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few faint brown (10YR 5/3) coatings on faces of peds; about 5 percent gravel; few fine rounded nodules (iron and manganese oxides); slightly effervescent; slightly alkaline; clear smooth boundary.

C—55 to 60 inches; yellowish brown (10YR 5/4) clay loam; few medium prominent light brownish gray (2.5Y 6/2) and many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few faint brown (10YR 5/3) coatings lining pores; about 5 percent gravel; few fine rounded nodules (iron and manganese oxides); strongly effervescent; moderately alkaline.

Range in Characteristics

A horizon:
Value—3 or 4
Chroma—2 or 3
Texture—loam or silt loam

E horizon (if it occurs):
Chroma—2 or 3
Texture—loam or silt loam

Bt or Btk horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or clay loam

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—2 to 6
Texture—silt loam, loam, clay loam, or sandy loam

Huntsville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Flood plains

Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Huntsville silt loam, occasionally flooded, 2,300 feet west and 1,900 feet north of the southeast corner of sec. 36, T. 5 N., R. 5 W.

Ap1—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure parting to weak fine granular; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Ap2—6 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

A1—10 to 19 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky and moderate fine angular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

A2—19 to 28 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium angular blocky structure parting to moderate fine angular blocky; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

AC—28 to 43 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

C—43 to 60 inches; stratified brown (10YR 4/3) silt loam and brown (10YR 5/3) sandy loam; massive; friable; few faint very dark grayish brown (10YR 3/2) organic coatings lining pores; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 54 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

AC horizon:
Value—4 or 5
Chroma—3 or 4

C horizon:
Value—3 to 5
Chroma—3 or 4

Ipava Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Uplands
Landscape position: Summits, head slopes, and side slopes of loess-covered till plains
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine, montmorillonitic, mesic Aquic Argiudolls
Taxadjunct features: Ipava silt loam, 2 to 5 percent slopes, eroded, does not have a mollic epipedon, which is definitive for the series. This soil is classified as fine, mixed, mesic Udollic Ochraqualfs.

Typical Pedon

Ipava silt loam, 0 to 2 percent slopes, 1,900 feet west and 220 feet south of the northeast corner of sec. 3, T. 5 N., R. 7 W.

Ap—0 to 5 inches; black (10YR 2/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; moderately acid; abrupt smooth boundary.

A1—5 to 13 inches; black (10YR 2/1) silt loam, gray (10YR 5/1) dry; weak very fine subangular blocky structure parting to weak fine granular; friable; moderately acid; clear smooth boundary.

A2—13 to 20 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine subangular blocky structure parting to weak fine granular; friable; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt—20 to 25 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) and common fine distinct olive brown (2.5Y 4/4) mottles; moderate very fine subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many prominent very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Btg1—25 to 31 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/6) and common medium faint light brownish gray (2.5Y 6/2) mottles; moderate fine angular blocky structure; friable; many distinct dark gray (10YR 4/1) clay films and few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common medium rounded accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

Btg2—31 to 46 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) and few medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium rounded accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

BCg—46 to 57 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) and few medium prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; common medium rounded accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

Cg—57 to 66 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) and few medium prominent dark yellowish brown (10YR 4/6) mottles; massive; friable; many medium rounded accumulations (iron and manganese oxides); slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Bt or Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silty clay

BCg or Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silt loam

Jasper Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Terraces
Position on the landform: Terrace risers of stream terraces and summits and footslopes of fan terraces
Parent material: Stratified loamy sediments
Slope range: 1 to 10 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct features: Jasper fine sandy loam, 5 to 10 percent slopes, eroded, does not have a mollic epipedon, which is definitive for the series. Also, this soil typically has a thicker BC horizon than is defined as the range for the series. The soil is classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Jasper loam, 1 to 5 percent slopes, 470 feet east and 880 feet north of the southwest corner of sec. 3, T. 7 N., R. 7 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; friable; about 1 percent gravel; moderately acid; clear smooth boundary.

A—8 to 16 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; about 3 percent gravel; slightly acid; clear smooth boundary.

Bt1—16 to 22 inches; brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; about 4 percent gravel; slightly acid; gradual smooth boundary.

Bt2—22 to 34 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; about 2 percent gravel; neutral; gradual smooth boundary.

Bt3—34 to 51 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; about 4 percent gravel; neutral; gradual smooth boundary.

BC—51 to 60 inches; brown (10YR 4/3), stratified loam and silt loam; weak coarse subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; about 3 percent gravel; few fine rounded accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Value—4 or 5
Chroma—3 to 6
Texture—clay loam or sandy clay loam with subhorizons ranging to loam, silty clay loam, and fine sandy loam in some pedons

C horizon:
Value—4 to 6
Chroma—3 to 6
Texture—loam or fine sandy loam stratified with silt loam, silty clay loam, clay, and gravelly coarse sand

Keller Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and slow in the lower part
Landscape: Uplands
Position on the landscape: Head slopes and side slopes of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 5 to 12 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls
Taxadjunct features: The Keller soils in this survey area do not have a mollic epipedon, which is definitive for the series. They are classified as fine-silty, mixed, mesic Udollic Ochraqualfs.

Typical Pedon

Keller silt loam, 5 to 12 percent slopes, eroded, 2,560 feet south and 1,600 feet west of the northeast corner of sec. 6, T. 5 N., R. 6 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with common dark yellowish brown (10YR 4/4) fragments of subsoil material; weak fine granular structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate very fine subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; few fine rounded concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt2—14 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and many fine distinct light gray (10YR 6/1) mottles; moderate fine subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); moderately acid; clear smooth boundary.

Btg1—21 to 31 inches; light gray (10YR 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common faint gray (10YR 5/1) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); moderately acid; clear smooth boundary.

2Btg2—31 to 46 inches; gray (10YR 5/1) silty clay; common medium prominent light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; very firm; many faint dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds; about 5 percent gravel; neutral; gradual smooth boundary.

2BCg—46 to 62 inches; gray (10YR 5/1) silty clay; common medium prominent light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; common faint gray (10YR 5/1) coatings on vertical faces of peds; about 5 percent gravel; neutral.

Range in Characteristics

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Bt or Btg horizon:
Value—4 to 6
Chroma—2 to 4
Texture—silty clay or silty clay loam

2Bt or 2Btg horizon:
Hue—10YR, 2.5Y, or neutral
Value—3 to 6
Chroma—0 to 3

Keomah Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow or moderately slow in the upper

part of the subsoil and moderately slow in the lower part
Landscape: Uplands and terraces
Position on the landscape: Summits and head slopes and side slopes of loess-covered till plains and terrace treads of stream terraces
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine, montmorillonitic, mesic Aeric Ochraqualfs

Typical Pedon

Keomah silt loam, 0 to 2 percent slopes, 1,400 feet west and 80 feet south of the northeast corner of sec. 18, T. 5 N., R. 6 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; neutral; abrupt smooth boundary.

E—9 to 16 inches; grayish brown (10YR 5/2) silt loam; weak thin platy structure; very friable; common faint light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); neutral; clear smooth boundary.

BE—16 to 20 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate very fine subangular blocky structure; friable; common faint light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt—20 to 30 inches; brown (10YR 5/3) silty clay; many medium distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate very fine subangular blocky structure; firm; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg—30 to 46 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; many distinct grayish brown (2.5Y 5/2) clay films on faces of peds; many fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

BCg—46 to 59 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few prominent very dark gray (10YR 3/1) organic coatings lining pores; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; many fine rounded concretions (iron and manganese oxides); moderately acid; diffuse smooth boundary.

Cg—59 to 73 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores; many fine rounded concretions (iron and manganese oxides); moderately acid.

Range in Characteristics

Ap horizon:
Value—4 or 5
Chroma—1 or 2

E horizon:
Value—4 or 5
Chroma—1 to 3

Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silty clay

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silt loam

Lacrescent Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Landscape: Uplands
Position on the landform: Side slopes
Parent material: Mixture of loess and talus of limestone cobbles
Slope range: 5 to 60 percent
Taxonomic classification: Loamy-skeletal, mixed, mesic Typic Hapludolls

Typical Pedon

Lacrescent cobbly silt loam, 30 to 60 percent slopes, 2,200 feet north and 520 feet east of the southwest corner of sec. 32, T. 6 N., R. 8 W.

A—0 to 10 inches; very dark grayish brown (10YR 3/2) cobbly silt loam, brown (10YR 4/3) dry; moderate fine granular structure; friable; about 20 percent cobbles; neutral; gradual smooth boundary.

AB—10 to 14 inches; dark brown (10YR 3/3) cobbly silt loam, brown (10YR 5/3) dry; common distinct dark yellowish brown (10YR 4/4) mottles; friable; moderate fine subangular blocky structure; about 25 percent cobbles; neutral; gradual smooth boundary.

Bw—14 to 21 inches; dark yellowish brown (10YR 4/4) very cobbly loam; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) coatings on faces of peds; about 50 percent cobbles; neutral; gradual smooth boundary.

C—21 to 60 inches; light olive brown (2.5Y 5/4) very cobbly loam; common distinct yellowish brown (10YR 5/4) mottles; massive; friable; about 60 percent cobbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 12 to 21 inches
Thickness of the mollic epipedon: 14 to 20 inches
Thickness of the loess: 0 to 20 inches

A horizon:
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or cobbly silt loam

Bw horizon:
Chroma—3 or 4
Texture—silty clay loam, loam, cobbly silt loam, very cobbly silt loam, or very cobbly loam

C horizon:
Hue—10YR or 2.5YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam, loam, or the gravelly analogs of these textures

Landes Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the lower part
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-loamy, mixed, mesic Fluventic Hapludolls

Typical Pedon

Landes loam, occasionally flooded, 2,460 feet east and 1,740 feet south of the northwest corner of sec. 28, T. 4 N., R. 9 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium and fine granular structure; friable; slightly acid; clear smooth boundary.

A—8 to 14 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak medium granular; friable; slightly acid; clear smooth boundary.

BA—14 to 21 inches; dark brown (10YR 3/3) fine sandy loam; weak medium and fine subangular blocky structure; friable; common medium irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bw—21 to 33 inches; brown (10YR 4/3) fine sandy loam; common fine faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; common faint dark brown (10YR 3/3) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

BC—33 to 39 inches; dark yellowish brown (10YR 4/4) and brown (10YR 5/3) loamy fine sand; weak medium subangular blocky structure; very friable; few medium and fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

C—39 to 60 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3
Texture—dominantly loam, but the range includes fine sandy loam, very fine sandy loam, and sandy loam

Bw horizon:
Value—3 to 5
Chroma—2 to 4
Texture—fine sandy loam, very fine sandy loam, or sandy loam

C horizon:
Value—4 to 6
Chroma—3 or 4
Texture—sand, fine sand, very fine sand, loamy sand, loamy fine sand, or loamy very fine sand

Lawler Series

Depth class: Deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and very rapid in the lower part
Landscape: Terraces
Position on the landform: Stream terraces
Parent material: Alluvium and the underlying coarse textured sediments overlying limestone bedrock
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Hapludolls

Typical Pedon

Lawler clay loam, bedrock substratum, 0 to 2 percent slopes, 2,400 feet west and 2,540 feet south of the northeast corner of sec. 2, T. 6 N., R. 9 W.

Ap—0 to 4 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A—4 to 13 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

BA—13 to 17 inches; grayish brown (10YR 5/2) clay loam; few fine distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; many distinct black (10YR 2/1) organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly alkaline; gradual smooth boundary.

Bg—17 to 27 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) and common fine distinct olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings and few distinct dark gray (10YR 4/1) coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); about 3 percent gravel; slightly alkaline; gradual smooth boundary.

BCg—27 to 33 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common distinct dark gray (10YR 4/1) coatings and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); about 5 percent gravel; black (10YR 2/1) krotovina; strongly effervescent; moderately alkaline; clear wavy boundary.

2C—33 to 45 inches; yellowish brown (10YR 5/4) very gravelly loamy sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose; about 45 percent, by volume, gravel, channers, and flagstones; strongly effervescent; moderately alkaline; abrupt wavy boundary.

3R—45 inches; limestone bedrock.

Range in Characteristics

Depth to carbonates: 24 to 40 inches
Depth to bedrock: 40 to 60 inches
Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Value—2 or 3

Bg horizon:
Value—4 or 5
Chroma—2 or 3

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 4

Lawson Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Lawson silt loam, frequently flooded, 840 feet west and 1,600 feet south of the northeast corner of sec. 11, T. 5 N., R. 6 W.

Ap1—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; very friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Ap2—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fine grayish brown (10YR 5/2) lenses; moderate fine subangular blocky structure parting to moderate fine granular; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); neutral; clear smooth boundary.

A1—11 to 20 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; common fine faint brown (10YR 4/3) mottles; moderate fine subangular blocky structure parting to moderate fine granular; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); neutral; clear smooth boundary.

A2—20 to 28 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; common fine faint dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure parting to moderate fine granular; friable; common faint black (N 2/0) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); slightly acid; gradual smooth boundary.

C1—28 to 36 inches; brown (10YR 4/3) silt loam; few fine distinct grayish brown (2.5Y 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); neutral; gradual smooth boundary.

C2—36 to 60 inches; brown (10YR 4/3) silt loam; common fine distinct yellowish brown (10YR 5/6) and many medium distinct grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable; common faint light gray (10YR 6/1) coatings on faces of peds; common fine irregular nodules (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap or A horizon:
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam or silty clay loam

C horizon:
- Hue—10YR or 2.5Y
- Value—3 to 5
- Chroma—1 to 3
- Texture—silt loam or silty clay loam with strata of clay loam, loam, or sandy loam below a depth of 40 inches

Medway Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Medway loam, occasionally flooded, 2,200 feet west and 1,640 south of the northeast corner of sec. 31, T. 3 N., R. 9 W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; neutral; gradual smooth boundary.

A—5 to 15 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bw1—15 to 20 inches; brown (10YR 4/3) loam; few fine prominent strong brown (7.5YR 4/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bw2—20 to 30 inches; dark grayish brown (10YR 4/2) loam; common fine prominent strong brown (7.5YR 4/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bw3—30 to 44 inches; dark grayish brown (10YR 4/2) loam; common fine prominent strong brown (7.5YR 4/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

BC—44 to 53 inches; stratified brown (7.5YR 5/4) loam and grayish brown (10YR 5/2) sandy loam; few fine prominent grayish brown (2.5Y 5/2) and many fine and medium distinct strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; friable; few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

C—53 to 60 inches; stratified strong brown (7.5YR 4/6) loam and grayish brown (10YR 5/2) sandy loam; common fine prominent dark grayish brown (10YR 4/2) and few fine prominent grayish brown (2.5Y 5/2) mottles; massive; friable; few fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
- Value—2 or 3
- Chroma—1 to 3
- Texture—loam

Bw horizon:
- Hue—7.5YR, 10YR, or 2.5Y
- Value—3 to 5
- Chroma—2 to 4
- Texture—loam, silt loam, clay loam, sandy loam, fine sandy loam, or sandy clay loam

C horizon:
- Hue—7.5YR, 10YR, or 2.5Y
- Value—4 or 5
- Chroma—1 to 6
- Texture—stratified loam, silt loam, sandy loam, silty clay loam, clay loam, or the gravelly analogs of these textures
- Content of rock fragments—15 to 35 percent

Mt. Carroll Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Summits and side slopes of loess-covered till plains
Parent material: Loess
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Mollic Hapludalfs

Typical Pedon

Mt. Carroll silt loam, 2 to 5 percent slopes, 2,200 feet north and 100 feet west of the southeast corner of sec. 23, T. 3 N., R. 9 W.

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

E—8 to 12 inches; brown (10YR 5/3) silt loam; moderate thin platy structure; friable; few faint dark brown (10YR 3/3) organic coatings lining pores; slightly acid; clear smooth boundary.

Bt1—12 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine subangular blocky structure; friable; many faint brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Bt2—24 to 32 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many faint brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bt3—32 to 42 inches; dark yellowish brown (10YR 4/4) silt loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; diffuse smooth boundary.

BC—42 to 51 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; diffuse smooth boundary.

C—51 to 70 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; common fine rounded concretions (iron and manganese oxides); slightly acid.

Range in Characteristics

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

E horizon:
Value—4 to 6
Chroma—2 to 4

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 5

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 8

Muscatine Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Uplands
Landscape position: Slight rises on uplands
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Hapludolls
Taxadjunct features: The Muscatine soils in this survey area have an argillic horizon, which is not definitive for the series. These soils are classified as fine-silty, mixed, mesic Aquic Argiudolls. Also, Muscatine silt loam, 2 to 5 percent slopes, eroded, does not have a mollic epipedon. This soil is classified as fine-silty, mixed, mesic Udollic Ochraqualfs.

Typical Pedon

Muscatine silt loam, 0 to 2 percent slopes, 205 feet north and 1,900 feet west of the southeast corner of sec. 28, T. 7 N., R. 5 W.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and very fine granular structure; friable; neutral; abrupt smooth boundary.

A1—8 to 13 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

A2—13 to 19 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine subangular blocky structure parting to moderate fine granular; friable; slightly acid; gradual smooth boundary.

Btg1—19 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct grayish brown (2.5Y 5/2) and common fine prominent light olive brown (2.5Y 5/4) mottles; moderate fine and medium subangular blocky structure; friable; many distinct very dark gray (10YR 3/1) organic coatings lining pores and on faces of peds; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine accumulations (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg2—25 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct very dark grayish brown (2.5Y 3/2) organic coatings lining pores; common fine concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Btg3—32 to 39 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common distinct dark gray (10YR 4/1) organic coatings lining pores; common fine and medium concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

BCg—39 to 47 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) and common fine distinct light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Cg—47 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; common distinct dark grayish brown (2.5Y 4/2) clay films along vertical cleavage planes; common fine concretions (iron and manganese oxides); slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 19 inches

A or Ap horizon:
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt or Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silty clay loam

Cg horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—2 to 4
Texture—silt loam or silty clay loam

Orion Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains and alluvial fans
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents

Typical Pedon

Orion silt loam, occasionally flooded, 1,640 feet east and 1,140 feet south of the northwest corner of sec. 15, T. 3 N., R. 9 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.
C—8 to 29 inches; stratified dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), and brown (10YR 5/3) silt loam; massive; common fine prominent strong brown (7.5YR 5/6) mottles; friable; common fine irregular accumulations (iron and manganese oxides); neutral; clear smooth boundary.
Ab1—29 to 36 inches; very dark gray (10YR 3/1) silt loam; weak very fine subangular blocky structure; friable; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); neutral; clear smooth boundary.
Ab2—36 to 51 inches; black (10YR 2/1) silt loam; moderate fine subangular blocky structure; friable; few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.
Ab3—51 to 60 inches; very dark gray (10YR 3/1) silt loam; common fine faint dark gray (10YR 4/1) mottles; moderate medium subangular blocky structure; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Ap or A horizon:
Value—4 or 5
Chroma—1 or 2

C horizon:
Hue—10YR or 2.5YR
Value—4 or 5
Chroma—2 or 3

Ab horizon:
Value—2 or 3
Chroma—1 or 2

Raddle Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Flood plains
Landscape position: Low terraces and natural levees of flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludolls

Typical Pedon

Raddle silt loam, rarely flooded, 540 feet west and 2,640 feet north of the southeast corner of sec. 5, T. 7 N., R. 7 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.
A—10 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure; friable; neutral; gradual smooth boundary.
BA—18 to 26 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw1—26 to 36 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few prominent black (N 2/0) organic coatings lining pores; moderately acid; diffuse smooth boundary.

Bw2—36 to 49 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) organic coatings on faces of peds; few prominent black (N 2/0) organic coatings lining pores; few fine rounded concretions (iron and manganese oxides); moderately acid; diffuse smooth boundary.

BC—49 to 65 inches; brown (7.5YR 4/4) silt loam; weak coarse subangular blocky structure; friable; common distinct reddish brown (5YR 4/3) organic coatings on faces of peds; few prominent black (N 2/0) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
- Value—2 or 3
- Chroma—1 to 3

Bw horizon:
- Hue—10YR or 7.5YR
- Value—3 to 6
- Chroma—3 or 4
- Texture—silt loam or loam

BC or C horizon:
- Hue—10YR or 7.5YR
- Value—4 to 6
- Chroma—2 to 4
- Texture—silt loam or loam

Riley Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the solum and rapid in the underlying sediments
Landscape: Flood plains
Position on the landform: Nearly level flood plains along major streams
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Riley silt loam, occasionally flooded, 120 feet east and 820 feet north of the southwest corner of sec. 28, T. 4 N., R. 9 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak very fine granular structure; friable; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; clear smooth boundary.

A—8 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and very fine subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

BA—11 to 15 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bw—15 to 25 inches; dark yellowish brown (10YR 4/4) loam; many fine distinct dark grayish brown (10YR 4/2) and common medium distinct dark brown (7.5YR 3/4) mottles; weak medium subangular blocky structure; friable; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

2C1—25 to 37 inches; dark yellowish brown (10YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; neutral; gradual smooth boundary.

2C2—37 to 60 inches; brown (10YR 5/3) sand; single grain; loose; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches

Ap or A horizon:
- Value—2 or 3
- Chroma—1 to 3
- Texture—silt loam or loam

Bw horizon:
- Value—4 to 6
- Chroma—2 to 4
- Texture—silty clay loam, clay loam, sandy clay loam, loam, or silt loam

2C horizon:
- Value—4 to 7
- Chroma—2 to 4
- Texture—loamy sand or sand; lenses or strata of

silt loam, loam, fine sandy loam, loamy fine sand, or silty clay loam

Ross Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, mesic Cumulic Hapludolls

Typical Pedon

Ross silt loam, frequently flooded, 1,560 feet west and 2,500 feet north of the southeast corner of sec. 32, T. 6 N., R. 8 W.

A1—0 to 18 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; slightly alkaline; gradual smooth boundary.

A2—18 to 27 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; about 3 percent gravel; slightly alkaline; gradual smooth boundary.

Bw1—27 to 32 inches; dark brown (10YR 3/3) loam; weak fine and medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 7 percent gravel; slightly alkaline; gradual smooth boundary.

Bw2—32 to 43 inches; brown (10YR 4/3) gravelly loam; weak medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 20 percent gravel; slightly effervescent; slightly alkaline; gradual smooth boundary.

C1—43 to 52 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam; massive; friable; few distinct very dark gray (10YR 3/1) organic coatings on vertical cleavage planes; about 30 percent gravel; about 10 percent limestone cobbles; slightly effervescent; moderately alkaline; gradual smooth boundary.

C2—52 to 60 inches; stratified brown (10YR 4/3) (60 percent) and dark gray (N 4/0) (40 percent) very gravelly sandy loam; massive; friable; about 30 percent gravel; about 10 percent limestone cobbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to bedrock: Greater than 60 inches
Thickness of the mollic epipedon: 24 to 40 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or loam

Bw horizon:
Value—2 to 5
Chroma—2 or 3

C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—sandy loam, loam, or the gravelly or very gravelly analogs of these textures

Rozetta Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Uplands and terraces
Position on the landform: Summits and side slopes of loess-covered till plains and terrace treads of stream terraces
Parent material: Loess
Slope range: 2 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Rozetta silt loam, 2 to 5 percent slopes, 2,000 feet west and 2,200 feet north of the southeast corner of sec. 11, T. 5 N., R. 6 W.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

E—6 to 12 inches; brown (10YR 4/3) silt loam; weak medium platy structure; friable; krotovina; common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

BE—12 to 15 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable;

common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—15 to 22 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt2—22 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt3—29 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular accumulations (iron and manganese oxides); strongly acid; gradual smooth boundary.

BC—45 to 60 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular accumulations (iron and manganese oxides); strongly acid.

Range in Characteristics

Ap or A horizon:
Value—3 to 5
Chroma—1 to 3
Texture—silt loam or silty clay loam

E horizon:
Value—4 to 6
Chroma—2 or 3

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—3 to 6

C horizon:
Value—4 to 6
Chroma—2 to 6

Sable Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Low-lying areas on loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Haplaquolls

Typical Pedon

Sable silty clay loam, 1,200 feet east and 200 feet north of the southwest corner of sec. 36, T. 7 N., R. 7 W.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine irregular accumulations (iron and manganese oxides); neutral; abrupt smooth boundary.

A1—7 to 12 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

A2—12 to 19 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine irregular accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bg1—19 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine faint grayish brown (2.5Y 5/2) and common fine prominent brownish yellow (10YR 6/8) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct black (N 2/0) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); neutral; gradual smooth boundary.

Bg2—24 to 33 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent brownish yellow (10YR 6/8) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine irregular nodules (iron and manganese oxides); neutral; gradual smooth boundary.

Bg3—33 to 42 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few distinct dark gray (10YR 4/1) organic coatings on faces of peds; common fine rounded nodules (iron and manganese oxides); slightly alkaline; gradual smooth boundary.

BCg—42 to 57 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent brownish yellow (10YR 6/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few distinct dark gray (10YR 4/1) organic coatings on faces of peds; few fine rounded nodules (iron and manganese oxides); slightly alkaline; gradual smooth boundary.

Cg—57 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent brownish yellow (10YR 6/8) mottles; massive; friable; few distinct dark gray (10YR 4/1) organic coatings lining pores; few fine rounded nodules (iron and manganese oxides); slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 12 to 24 inches

Ap or A horizon:
Hue—10YR, 5Y, or neutral
Value—2 or 3
Chroma—0 or 1
Texture—silt loam or silty clay loam

Btg horizon:
Hue—10YR, 2.5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam in the upper part, silty clay loam or silt loam in the lower part

Cg horizon:
Hue—10YR, 2.5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—typically silt loam; silty clay loam in the upper part in some pedons

Sarpy Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landscape: Flood plains
Position on the landform: Natural levees of low flood plains
Parent material: Sandy alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Mixed, mesic Typic Udipsamments

Typical Pedon

Sarpy sand, occasionally flooded, 1,340 feet east and 1,300 feet south of the northwest corner of sec. 8, T. 3 N., R. 9 W.

Ap—0 to 9 inches; brown (10YR 4/3) sand, pale brown (10YR 6/3) dry; single grain; loose; neutral; abrupt smooth boundary.

C1—9 to 55 inches; stratified brown (10YR 4/3) and pale brown (10YR 6/3) sand; single grain; loose; neutral; gradual wavy boundary.

C2—55 to 60 inches; stratified yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) sand; single grain; loose; neutral.

Range in Characteristics

Ap or A horizon:
Value—3 to 5
Chroma—1 to 3
Texture—sand, loamy sand, loamy fine sand, fine sand, or fine sandy loam

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—loamy fine sand, loamy sand, fine sand, or sand

Sawmill Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Cumulic Haplaquolls

Typical Pedon

Sawmill silty clay loam, frequently flooded, 20 feet east and 2,100 feet north of the southwest corner of sec. 12, T. 5 N., R. 6 W.

Ap1—0 to 3 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine irregular accumulations (iron and manganese oxides); compaction planes; neutral; abrupt smooth boundary.

Ap2—3 to 8 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few distinct black (N 2/0) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides); compaction planes; neutral; abrupt smooth boundary.

A1—8 to 17 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; few fine distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; common distinct black (N 2/0) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides) and few fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

A2—17 to 22 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few distinct black (N 2/0) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); few fine rounded concretions (iron and manganese oxides); about 2 percent gravel; neutral; gradual smooth boundary.

Bg1—22 to 28 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; common fine distinct grayish brown (2.5Y 5/2) and few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few distinct dark gray (10YR 4/1) pressure faces; few distinct light gray (10YR 7/2 dry) silt coatings and few distinct black (N 2/0) organic coatings on faces of peds; common fine irregular accumulations (iron and manganese oxides); few fine rounded concretions (iron and manganese oxides); about 2 percent gravel; neutral; gradual smooth boundary.

Bg2—28 to 35 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct grayish brown (2.5Y 5/2), few fine distinct dark yellowish brown (10YR 3/4), and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct dark gray (10YR 4/1) pressure faces; few distinct light gray (10YR 7/2 dry) silt coatings and few distinct black (N 2/0) organic coatings on faces of peds; common fine rounded nodules (iron and manganese oxides); few fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bg3—35 to 49 inches; dark gray (10YR 4/1) silty clay loam; common fine prominent strong brown (7.5YR 4/6) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few distinct gray (10YR 5/1) pressure faces; few distinct black (N 2/0) organic coatings on faces of peds; common fine rounded nodules (iron and manganese oxides); slightly acid; gradual smooth boundary.

BCg—49 to 60 inches; gray (10YR 5/1) silty clay loam; common fine prominent strong brown (7.5YR 4/6) and common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few distinct light gray (10YR 6/1) pressure faces; few distinct black (N 2/0) organic coatings on faces of peds; common fine rounded nodules (iron and manganese oxides); slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap or A horizon:
Hue—10YR, 2.5YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—silt loam, silty clay loam, or silty clay

Bg or Btg horizon:
Hue—10YR, 2.5YR, or neutral
Value—3 to 6
Chroma—0 to 2
Texture—silt loam, silty clay loam, or silty clay

Cg horizon:
Hue—10YR, 2.5Y, or neutral
Value—3 to 5
Chroma—0 to 2
Texture—silty clay loam or silt loam

Seaton Series

Depth class: Very deep
Drainage class: Well drained and moderately well drained
Permeability: Moderate
Landscape: Uplands

Position on the landform: Summits, side slopes, backslopes, and shoulders of loess-covered till plains
Parent material: Loess
Slope range: 0 to 60 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Seaton silt, 2 to 5 percent slopes, 1,040 feet west and 2,400 feet north of the southeast corner of sec. 23, T. 3 N., R. 9 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt, light brownish gray (10YR 6/2) dry; mixed with dark yellowish brown (10YR 4/4) fragments of subsoil material; moderate fine granular structure; friable; strongly acid; abrupt smooth boundary.
BE—8 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.
Bt1—13 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt2—23 to 35 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.
BC—35 to 52 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) coatings on faces of peds; moderately acid; diffuse smooth boundary.
C—52 to 73 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; massive; friable; few distinct brown (10YR 4/3) coatings along vertical cleavage planes; moderately acid.

Range in Characteristics

Thickness of the loess: 42 to 60 inches

Ap or A horizon:
Value—2 to 4
Chroma—2 to 4
Texture—silt loam or silt

E horizon:
Value—4 to 6
Chroma—2 to 4
Texture—silt loam or silt

Bt horizon:
Value—4 or 5
Chroma—3 to 6

C horizon:
Value—4 to 6
Chroma—2 to 6
Texture—silt loam or silt

Shiloh Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Landscape: Uplands
Position on the landform: Shallow closed depressions on loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Cumulic Haplaquolls

Typical Pedon

Shiloh silty clay, 2,100 feet east and 860 feet south of the northwest corner of sec. 16, T. 5 N., R. 7 W.

Ap—0 to 6 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; moderate very fine granular structure; friable; neutral; abrupt smooth boundary.
A1—6 to 11 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; moderate fine angular blocky structure (compacted layer); firm; neutral; clear smooth boundary.
A2—11 to 22 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; few fine prominent grayish brown (2.5Y 5/2) mottles; weak very fine subangular blocky structure; firm; neutral; gradual smooth boundary.
Bg1—22 to 30 inches; black (10YR 2/1) silty clay loam; many fine prominent grayish brown (2.5Y 5/2) and few fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; neutral; gradual smooth boundary.
Bg2—30 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; many prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few

prominent black (10YR 2/1) organic coatings lining pores; firm; neutral; diffuse smooth boundary.

BCg—38 to 48 inches; light olive gray (5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; common prominent black (10YR 2/1) organic coatings lining pores; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; diffuse smooth boundary.

Cg—48 to 64 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common prominent black (10YR 2/1) organic coatings lining pores; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap or A horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—2 or 3
Chroma—0 to 2

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 to 6
Chroma—1 or 2
Texture—silty clay or silty clay loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 to 6
Chroma—1 or 2
Texture—silty clay or silty clay loam

Stronghurst Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Summits of loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aeric Ochraqualfs

Typical Pedon

Stronghurst silt loam, 0 to 2 percent slopes, 1,740 feet west and 880 feet south of the northeast corner of sec. 29, T. 7 N., R. 8 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/1) dry; weak fine granular structure; friable; few fine rounded nodules (iron and manganese oxides) and few fine irregular accumulations (iron and manganese oxides); neutral; abrupt smooth boundary.

E—6 to 10 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure parting to weak medium granular; friable; few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine irregular accumulations (iron and manganese oxides) and few fine rounded nodules (iron and manganese oxides); neutral; clear smooth boundary.

BE—10 to 14 inches; brown (10YR 5/3) silt loam; common fine faint grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; many prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; common distinct dark grayish brown (10YR 4/2) and common faint yellowish brown (10YR 5/4) clay films on faces of peds; few fine irregular accumulations (iron and manganese oxides) and few fine rounded nodules (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt—14 to 18 inches; brown (10YR 5/3) silty clay loam; few fine faint light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to moderate very fine and fine subangular blocky; friable; many faint grayish brown (10YR 5/2) clay films and common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine and medium rounded nodules (iron and manganese oxides) and few fine irregular accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

Btg1—18 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common faint grayish brown (10YR 5/2) and common prominent light brownish gray (2.5Y 6/2) clay films on faces of peds; few fine rounded nodules (iron and manganese oxides) and few fine irregular accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

Btg2—27 to 35 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine and medium prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct dark grayish brown (10YR 4/2) and few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine and medium rounded nodules (iron and manganese oxides); few fine irregular accumulations (iron and manganese oxides); moderately acid; clear smooth boundary.

Btg3—35 to 43 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium and coarse prominent strong brown (7.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate coarse subangular blocky; firm; common distinct dark grayish brown (10YR 4/2) and few distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium irregular accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

BCg—43 to 54 inches; light brownish gray (2.5Y 6/2) silt loam; common medium and coarse prominent strong brown (7.5YR 4/6) mottles; moderate coarse prismatic structure; firm; few distinct dark grayish brown (2.5Y 4/2) and few prominent dark yellowish brown (10YR 4/6) clay films on faces of peds; common prominent very dark gray (10YR 3/1) organic coatings lining pores; few fine and medium irregular nodules (iron and manganese oxides); neutral; clear smooth boundary.

Cg—54 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent strong brown (7.5YR 4/6) mottles; massive; firm; few faint grayish brown (2.5Y 5/2) clay films along vertical cleavage planes; few fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Ap horizon:
Value—4 to 6
Chroma—1 or 2

E horizon:
Value—4 to 6
Chroma—2 or 3

Bt or Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4

Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4

Tama Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Uplands and terraces
Position on the landform: Summits and side slopes of loess-covered till plains and terrace treads of stream terraces
Parent material: Loess
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls
Taxadjunct features: Tama silt loam, 2 to 5 percent slopes, eroded, does not have a mollic epipedon, which is definitive for the series. This soil is classified as fine-silty, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Tama silt loam, 2 to 5 percent slopes, 400 feet south and 50 feet west of the northeast corner of sec. 33, T. 6 N., R. 5 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; very friable; moderately acid; abrupt smooth boundary.

A—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; moderately acid; clear smooth boundary.

AB—11 to 15 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt1—15 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings and brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—26 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings and common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—31 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky;

friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

BC—38 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; massive; firm; few distinct dark grayish brown (10YR 5/2) coatings lining pores; few fine rounded concretions (iron and manganese oxides); slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Bt horizon:
Value—4 or 5
Chroma—3 or 4

C horizon:
Value—5 or 6
Chroma—2 or 3

Tice Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Tice silt loam, occasionally flooded, 2,040 feet west and 1,100 feet north of the southeast corner of sec. 4, T. 7 N., R. 7 W.

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; slightly acid; abrupt smooth boundary.

A1—8 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak thin platy structure parting to moderate fine granular; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—14 to 22 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak thin platy structure parting to moderate fine granular; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—22 to 33 inches; brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bw2—33 to 45 inches; brown (10YR 4/3) silt loam; common fine faint grayish brown (10YR 5/2) mottles; moderate medium angular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bw3—45 to 53 inches; brown (10YR 4/3) silt loam; common fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

BC—53 to 65 inches; brown (10YR 5/3), stratified silt loam and loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; common fine rounded concretions (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

A horizon:
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bw horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam; commonly contains strata of silt loam, loam, clay loam, or sandy loam below a depth of 30 inches

BC horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 to 3
Texture—stratified silty clay loam, clay loam, loam, sandy loam, or silt loam

Titus Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landscape: Flood plain
Position on the landform: Meanderbelts of low flood plains and backswamps of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls

Typical Pedon

Titus silty clay loam, occasionally flooded, 1,650 feet east and 960 feet south of the northwest corner of sec. 16, T. 3 N., R. 9 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine granular structure; firm; few fine rounded accumulations (iron and manganese oxides); neutral; abrupt smooth boundary.

A—8 to 15 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; firm; few fine rounded accumulations and concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg1—15 to 23 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded accumulations and few fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Bg2—23 to 36 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) and few fine distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to weak medium angular blocky; firm; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Bg3—36 to 57 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) and many fine faint gray (10YR 5/1) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine and medium rounded accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Cg—57 to 60 inches; dark gray (10YR 4/1) silty clay loam; common fine faint gray (10YR 5/1) mottles; massive; firm; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5

Ursa Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Parent material: Glacial till that has a strongly developed paleosol
Slope range: 10 to 20 percent
Taxonomic classification: Fine, montmorillonitic, mesic Typic Hapludalfs

Typical Pedon

Ursa clay loam, 15 to 20 percent slopes, severely eroded, 2,260 feet south and 600 feet west of the northeast corner of sec. 27, T. 3 N., R. 8 W.

Ap—0 to 2 inches; mixed dark yellowish brown (10YR

4/4) and very dark grayish brown (10YR 3/2) clay loam, pale brown (10YR 6/3) and grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; about 5 percent gravel; strongly acid; abrupt smooth boundary.

Bt1—2 to 12 inches; dark yellowish brown (10YR 4/4) clay; few fine distinct grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; about 5 percent gravel; few fine irregular accumulations (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt2—12 to 23 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; about 5 percent gravel; few fine irregular accumulations (iron and manganese oxides); strongly acid; diffuse smooth boundary.

Bt3—23 to 39 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; common distinct brown (10YR 4/3) clay films on vertical faces of peds; about 5 percent gravel; many medium irregular accumulations (iron and manganese oxides); slightly acid; diffuse smooth boundary.

BC—39 to 56 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; moderate coarse angular blocky structure; very firm; common distinct light olive brown (2.5Y 5/4) faces of cleavage planes and common prominent light olive gray (5Y 6/2) faces of vertical cleavage planes; few distinct brown (10YR 5/3) clay films lining pores; about 5 percent gravel; common medium irregular accumulations (iron and manganese oxides); common fine irregular concretions (iron and manganese oxides); slightly alkaline; diffuse smooth boundary.

C—56 to 75 inches; yellowish brown (10YR 5/6) clay loam; few fine prominent light brownish gray (2.5Y 6/2) mottles; moderate coarse angular blocky structure; very firm; many prominent light olive gray (5Y 6/2) faces of vertical cleavage planes and common distinct light olive brown (2.5Y 5/4) faces of cleavage planes; about 5 percent gravel; few medium irregular accumulations (iron and manganese oxides); slightly alkaline.

Range in Characteristics

Ap or A horizon:
Value—3 to 5
Chroma—2 to 4

Bt horizon:
Hue—10YR or 2.5YR
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam, clay loam, or clay

C horizon:
Hue—10YR, 7.5YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6

Velma Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands
Position on the landform: Side slopes, backslopes, and shoulders of loess-covered till plains
Parent material: Loess and the underlying glacial till, which has a well developed paleosol
Slope range: 10 to 15 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct features: The Velma soils in this survey area do not have a mollic epipedon, which is definitive for the series. These soils are classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Velma loam, 10 to 15 percent slopes, eroded, 1,200 feet east and 1,580 feet south of the northwest corner of sec. 11, T. 4 N., R. 5 W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; mixed with brown (10YR 4/3) subsoil material; moderate fine and very fine granular structure; friable; slightly acid; clear smooth boundary.

Bt1—8 to 15 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and very fine subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; common distinct very dark brown (10YR 2/2) organic coatings lining pores; about 3 percent gravel; slightly acid; gradual smooth boundary.

Bt2—15 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable; common distinct brown

(10YR 4/3) clay films on faces of peds; few distinct very dark brown (10YR 2/2) organic coatings lining pores; about 4 percent gravel; moderately acid; gradual smooth boundary.

Bt3—23 to 32 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; about 7 percent gravel; few fine concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt4—32 to 41 inches; yellowish brown (10YR 5/4) clay loam; common medium prominent strong brown (7.5YR 4/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common distinct brown (10YR 4/3) clay films on faces of peds; about 4 percent gravel; common fine concretions (iron and manganese oxides); moderately acid; gradual smooth boundary.

Bt5—41 to 51 inches; yellowish brown (10YR 5/4) clay loam; common medium prominent strong brown (7.5YR 4/6) and common fine faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay films on faces of peds; about 5 percent gravel; many fine and medium concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

BC—51 to 60 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) and brown (10YR 5/3) mottles; weak medium and coarse subangular blocky structure; friable; few fine faint pale brown (10YR 6/3) clay films on faces of peds; about 6 percent gravel; common fine concretions (iron and manganese oxides); slight effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 0 to 20 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

Bt horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 or 5
Chroma—3 to 8
Texture—clay loam or loam

C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—5 or 6
Chroma—3 to 8
Texture—clay loam, loam, or sandy loam

Virden Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Uplands
Position on the landform: Low-lying areas on loess-covered till plains
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Typic Argiaquolls

Typical Pedon

Virden silty clay loam, 320 feet south and 60 feet west of the northeast corner of sec. 2, T. 5 N., R. 7 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; compacted layer from a depth of 3 inches to a depth of 8 inches; friable; slightly acid; abrupt smooth boundary.

Bt—8 to 17 inches; black (N 2/0) silty clay loam; moderate very fine subangular blocky structure; firm; common faint very dark gray (N 3/0) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg1—17 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common distinct very dark gray (5Y 3/1) clay films on faces of peds; common fine rounded concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg2—24 to 33 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; common distinct very dark gray (5Y 3/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Btg3—33 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct dark gray (5Y 4/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

BCg—42 to 56 inches; light gray (5Y 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; few distinct dark gray (5Y 4/1) clay films on vertical faces of peds; common prominent very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Cg—56 to 64 inches; light gray (5Y 6/1) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common prominent very dark gray (10YR 3/1) organic coatings lining pores; common fine rounded concretions (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 12 to 24 inches

Ap or A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2

Bt and Btg horizons:
Hue—10YR, 2.5Y, or neutral
Value—3 to 6
Chroma—0 to 2
Texture—silty clay loam or silty clay

BCg or Cg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silt loam

Volney Series

Depth class: Deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid in the solum and very rapid in the substratum
Landscape: Flood plains
Position on the landform: Meanderbelts of high flood plains
Parent material: Alluvium over limestone bedrock
Slope range: 0 to 2 percent
Taxonomic classification: Loamy-skeletal, mixed, mesic Cumulic Hapludolls

Typical Pedon

Volney silt loam, bedrock substratum, frequently flooded, overwash, 1,200 feet west and 380 feet north of the southeast corner of sec. 1, T. 4 N., R. 9 W.

A1—0 to 7 inches; stratified brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; about 4 percent gravel; slightly acid; clear wavy boundary.

A2—7 to 20 inches; very dark gray (10YR 3/1) very channery loam, gray (10YR 5/1) dry; weak fine granular structure; friable; about 48 percent channers, cobbles, and gravel; slight effervescence; moderately alkaline; gradual wavy boundary.

A3—20 to 36 inches; very dark gray (10YR 3/1) very channery loam, gray (10YR 5/1) dry; weak fine granular structure; friable; about 37 percent channers, cobbles, and gravel; slight effervescence; moderately alkaline; gradual wavy boundary.

C—36 to 46 inches; very dark grayish brown (10YR 3/2) very channery loam; massive; friable; about 42 percent channers, cobbles, and gravel; strong effervescence; moderately alkaline; abrupt wavy boundary.

2R—46 inches; limestone bedrock.

Range in Characteristics

Depth to carbonates: 0 to 8 inches
Depth to bedrock: 40 to 60 inches
Thickness of the mollic epipedon: 24 to 36 inches

A or Ap horizon:
Value—dominantly 2 or 3; strata of recent overwash may have higher value
Chroma—1 or 2
Texture—silt loam or loam or the channery analogs of these textures

C horizon:
Value—2 to 4
Chroma—2 or 3
Texture—the very channery or extremely channery analogs of silt loam or loam

Wakeland Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate

Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Wakeland silt loam, frequently flooded, 1,380 feet west and 2,400 feet north of the southeast corner of sec. 27, T. 3 N., R. 8 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine faint brown (10YR 4/3) mottles; weak fine and medium granular structure; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine rounded accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Cg1—7 to 13 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint brown (10YR 4/3), common fine prominent brown (7.5YR 4/4), and few fine faint grayish brown (10YR 5/2) mottles; weak medium granular structure; friable; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine rounded accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Cg2—13 to 31 inches; dark grayish brown (10YR 4/2) silt loam with strata of fine sandy loam; common fine faint dark gray (10YR 4/1), many fine faint brown (10YR 4/3), and common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium granular structure; friable; few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; common fine rounded accumulations (iron and manganese oxides); neutral; gradual smooth boundary.

Cg3—31 to 60 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark gray (10YR 4/1), common fine and medium distinct yellowish brown (10YR 5/4), and common fine faint light brownish gray (10YR 6/2) mottles; massive; friable; common fine rounded accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Ap or A horizon:
Value—4 or 5
Chroma—2 or 3

Cg horizon:
Chroma—2 to 4
Texture—silt loam; thin layers ranging from loam to fine sand below a depth of 40 inches in some pedons

Worthen Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands and terraces
Position: Summits of fan terraces, footslopes of loess-covered till plains, and terrace treads of stream terraces
Parent material: Local alluvium
Slope range: 0 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Cumulic Hapludolls

Typical Pedon

Worthen silt loam, 0 to 2 percent slopes, 1,300 feet west and 1,000 feet north of the southeast corner of sec. 15, T. 3 N., R. 9 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; neutral; clear smooth boundary.

A—8 to 16 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; neutral; clear smooth boundary.

AB—16 to 30 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bw1—30 to 42 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; diffuse smooth boundary.

Bw2—42 to 62 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 to 3

Bw horizon:
Value—3 or 4
Chroma—2 to 4

Zook Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landscape: Flood plains
Position on the landform: Meanderbelts of low flood plains, backswamps of high flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine, montmorillonitic, mesic Cumulic Haplaquolls

Typical Pedon

Zook silty clay loam, occasionally flooded, 1,640 feet west and 2,480 feet north of the southeast corner of sec. 21, T. 3 N., R. 9 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

A—9 to 22 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine angular blocky compacted layer from a depth of 9 inches to a depth of 12 inches; moderate very fine subangular blocky structure from a depth of 12 inches to a depth of 22 inches; firm; common fine irregular concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Bg—22 to 49 inches; very dark gray (5Y 3/1) silty clay loam; few fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate fine and medium subangular blocky structure; firm; many fine irregular accumulations (iron and manganese oxides); neutral; diffuse smooth boundary.

BCg—49 to 58 inches; dark gray (5Y 4/1) silty clay loam; few fine faint gray (5Y 5/1) mottles; weak coarse subangular blocky structure; firm; many fine irregular accumulations (iron and manganese oxides); neutral; diffuse smooth boundary.

Cg—58 to 68 inches; dark gray (5Y 4/1) silty clay loam; common fine faint gray (5Y 5/1) mottles; massive; firm; common fine irregular accumulations (iron and manganese oxides); neutral.

Range in Characteristics

Thickness of the mollic epipedon: 36 to 50 inches

Ap or A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2

Bg horizon:
Hue—10YR, 2.5YR, or 5Y
Value—2 or 3
Chroma—1 or 2

Cg horizon:
Hue—10YR, 2.5YR, 5Y, or neutral
Value—2 to 5
Chroma—0 or 1

Zumbro Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Rapid
Landscape: Terraces
Position on the landform: Terrace treads and risers
Parent material: Sandy alluvium
Slope range: 1 to 5 percent
Taxonomic classification: Sandy, mixed, mesic Entic Hapludolls

Typical Pedon

Zumbro loamy fine sand, 1 to 5 percent slopes, rarely flooded, 1,940 feet east and 1,640 feet south of the northwest corner of sec. 28, T. 4 N., R. 9 W.

Ap—0 to 11 inches; black (10YR 2/1) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak very fine granular; friable; moderately acid; gradual smooth boundary.

A—11 to 19 inches; very dark brown (10YR 2/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; moderately acid; gradual smooth boundary.

Bw1—19 to 23 inches; dark brown (10YR 3/3) loamy fine sand; weak fine subangular blocky structure; friable; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw2—23 to 31 inches; brown (10YR 4/3) loamy fine sand; weak medium subangular blocky structure; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

C—31 to 60 inches; brown (10YR 4/3) fine sand; single grain; loose; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Bw horizon:
Value—3 to 6
Chroma—3 to 6
Texture—loamy fine sand, loamy sand, fine sand, or sand

C horizon:
Value—4 to 6
Chroma—3 to 6
Texture—sand or fine sand

Formation of the Soils

Soil forms as the result of soil-forming factors acting on material deposited or otherwise exposed during geological events (Jenny, 1941). The factors of soil formation are the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the relief, commonly referred to as the lay of the land; the kind of vegetation and animal life on or in the soil; and the length of time the soil-forming factors have acted upon the soil.

The effects of any single factor are generally conditioned by the other factors. The factors of soil formation are so closely interrelated that few generalizations can be made regarding the effect of one factor unless conditions are specified for the others.

Parent Material

Prepared by Jeffrey Crockett, geologist/cartographic aid.

The unconsolidated organic and mineral material in which soil forms is called parent material. The mineralogical composition and texture of the soil are largely dependent on the type of parent material. The soils in Hancock County formed in four main types of parent material—loess, till, alluvium, and residuum. Each different type of parent material is related to different associations of soils.

The most common parent material in Hancock County is loess. Loess is massively bedded, well sorted, silt-sized material that has been deposited by wind. The source areas for the loess are believed to be the river flood plains. As glaciers receded from the area, a large amount of outwash was carried down onto the river flood plains and deposited. Eolian processes separated silt-sized particles from the smaller and more cohesive clay-sized particles and from the larger and heavier sand-sized particles. The silt-sized material was deposited on the till-covered upland plains. The loess in Hancock County has been divided into two separate stratigraphic units. These are the Roxana silt and the Peoria loess.

The Roxana silt is the oldest of the two soil-forming loess formations. It varies in thickness from more than 150 inches on the bluffs of the Illinois and Mississippi Rivers to less than 15 inches in the center of the upland plains (Fehrenbacher and others, 1986). In Hancock County the Roxana silt ranges in thickness from more than 50 inches on the bluff east of Dallas City to less than 15 inches in the southwest corner of the county (Fehrenbacher and others, 1986). The Roxana silt can be distinguished from the basal Peoria loess by a change in mineralogy. The Roxana silt has little or no calcite, except for outcrops along the Mississippi River south of Alton (Frye and others, 1962). Montmorillonite is the dominant clay, and quartz is the dominant very fine sand/silt constituent in the Roxana silt (Frye and others, 1962).

The Roxana silt is the parent material of some of the soils in the western part of the county. In most of the county, however, the Roxana silt is covered by the Peoria loess.

The Peoria loess is probably the most common parent material in Hancock County. It ranges in thickness from more than 300 inches on the bluff in the northern part of the county to less than 40 inches in the southeast corner (Fehrenbacher and others, 1986). The Peoria loess is much more illitic than the Roxana silt, and the very fine sand/silt constituent is predominantly feldspars and heavy minerals (Frye and others, 1962).

In Hancock County, loess is the parent material for all of the upland prairie soils and some of the transitional soils. An example of an association of soils that has formed in loess is the Ipava-Virden-Herrick association.

In areas where loess has been removed by erosion, the soils have been forming in glacial till and associated paleosols. In Hancock County, till is a common parent material. Till is unstratified, poorly sorted sediment that has been left behind by receding glaciers. Nearly all of the soil-forming till in Hancock County is Illinoian, except in some locations where Kansan till has been exposed by erosion from fluvial processes.

Till is very poorly sorted sediment with a high clay content. The clay in the till is responsible for the virtual lack of interparticular porosity. Soils that form in till tend to have a high clay content. The till is topped by paleosols that formed prior to the deposition of additional material. The Sangamon soil and the Yarmouthian soil are two paleosols in Hancock County. The Yarmouthian soil is in the top of the Kansan till and is an interglacial paleosol. The Sangamon soil is in the top of the Illinoian till and is a postglacial paleosol. These paleosols are recognized as stratigraphic units in Hancock County.

The till and associated paleosols in Hancock County are below the loess, so they are only exposed where fluvial processes have removed the overlying loess. Soils that formed in till are on slopes along rivers and streams. Hickory soils are examples. Atlas soils formed in till with a strongly developed paleosol.

Alluvium is the dominant parent material on flood plains along rivers and on bottom land along streams. Alluvium is any material that has been transported and deposited by fluvial systems, such as rivers and streams. Alluvial sediments can vary from clay-sized sediments to cobble- and boulder-sized sediments, depending on the speed of the river or stream. In Hancock County, most of the alluvium is silt- and sand-sized material. Clay-sized material can be deposited on flood plains where ponding has occurred after a flood. In Hancock County, Beaucoup soils are examples of soils that formed in alluvium on flood plains.

In some areas of Hancock County, no glacial drift or loess was deposited or all of the glacial drift and loess has been eroded away. The soils in these areas formed in residuum. Residuum is material resulting from the chemical and physical weathering of the underlying bedrock. Limestone is the dominant bedrock in Hancock County.

Climate

Hancock County has a temperate, humid, continental climate. Apart from slight variations related to slope aspect, climatic conditions have not caused any obvious differences among the soils in the county. The influence of climate becomes more obvious, however, when comparisons are made on a broad regional basis.

Climate affects soil formation through its influence on vegetation and animal life and on weathering. Moisture and temperature combine to influence the rate of the physical and chemical processes involved in weathering. In addition, precipitation and the resulting percolation of water through the soil cause movement of the products of weathering. Consequently, soil horizons form and become increasingly distinct with the movement and accumulation of the products of weathering, such as soluble salts and clay. Differences in the rate and effectiveness of these processes contribute to variations among soils.

Relief

Relief involves landscape characteristics, such as gradient, shape, and aspect of slopes. In combination with the other soil-forming factors, relief exerts a strong influence on soil moisture, rate of erosion, and rate of soil formation.

Where the parent material is relatively uniform and is medium textured, differences in natural drainage generally are closely related to slope. Soils that form on the more sloping uplands are generally moderately well drained or well drained. Examples are Tama and Fayette soils. In contrast, somewhat poorly drained and poorly drained soils are more likely to be in gently sloping or level areas. These soils have a seasonal high water table relatively close to the surface. Examples are Keomah and Sable soils.

Relief also influences the intensity of erosion and the degree of soil development. On the steeper slopes, runoff and the attendant soil loss may be significant enough to eliminate the possibility of development of well defined horizons or a deep solum. Hamburg soils are examples of soils that formed in the steeper areas.

Vegetation and Animal Life

Living organisms interact with the other soil-forming factors and strongly influence soil development. The effect of native vegetation is striking. The native vegetation in Hancock County consisted primarily of tall grass prairie and deciduous hardwood trees. Over time, each of these vegetative types exerted a strong influence on soil characteristics.

Because of leaf decomposition, organic matter accumulates primarily on the surface of soils that form under deciduous hardwoods. The dark surface layer is relatively thin. In Hancock County, the soils bordering stream valleys typically formed under hardwood forest. Examples are Fayette and Hickory soils. In comparison, Ipava, Sable, and other soils that formed under prairie vegetation have more organic matter in the surface and subsurface horizons. Downs, Clarksdale, and other soils that formed under mixed prairie and forest vegetation or in forest encroaching on prairie are intermediate in surface soil color and organic matter content. Regardless of plant type, the protection provided by vegetative cover reduces the rate of erosion.

Animals also affect soil formation, although to a more limited extent than plants. Earthworms, insects, and large burrowing animals are active in the decomposition of plant and animal remains and the incorporation of these remains into the soil. Micro-organisms also aid decomposition and help to fix nitrogen in the soil. Human activities, including installing subsurface drains, building levees for flood protection, and surface mining of mineral resources, can also affect soil formation.

Time

Time affects the degree of profile development in a soil. The influence of time, however, can be modified by the influence of relief and of parent material. In any case, the effect of time cannot be measured simply in terms of years.

The effect of relief interacting with time is expressed most clearly in situations of accelerated erosion or deposition. On some of the steeper slopes, the surface soil is eroded so quickly that only a very thin soil forms in spite of exposure to weathering for thousands of years. Some soils on flood plains, such as Birds and Wakeland soils, receive alluvial material during each flood. In terms of soil formation, these soils are much younger than many other soils in the county. Also, they have only weakly expressed horizons.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

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.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

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 or miscellaneous areas 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

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

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.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

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 material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) 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 depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

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.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or 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.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

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. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

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.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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 wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

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.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of 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, such as a fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

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.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

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. 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. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

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. 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.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

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. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil 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, a plowed surface horizon, most of which was originally part of a B horizon.

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 A horizon. The B horizon is in part a layer of transition from the overlying A 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) 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 soil material. 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.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it 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 potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

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.

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

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Krotovinas. Irregular, tubular streaks in a soil horizon that are created when tunnels made by a burrowing animal are filled with material from another horizon.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

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 wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

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.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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. 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).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

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.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

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. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is 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.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

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 movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 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 flooding.

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.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

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:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly 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

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

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 generally is 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.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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. 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.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). 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.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

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.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

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.

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 material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that 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 grain* (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.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 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, considered collectively. 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. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

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). 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.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded 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.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at La Harpe, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	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----	32.3	12.7	22.5	61	-18	1	1.47	0.47	3.29	3	6.5
February---	37.4	17.3	27.4	66	-12	2	1.28	.70	1.80	3	5.6
March------	50.1	28.7	39.4	81	4	33	2.98	1.57	4.22	6	3.8
April------	63.9	40.0	51.9	88	19	148	3.91	2.04	5.56	6	1.1
May--------	74.6	50.2	62.4	91	32	389	3.87	1.98	5.52	7	.0
June-------	83.7	59.3	71.5	97	44	644	4.33	2.29	6.13	6	.0
July-------	87.7	63.2	75.5	101	48	788	4.31	2.00	6.29	6	.0
August-----	85.1	60.5	72.8	99	45	706	3.94	2.33	5.38	6	.0
September--	78.1	53.0	65.5	95	33	468	4.45	1.84	6.66	6	.0
October----	66.7	41.8	54.3	88	22	193	2.98	1.25	4.63	5	.1
November---	51.1	30.7	40.9	76	8	35	2.73	1.08	4.12	5	1.7
December---	36.5	18.3	27.4	65	-12	3	2.21	1.09	3.18	5	5.9
Yearly:											
Average---	62.3	39.7	51.0	---	---	---	---	---	---	---	---
Extreme---	---	---	---	101	-19	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,408	38.47	30.92	45.54	64	24.6

* 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 (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at La Harpe, 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. 14	Apr. 26	May 5
2 years in 10 later than--	Apr. 10	Apr. 21	Apr. 30
5 years in 10 later than--	Apr. 1	Apr. 12	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 21	Oct. 4	Sept. 26
2 years in 10 earlier than--	Oct. 25	Oct. 10	Oct. 1
5 years in 10 earlier than--	Nov. 2	Oct. 21	Oct. 11

Table 3.--Growing Season

(Recorded in the period 1961-90 at La Harpe, 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	195	170	152
8 years in 10	202	177	159
5 years in 10	214	191	172
2 years in 10	226	205	185
1 year in 10	233	212	192

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
6C2	Fishhook silt loam, 5 to 10 percent slopes, eroded	15,780	3.0
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded	3,920	0.8
8D2	Hickory loam, 10 to 18 percent slopes, eroded	5,340	1.0
8F	Hickory loam, 18 to 30 percent slopes	28,710	5.5
8G	Hickory loam, 30 to 60 percent slopes	4,010	0.8
17A	Keomah silt loam, 0 to 2 percent slopes	7,870	1.5
17B	Keomah silt loam, 2 to 5 percent slopes	1,400	0.3
17B2	Keomah silt loam, 2 to 5 percent slopes, eroded	10,050	1.9
36B	Tama silt loam, 2 to 5 percent slopes	3,200	0.6
36B2	Tama silt loam, 2 to 5 percent slopes, eroded	3,690	0.7
37A	Worthen silt loam, 0 to 2 percent slopes	590	0.1
37B	Worthen silt loam, 2 to 5 percent slopes	610	0.1
41A	Muscatine silt loam, 0 to 2 percent slopes	20,140	3.9
41B2	Muscatine silt loam, 2 to 5 percent slopes, eroded	7,520	1.4
43A	Ipava silt loam, 0 to 2 percent slopes	47,130	9.0
43B	Ipava silt loam, 2 to 5 percent slopes	670	0.1
43B2	Ipava silt loam, 2 to 5 percent slopes, eroded	24,380	4.7
46A	Herrick silt loam, 0 to 2 percent slopes	22,800	4.4
50	Virden silty clay loam	38,940	7.5
61A	Atterberry silt loam, 0 to 2 percent slopes	4,290	0.8
61B2	Atterberry silt loam, 2 to 5 percent slopes, eroded	4,730	0.9
68	Sable silty clay loam	10,280	2.0
112	Cowden silt loam	7,830	1.5
119C2	Elco silt loam, 5 to 10 percent slopes, eroded	3,980	0.8
134B	Camden silt loam, 2 to 5 percent slopes	1,310	0.3
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	430	*
138	Shiloh silty clay	1,020	0.2
250D2	Velma loam, 10 to 15 percent slopes, eroded	880	0.2
257A	Clarksdale silt loam, 0 to 2 percent slopes	18,990	3.6
257B	Clarksdale silt loam, 2 to 5 percent slopes	570	0.1
257B2	Clarksdale silt loam, 2 to 5 percent slopes, eroded	22,530	4.3
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	5,110	1.0
268B	Mt. Carroll silt loam, 2 to 5 percent slopes	270	*
274A	Seaton silt loam, 0 to 2 percent slopes	340	*
274B	Seaton silt, 2 to 5 percent slopes	2,980	0.6
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded	2,430	0.5
274D3	Seaton silt loam, 10 to 18 percent slopes, severely eroded	970	0.2
278A	Stronghurst silt loam, 0 to 2 percent slopes	830	0.2
279B	Rozetta silt loam, 2 to 5 percent slopes	28,390	5.4
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	19,820	3.8
280D2	Fayette silt loam, 10 to 18 percent slopes, eroded	2,740	0.5
379B	Dakota loam, 1 to 5 percent slopes	240	*
386B	Downs silt loam, 2 to 5 percent slopes	9,130	1.8
417G	Derinda silt loam, 30 to 60 percent slopes	1,160	0.2
440B	Jasper loam, 1 to 5 percent slopes	470	*
440C2	Jasper fine sandy loam, 5 to 10 percent slopes, eroded	300	*
470C2	Keller silt loam, 5 to 12 percent slopes, eroded	12,990	2.5
516	Faxon silty clay loam	50	*
605E3	Ursa clay loam, 15 to 20 percent slopes, severely eroded	4,160	0.8
647A	Lawler clay loam, bedrock substratum, 0 to 2 percent slopes	250	*
660C3	Coatsburg silty clay loam, 5 to 10 percent slopes, severely eroded	1,710	0.3
785C	Lacrescent silt loam, 5 to 10 percent slopes	140	*
785G	Lacrescent cobbly silt loam, 30 to 60 percent slopes	1,610	0.3
802B	Orthents, loamy, gently sloping	280	*
802F	Orthents, loamy, steep	210	*
864	Pits, quarries	180	*
874F	Dickinson-Hamburg complex, 10 to 60 percent slopes	330	*
915D2	Elco-Ursa complex, 10 to 15 percent slopes, eroded	9,250	1.8
936F	Fayette-Hickory complex, 15 to 30 percent slopes	5,180	1.0
936G	Fayette-Hickory complex, 30 to 60 percent slopes	1,760	0.3
937F	Seaton-Hickory complex, 15 to 30 percent slopes	1,540	0.3
937G	Seaton-Hickory complex, 30 to 60 percent slopes	1,690	0.3

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
971D3	Fishhook-Atlas complex, 10 to 15 percent slopes, severely eroded	11,040	2.1
1070	Beaucoup silty clay loam, undrained	940	0.2
3070	Beaucoup silty clay loam, frequently flooded	1,950	0.4
3073	Ross silt loam, frequently flooded	590	0.1
3107	Sawmill silty clay loam, frequently flooded	3,430	0.7
3284	Tice silty clay loam, frequently flooded	1,390	0.3
3331	Haymond silt loam, frequently flooded	780	0.1
3333	Wakeland silt loam, frequently flooded	4,830	0.9
3334	Birds silt loam, frequently flooded	1,220	0.2
3415	Orion silt loam, frequently flooded	540	0.1
3428	Coffeen silt loam, frequently flooded	9,260	1.8
3451	Lawson silt loam, frequently flooded	10,860	2.1
3452	Riley loam, frequently flooded	830	0.2
3789	Volney silt loam, bedrock substratum, frequently flooded, overwash	770	0.1
7349B	Zumbro loamy fine sand, 1 to 5 percent slopes, rarely flooded	1,150	0.2
7430	Raddle silt loam, rarely flooded	240	*
8070	Beaucoup silty clay loam, occasionally flooded	1,240	0.2
8071	Darwin silty clay, occasionally flooded	180	*
8077	Huntsville silt loam, occasionally flooded	330	*
8092	Sarpy sand, occasionally flooded	490	*
8107	Sawmill silty clay loam, occasionally flooded	1,510	0.3
8162	Gorham silty clay loam, occasionally flooded	1,600	0.3
8284	Tice silt loam, occasionally flooded	2,140	0.4
8304	Landes loam, occasionally flooded	790	0.2
8404	Titus silty clay loam, occasionally flooded	2,400	0.5
8405	Zook silty clay loam, occasionally flooded	2,080	0.4
8415	Orion silt loam, occasionally flooded	1,150	0.2
8451	Lawson silt loam, occasionally flooded	560	0.1
8452	Riley silt loam, occasionally flooded	1,010	0.2
8682	Medway loam, occasionally flooded	2,860	0.5
	Water	12,960	2.5
	Total	521,220	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
17A	Keomah silt loam, 0 to 2 percent slopes (where drained)
17B	Keomah silt loam, 2 to 5 percent slopes
17B2	Keomah silt loam, 2 to 5 percent slopes, eroded
36B	Tama silt loam, 2 to 5 percent slopes
36B2	Tama silt loam, 2 to 5 percent slopes, eroded
37A	Worthen silt loam, 0 to 2 percent slopes
37B	Worthen silt loam, 2 to 5 percent slopes
41A	Muscatine silt loam, 0 to 2 percent slopes
41B2	Muscatine silt loam, 2 to 5 percent slopes, eroded
43A	Ipava silt loam, 0 to 2 percent slopes
43B	Ipava silt loam, 2 to 5 percent slopes
43B2	Ipava silt loam, 2 to 5 percent slopes, eroded
46A	Herrick silt loam, 0 to 2 percent slopes
50	Virden silty clay loam (where drained)
61A	Atterberry silt loam, 0 to 2 percent slopes (where drained)
61B2	Atterberry silt loam, 2 to 5 percent slopes, eroded
68	Sable silty clay loam (where drained)
112	Cowden silt loam (where drained)
134B	Camden silt loam, 2 to 5 percent slopes
138	Shiloh silty clay (where drained)
257A	Clarksdale silt loam, 0 to 2 percent slopes (where drained)
257B	Clarksdale silt loam, 2 to 5 percent slopes
257B2	Clarksdale silt loam, 2 to 5 percent slopes, eroded
268B	Mt. Carroll silt loam, 2 to 5 percent slopes
274A	Seaton silt loam, 0 to 2 percent slopes
274B	Seaton silt, 2 to 5 percent slopes
278A	Stronghurst silt loam, 0 to 2 percent slopes (where drained)
279B	Rozetta silt loam, 2 to 5 percent slopes
379B	Dakota loam, 1 to 5 percent slopes
386B	Downs silt loam, 2 to 5 percent slopes
440B	Jasper loam, 1 to 5 percent slopes
516	Faxon silty clay loam (where drained)
647A	Lawler clay loam, bedrock substratum, 0 to 2 percent slopes
3070	Beaucoup silty clay loam, frequently flooded (where drained and protected from flooding or not frequently flooded during the growing season)
3073	Ross silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3107	Sawmill silty clay loam, frequently flooded (where drained and protected from flooding or not frequently flooded during the growing season)
3284	Tice silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3331	Haymond silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3333	Wakeland silt loam, frequently flooded (where drained and protected from flooding or not frequently flooded during the growing season)
3334	Birds silt loam, frequently flooded (where drained and protected from flooding or not frequently flooded during the growing season)
3415	Orion silt loam, frequently flooded (where 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)
3452	Riley loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3789	Volney silt loam, bedrock substratum, frequently flooded, overwash (where protected from flooding or not frequently flooded during the growing season)
7430	Raddle silt loam, rarely flooded
8070	Beaucoup silty clay loam, occasionally flooded (where drained)

Table 5.--Prime Farmland--Continued

Map symbol	Soil name
8071	Darwin silty clay, occasionally flooded (where drained)
8077	Huntsville silt loam, occasionally flooded
8107	Sawmill silty clay loam, occasionally flooded (where drained)
8162	Gorham silty clay loam, occasionally flooded (where drained)
8284	Tice silt loam, occasionally flooded
8304	Landes loam, occasionally flooded
8404	Titus silty clay loam, occasionally flooded (where drained)
8405	Zook silty clay loam, occasionally flooded (where drained)
8415	Orion silt loam, occasionally flooded (where drained)
8451	Lawson silt loam, occasionally flooded (where drained)
8452	Riley silt loam, occasionally flooded
8682	Medway loam, 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. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
6C2:							
Fishhook	3e	69	20	22	42	2.4	3.9
7C3:							
Atlas	4e	---	---	16	36	2.2	3.6
8D2:							
Hickory	3e	72	23	28	50	2.7	4.5
8F:							
Hickory	6e	---	---	---	---	2.4	4.0
8G:							
Hickory	7e	---	---	---	---	---	---
17A:							
Keomah	2w	129	39	52	72	5.1	8.5
17B:							
Keomah	2e	128	39	51	71	5.0	8.4
17B2:							
Keomah	2e	124	37	50	69	4.9	8.2
36B:							
Tama	2e	153	46	61	88	5.8	9.7
36B2:							
Tama	2e	149	44	60	85	5.7	9.4
37A:							
Worthen	1	151	46	62	88	5.9	9.8
37B:							
Worthen	2e	149	46	61	87	5.8	9.7
41A:							
Muscatine	1	167	51	64	95	---	---
41B2:							
Muscatine	2e	160	49	61	91	---	---
43A:							
Ipava	1	163	52	66	91	---	---
43B:							
Ipava	2e	161	51	65	90	---	---
43B2:							
Ipava	2e	156	50	63	87	---	---
46A:							
Herrick	2w	141	45	61	78	---	---
50:							
Virden	2w	138	46	57	72	---	---

See footnote at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
61A:							
Atterberry------	1	149	44	60	85	---	---
61B2:							
Atterberry------	2e	143	42	58	79	5.4	8.9
68:							
Sable-----------	2w	156	51	61	85	---	---
112:							
Cowden----------	2w	120	37	53	66	---	---
119C2:							
Elco------------	3e	105	35	44	60	4.1	6.6
134B:							
Camden----------	2e	124	39	54	71	5.0	8.2
134C2:							
Camden----------	3e	117	37	52	68	4.7	7.8
138:							
Shiloh----------	2w	139	46	56	70	---	---
250D2:							
Velma-----------	3e	106	35	46	65	4.1	6.9
257A:							
Clarksdale------	1	140	43	57	79	---	---
257B:							
Clarksdale------	2e	139	43	56	78	5.2	8.4
257B2:							
Clarksdale------	2e	132	40	54	74	5.1	8.2
259C2:							
Assumption------	3e	120	37	52	72	4.7	7.8
268B:							
Mt. Carroll-----	2e	136	43	56	83	5.4	8.9
274A:							
Seaton----------	1	118	35	49	69	4.8	8.0
274B:							
Seaton----------	2e	117	35	49	68	4.8	7.8
274C2:							
Seaton----------	3e	110	33	46	64	4.5	7.4
274D3:							
Seaton----------	4e	97	29	41	56	4.0	6.4
278A:							
Stronghurst-----	2w	138	42	55	76	5.3	9.3
279B:							
Rozetta---------	2e	130	40	53	72	5.1	8.6
279C2:							
Rozetta---------	3e	123	38	51	69	4.9	8.2

See footnote at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
280D2:							
Fayette----------	4e	116	35	48	66	4.7	7.8
379B:							
Dakota-----------	2e	105	35	50	65	4.5	7.5
386B:							
Downs------------	2e	147	43	58	82	5.5	9.2
417G:							
Derinda----------	7e	---	---	---	---	---	---
440B:							
Jasper-----------	2e	125	44	50	---	---	---
440C2:							
Jasper-----------	3e	115	40	46	---	---	---
470C2:							
Keller-----------	3e	86	30	40	54	3.6	6.0
516:							
Faxon------------	3w	112	37	40	69	---	---
605E3:							
Ursa-------------	6e	---	---	---	---	2.0	3.4
647A:							
Lawler-----------	2s	115	39	44	61	---	---
660C3:							
Coatsburg--------	4e	66	21	23	36	2.6	4.3
785C:							
Lacrescent-------	4e	---	---	---	---	---	---
785G:							
Lacrescent-------	7e	---	---	---	---	---	---
802B, 802F:							
Orthents.							
864:							
Pits.							
874F-------------		---	---	---	---	---	---
Dickinson--------	6e						
Hamburg----------	7e						
915D2------------		79	25	32	46	3.1	5.2
Elco-------------	3e						
Ursa-------------	4e						
936F-------------	6e	---	---	---	---	2.9	4.9
Fayette-Hickory							
936G-------------	7e	---	---	---	---	---	---
Fayette-Hickory							

See footnote at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
937F------------- Seaton-Hickory	6e	---	---	---	---	---	2.8
937G------------- Seaton-Hickory	7e	---	---	---	---	---	---
971D3------------ Fishhook-Atlas	6e	---	---	---	---	1.8	3.0
1070: Beaucoup--------	5w	---	---	---	---	---	---
3070: Beaucoup--------	3w	117	39	47	68	---	---
3073: Ross------------	2w	131	41	54	72	5.0	8.2
3107: Sawmill---------	3w	132	42	49	68	---	---
3284: Tice------------	3w	138	42	55	76	4.1	6.9
3331: Haymond---------	2w	126	41	54	69	4.8	8.0
3333: Wakeland--------	2w	122	41	51	67	4.7	7.8
3334: Birds-----------	3w	110	38	47	65	---	---
3415: Orion-----------	3w	80	26	47	58	---	---
3428: Coffeen---------	2w	137	42	36	50	5.2	8.7
3451: Lawson----------	3w	145	39	56	77	5.1	8.6
3452: Riley-----------	3w	100	37	50	68	4.2	7.0
3789: Volney----------	4s	50	17	20	30	---	3.5
7349B: Zumbro----------	3s	85	28	37	53	3.5	6.0
7430: Raddle----------	1	149	45	59	83	5.2	8.8
8070: Beaucoup--------	2w	138	46	55	75	---	---
8071: Darwin----------	3w	99	35	47	63	---	---
8077: Huntsville------	2w	152	48	64	86	4.1	6.0

See footnote at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
8092:							
Sarpy-----------	4s	71	26	34	47	3.0	5.0
8107:							
Sawmill---------	2w	147	47	54	76	---	---
8162:							
Gorham----------	2w	141	46	56	77	---	---
8284:							
Tice------------	2w	153	47	61	84	5.7	9.5
8304:							
Landes----------	2w	99	34	45	62	3.7	6.2
8404:							
Titus-----------	3w	125	42	52	68	---	---
8405:							
Zook------------	2w	92	35	42	65	---	---
8415:							
Orion-----------	2w	135	43	52	72	4.7	7.8
8451:							
Lawson----------	3w	161	48	62	86	5.7	9.5
8452:							
Riley-----------	2w	122	41	55	75	4.7	7.8
8682:							
Medway----------	2w	132	42	53	72	5.3	8.8

* 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)

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
6C2: Fishhook	4C	Slight	Slight	Slight	Moderate	Moderate	White oak	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Northern red oak	70	57	
							Green ash	---	---	
							Bur oak	---	---	
7C3: Atlas	4C	Slight	Slight	Moderate	Moderate	Slight	White oak	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Bur oak	70	57	
							Northern red oak	70	57	
							Green ash	---	---	
8D2: Hickory	5A	Slight	Slight	Slight	Slight	Moderate	White oak	85	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	85	72	
							Black oak	---	---	
							Tuliptree	95	100	
							Green ash	---	---	
							Bitternut hickory	---	---	
8F: Hickory	5R	Moderate	Moderate	Slight	Slight	Moderate	White oak	85	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	95	100	
							Northern red oak	85	72	
							Black oak	---	---	
							Bitternut hickory	---	---	
							Green ash	---	---	
8G: Hickory	5R	Severe	Severe	Slight	Slight	Moderate	White oak	85	72	Black walnut, eastern white pine, red pine, sugar maple, tuliptree, white oak.
							Tuliptree	95	100	
							Northern red oak	85	72	
							Black oak	---	---	
							Bitternut hickory	---	---	
							Green ash	---	---	
17A: Keomah	3A	Slight	Slight	Slight	Slight	Moderate	White oak	65	43	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	70	57	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Suggested trees to plant
17B:										
Keomah	3A	Slight	Slight	Slight	Slight	Moderate	White oak	65	43	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	70	57	
17B2:										
Keomah	3A	Slight	Slight	Slight	Slight	Moderate	White oak	65	43	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	70	57	
61A:										
Atterberry	4A	Slight	Slight	Slight	Slight	Moderate	White oak	70	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	70	57	
							Green ash	---	---	
							Bur oak	---	---	
61B2:										
Atterberry	4A	Slight	Slight	Slight	Slight	Moderate	White oak	70	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak	70	57	
							Green ash	---	---	
							Bur oak	---	---	
119C2:										
Elco	4A	Slight	Slight	Slight	Slight	Moderate	White oak	80	57	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Black walnut	---	---	
							Northern red oak	---	---	
134B:										
Camden	7A	Slight	Slight	Slight	Slight	Severe	White oak	85	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Green ash	76	72	
							Sweetgum	80	86	
							Tuliptree	95	100	
							Northern red oak	85	72	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
134C2:										
Camden----------	7A	Slight	Slight	Slight	Slight	Severe	White oak-----------	85	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Green ash-----------	76	72	
							Sweetgum------------	80	86	
							Tuliptree-----------	95	100	
							Northern red oak----	85	72	
257A:										
Clarksdale------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
257B:										
Clarksdale------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
257B2:										
Clarksdale------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
268B:										
Mt. Carroll-----	6A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
274A:										
Seaton----------	6A	Slight	Slight	Slight	Slight	Severe	White oak-----------	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
274B:										
Seaton----------	6A	Slight	Slight	Slight	Slight	Severe	White oak-----------	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
274C2:										
Seaton----------	6A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
274D3:										
Seaton----------	6A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
278A:										
Stronghurst-----	4A	Slight	Slight	Slight	Slight	Slight	White oak-----------	70	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak----	70	57	
							Green ash-----------	---	---	
							Bur oak-------------	---	---	
279B:										
Rozetta---------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
279C2:										
Rozetta---------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
280D2:										
Fayette----------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
386B:										
Downs-----------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
417G:										
Derinda---------	4R	Severe	Severe	Slight	Slight	Severe	White oak-----------	70	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Northern red oak----	70	57	
							Green ash-----------	---	---	
							Bur oak-------------	---	---	
605E3:										
Ursa------------	4R	Moderate	Moderate	Moderate	Slight	Slight	White oak-----------	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Northern red oak----	70	57	
							Black oak-----------	70	57	
							Green ash-----------	---	---	
785G:										
Lacrescent------	3R	Severe	Severe	Slight	Slight	Moderate	White oak-----------	55	43	Green ash, eastern redcedar, black locust.
							Northern red oak----	59	43	
							American basswood---	62	57	
Hamburg.										
874F:										
Dickinson.										
Hamburg---------	2R	Severe	Severe	Severe	Slight	Slight	White oak-----------	45	29	Bur oak, eastern redcedar, white oak.
							Black oak-----------	---	---	
							Bur oak-------------	---	---	
							Eastern redcedar----	---	---	
							Post oak------------	---	---	
915D2:										
Elco------------	4A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	80	57	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Black walnut--------	---	---	
							Northern red oak----	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns: Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
915D2:										
Ursa	4A	Slight	Slight	Slight	Slight	Slight	Black oak	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Green ash	---	---	
							Northern red oak	70	57	
							White oak	70	57	
936F:										
Fayette	4R	Moderate	Moderate	Slight	Slight	Moderate	White oak	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	90	86	
							Northern red oak	80	57	
							Black walnut	---	---	
Hickory	5R	Moderate	Moderate	Slight	Slight	Moderate	Bitternut hickory	---	---	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Black oak	---	---	
							Green ash	---	---	
							Northern red oak	85	72	
							Tuliptree	95	100	
							White oak	85	72	
936G:										
Fayette	4R	Severe	Severe	Slight	Slight	Moderate	White oak	80	57	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	90	86	
							Northern red oak	80	57	
							Black walnut	---	---	
Hickory	5R	Severe	Severe	Slight	Slight	Moderate	Bitternut hickory	---	---	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Black oak	---	---	
							Green ash	---	---	
							Northern red oak	85	72	
							Tuliptree	95	100	
							White oak	85	72	
937F:										
Seaton	6R	Moderate	Moderate	Moderate	Slight	Moderate	White oak	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	90	86	
							Northern red oak	80	57	
							Black walnut	---	---	
Hickory	5R	Moderate	Moderate	Slight	Slight	Moderate	Bitternut hickory	---	---	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Black oak	---	---	
							Green ash	---	---	
							Northern red oak	85	72	
							Tuliptree	95	100	
							White oak	85	72	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
937G:										
Seaton----------	6R	Severe	Severe	Severe	Slight	Moderate	White oak-----------	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	90	86	
							Northern red oak----	80	57	
							Black walnut--------	---	---	
Hickory---------	5R	Severe	Severe	Slight	Slight	Moderate	Bitternut hickory---	---	---	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Black oak-----------	---	---	
							Green ash-----------	---	---	
							Northern red oak----	85	72	
							Tuliptree-----------	95	100	
							White oak-----------	85	72	
971D3:										
Fishhook--------	4C	Slight	Slight	Slight	Moderate	Moderate	White oak-----------	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Northern red oak----	70	57	
							Green ash-----------	---	---	
							Bur oak-------------	---	---	
Atlas-----------	4C	Slight	Slight	Moderate	Moderate	Slight	Bur oak-------------	70	57	Green ash, baldcypress, hickory, pin oak, eastern redcedar.
							Green ash-----------	---	---	
							Northern red oak----	70	57	
							White oak-----------	70	57	
1070:										
Beaucoup--------	5W	Slight	Severe	Moderate	Moderate	Severe	Pin oak-------------	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood--	100	129	
							Sweetgum------------	---	---	
							American sycamore---	---	---	
							Cherrybark oak------	---	---	
3070:										
Beaucoup--------	5W	Slight	Severe	Moderate	Moderate	Severe	Pin oak-------------	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood--	100	129	
							Sweetgum------------	---	---	
							American sycamore---	---	---	
							Cherrybark oak------	---	---	
3073:										
Ross------------	5A	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	86	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree-----------	96	100	
							Sugar maple---------	85	57	
							White ash-----------	---	---	
							Black walnut--------	---	---	
							Black cherry--------	---	---	
							White oak-----------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
3107: Sawmill	5W	Slight	Moderate	Moderate	Moderate	Severe	Pin oak	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Sweetgum	---	---	
							American sycamore	---	---	
							Eastern cottonwood	---	---	
							Cherrybark oak	---	---	
3284: Tice	5A	Slight	Slight	Slight	Slight	Severe	Pin oak	96	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Sweetgum	86	100	
							Tuliptree	90	86	
							Virginia pine	90	129	
							White ash	---	---	
							Eastern cottonwood	---	---	
3331: Haymond	8A	Slight	Slight	Slight	Slight	Moderate	White oak	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	100	114	
							Black walnut	70	---	
3333: Wakeland	5A	Slight	Slight	Slight	Slight	Moderate	Pin oak	90	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	90	86	
							Sweetgum	88	100	
							Virginia pine	85	129	
3334: Birds	5W	Slight	Severe	Moderate	Moderate	Severe	Pin oak	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood	100	129	
							Sweetgum	---	---	
							American sycamore	---	---	
							Cherrybark oak	---	---	
3415: Orion	2W	Slight	Moderate	Slight	Slight	Severe	Silver maple	80	29	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Red maple	---	---	
							White ash	---	---	
3428: Coffeen	6W	Slight	Moderate	Slight	Slight	Severe	Tuliptree	90	86	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood	100	---	
							Pin oak	90	72	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
3451:										
Lawson----------	2W	Slight	Moderate	Slight	Slight	Severe	Silver maple--------	70	29	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Red maple-----------	---	---	
							White ash-----------	---	---	
3789:										
Volney----------	3A	Slight	Slight	Slight	Slight	Moderate	White oak-----------	55	43	Green ash, eastern redcedar, black locust.
							Northern red oak----	55	43	
8070:										
Beaucoup--------	5W	Slight	Severe	Moderate	Moderate	Severe	Pin oak-------------	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood--	100	129	
							American sycamore---	---	---	
							Sweetgum------------	---	---	
							Cherrybark oak------	---	---	
8071:										
Darwin----------	4W	Slight	Severe	Severe	Moderate	Severe	Pin oak-------------	80	57	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Green ash-----------	---	---	
							American sycamore---	---	---	
							Eastern cottonwood--	---	---	
							Swamp white oak-----	---	---	
8077:										
Huntsville------	7A	Slight	Slight	Slight	Slight	Moderate	Tuliptree-----------	98	100	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Eastern cottonwood--	110	157	
							Green ash-----------	---	---	
							Sweetgum------------	---	---	
							American sycamore---	---	---	
							Cherrybark oak------	---	---	
8092:										
Sarpy-----------	8S	Slight	Slight	Severe	Slight	Slight	Eastern cottonwood--	95	114	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
8107:										
Sawmill---------	5W	Slight	Moderate	Moderate	Moderate	Severe	Pin oak-------------	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Sweetgum------------	---	---	
							American sycamore---	---	---	
							Eastern cottonwood--	---	---	
							Cherrybark oak------	---	---	
8162:										
Gorham----------	5W	Slight	Severe	Moderate	Moderate	Severe	Pin oak-------------	90	72	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Eastern cottonwood--	100	129	
							Sweetgum------------	---	---	
							American sycamore---	---	---	
							Cherrybark oak------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Suggested trees to plant
8284: Tice	5A	Slight	Slight	Slight	Slight	Severe	Pin oak	96	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Sweetgum	86	100	
							Tuliptree	90	86	
							Virginia pine	90	129	
							Eastern cottonwood	---	---	
							White ash	---	---	
8304: Landes	7A	Slight	Slight	Slight	Slight	Severe	Tuliptree	95	100	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Eastern cottonwood	105	143	
							Green ash	---	---	
							Sweetgum	---	---	
							American sycamore	---	---	
8404: Titus	9W	Slight	Severe	Severe	Moderate	Severe	Eastern cottonwood	99	129	Swamp white oak, bur oak, baldcypress, green ash, pin oak.
							Silver maple	---	---	
							White ash	---	---	
8415: Orion	2W	Slight	Moderate	Slight	Slight	Severe	Silver maple	80	29	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Red maple	---	---	
							White ash	---	---	
8451: Lawson	2A	Slight	Slight	Slight	Slight	Severe	Silver maple	70	29	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Red maple	---	---	
							White ash	---	---	
8682: Medway	5A	Slight	Slight	Slight	Slight	Severe	Northern red oak	86	72	White oak, northern red oak, pecan, black walnut, cherrybark oak, green ash, baldcypress.
							Tuliptree	96	100	
							Sugar maple	---	---	
							White ash	---	---	
							Black walnut	---	---	
							Black cherry	---	---	
							White oak	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

Table 8.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
6C2:					
Fishhook	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
7C3:					
Atlas	---	Washington hawthorn, black hawthorn, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
8D2, 8F, 8G:					
Hickory	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
17A, 17B, 17B2:					
Keomah	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
36B, 36B2:					
Tama	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
37A, 37B:					
Worthen	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
41A, 41B2:					
Muscatine	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
43A, 43B, 43B2: Ipava	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
46A: Herrick	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
50: Virden	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
61A, 61B2: Atterberry	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
68: Sable	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
112: Cowden	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
119C2: Elco	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
134B, 134C2: Camden	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
138: Shiloh	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
250D2: Velma	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
257A, 257B, 257B2: Clarksdale	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
259C2: Assumption	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
268B: Mt. Carroll	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
274A, 274B, 274C2, 274D3: Seaton	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
278A: Stronghurst	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
279B, 279C2: Rozetta	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
280D2: Fayette	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
379B: Dakota	---	Alternateleaf dogwood, eastern redcedar, hazelnut, nannyberry, northern whitecedar, prairie crabapple, shadbush.	Eastern white pine, green ash.	---	---
386B: Downs	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
417G: Derinda	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf arrowwood.	Washington hawthorn, blackhaw, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
440B, 440C2: Jasper	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
470C2:					
Keller----------	---	Washington hawthorn, black hawthorn, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
516:					
Faxon-----------	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
605E3:					
Ursa------------	---	Washington hawthorn, black hawthorn, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
647A:					
Lawler----------	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
660C3:					
Coatsburg-------	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
785C, 785G:					
Lacrescent------	---	Alternateleaf dogwood, eastern redcedar, hazelnut, nannyberry, northern whitecedar, prairie crabapple, shadbush.	Eastern white pine, green ash.	---	---

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
874F:					
Dickinson	---	Alternateleaf dogwood, eastern redcedar, hazelnut, nannyberry, northern whitecedar, prairie crabapple, shadbush.	Eastern white pine, green ash.	---	---
Hamburg	---	Downy arrowwood, eastern redcedar, shadbush, southern arrowwood.	Eastern white pine, green ash, hackberry, northern red oak, tuliptree.	Eastern cottonwood	Imperial Carolina poplar.
915D2:					
Elco	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
Ursa	---	Washington hawthorn, black hawthorn, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
936F, 936G:					
Fayette	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
Hickory	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
937F, 937G:					
Seaton	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
Hickory	---	American plum, black hawthorn, hazelnut, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
971D3:					
Fishhook	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
Atlas	---	Washington hawthorn, black hawthorn, hazelnut, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood, imperial Carolina poplar.
1070, 3070:					
Beaucoup	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
3073:					
Ross	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3107:					
Sawmill	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
3284:					
Tice	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
3331: Haymond	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3333: Wakeland	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3334: Birds	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
3415: Orion	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3428: Coffeen	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3451: Lawson	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
3452: Riley	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
3789: Volney	---	Alternateleaf dogwood, eastern redcedar, hazelnut, nannyberry, northern whitecedar, prairie crabapple, shadbush.	Eastern white pine, green ash.	---	---
7349B: Zumbro	---	Alternateleaf dogwood, American cranberry, viburnum, hazelnut, nannyberry, prairie crabapple, shadbush, witchhazel.	Blue spruce, eastern redcedar, green ash, northern whitecedar.	Eastern white pine	---
7430: Raddle	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8070: Beaucoup	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
8071: Darwin	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
8077: Huntsville	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8092: Sarpy	---	Black hawthorn, downy arrowwood, shadbush, southern arrowwood.	Eastern redcedar, green ash, hackberry, nannyberry, northern red oak, northern whitecedar.	---	---
8107: Sawmill	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
8162: Gorham	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
8284: Tice	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8304: Landes	---	Alternateleaf dogwood, eastern redcedar, hazelnut, nannyberry, northern whitecedar, prairie crabapple, shadbush.	Eastern white pine, green ash.	---	---

Table 8.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
8404: Titus	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
8405: Zook	---	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	Eastern redcedar, hackberry, northern whitecedar, shadbush, tamarack, witchhazel.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, imperial Carolina poplar, pin oak.
8415: Orion	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8451: Lawson	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8452: Riley	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.
8682: Medway	---	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, green ash, hackberry, tuliptree.	Eastern cottonwood, eastern white pine, imperial Carolina poplar, pin oak.

Table 9.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
6C2: Fishhook	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness.
7C3: Atlas	Severe: percs slowly, wetness.	Severe: percs slowly.	Severe: percs slowly, slope, wetness.	Severe: erodes easily.	Moderate: droughty, wetness.
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: erodes easily, slope.	Severe: slope.
17A: Keomah	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Slight	Slight.
17B: Keomah	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Slight	Slight.
17B2: Keomah	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Slight	Slight.
36B: Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
36B2: Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
37A: Worthen	Slight	Slight	Slight	Slight	Slight.
37B: Worthen	Slight	Slight	Moderate: slope.	Slight	Slight.
41A: Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
41B2: Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
43A: Ipava	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
43B: Ipava	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
43B2: Ipava	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
46A: Herrick	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
50: Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
61A: Atterberry	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
61B2: Atterberry	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
112: Cowden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
119C2: Elco	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
134B: Camden	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
134C2: Camden	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
138: Shiloh	Severe: too clayey, wetness.	Severe: too clayey, wetness.	Severe: too clayey, wetness.	Severe: too clayey, wetness.	Severe: too clayey, wetness.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
250D2:					
Velma	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
257A:					
Clarksdale	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
257B:					
Clarksdale	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
257B2:					
Clarksdale	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
259C2:					
Assumption	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
268B:					
Mt. Carroll	Slight	Slight	Moderate: slope.	Slight	Slight.
274A:					
Seaton	Slight	Slight	Slight	Slight	Slight.
274B:					
Seaton	Slight	Slight	Moderate: slope.	Slight	Slight.
274C2:					
Seaton	Slight	Slight	Severe: slope.	Slight	Slight.
274D3:					
Seaton	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
278A:					
Stronghurst	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
279B:					
Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
279C2:					
Rozetta	Slight	Slight	Severe: slope.	Slight	Slight.
280D2:					
Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
379B:					
Dakota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
386B:					
Downs	Slight	Slight	Moderate: slope.	Slight	Slight.
417G:					
Derinda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
440B:					
Jasper	Slight	Slight	Moderate: slope.	Slight	Slight.
440C2:					
Jasper	Slight	Slight	Severe: slope.	Slight	Slight.
470C2:					
Keller	Moderate: percs slowly, slope, wetness.	Moderate: percs slowly, slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
516:					
Faxon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
605E3:					
Ursa	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
647A:					
Lawler	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
660C3:					
Coatsburg	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, slope, wetness.	Severe: erodes easily, wetness.	Severe: wetness.
785C:					
Lacrescent	Slight	Slight	Severe: slope.	Slight	Moderate: large stones.
785G:					
Lacrescent	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
802B:					
Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Severe: erodes easily.	Slight.
802F:					
Orthents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
864:					
Pits.					

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
874F:					
Dickinson	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
915D2:					
Elco	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Ursa	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
936F:					
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
936G:					
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
937F:					
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
937G:					
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
971D3:					
Fishhook	Moderate: percs slowly, slope, wetness.	Moderate: percs slowly, slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
Atlas	Severe: percs slowly, wetness.	Severe: percs slowly.	Severe: percs slowly, slope, wetness.	Severe: erodes easily.	Moderate: droughty, slope, wetness.
1070:					
Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3070:					
Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: flooding, ponding.
3073:					
Ross	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3107:					
Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
3284:					
Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.
3331:					
Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3333:					
Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
3334:					
Birds	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
3415:					
Orion	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
3428:					
Coffeen	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
3451:					
Lawson	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
3452:					
Riley	Severe: flooding.	Moderate: flooding, wetness.	Moderate: wetness.	Moderate: flooding, wetness.	Severe: flooding.
3789:					
Volney	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Severe: erodes easily.	Severe: flooding.
7349B:					
Zumbro	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
7430:					
Raddle	Severe: flooding.	Slight	Slight	Slight	Slight.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8070:					
Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8071:					
Darwin	Severe: flooding, percs slowly, ponding.	Severe: percs slowly, ponding, too clayey.	Severe: ponding, too clayey.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
8077:					
Huntsville	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
8092:					
Sarpy	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, flooding, too sandy.
8107:					
Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8162:					
Gorham	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8284:					
Tice	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Moderate: wetness.	Moderate: flooding, wetness.
8304:					
Landes	Severe: flooding.	Slight	Slight	Slight	Moderate: flooding.
8404:					
Titus	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8405:					
Zook	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8415:					
Orion	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.
8451:					
Lawson	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.

Table 9.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8452:					
Riley-----------	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: flooding, wetness.
8682:					
Medway----------	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Moderate: wetness.	Moderate: flooding, wetness.

Table 10.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	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
6C2: Fishhook	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7C3: 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.
17A: Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
17B: Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
17B2: Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
36B: Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36B2: Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
37A: Worthen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37B: Worthen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
41A: Muscatine	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
41B2: Muscatine	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43A: Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43B: Ipava	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
43B2: Ipava	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
46A:										
Herrick----------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
50:										
Virden-----------	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
61A:										
Atterberry-------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
61B2:										
Atterberry-------	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
68:										
Sable------------	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
112:										
Cowden-----------	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
119C2:										
Elco-------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
134B:										
Camden-----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2:										
Camden-----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
138:										
Shiloh-----------	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
250D2:										
Velma------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
257A:										
Clarksdale-------	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
257B:										
Clarksdale-------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
257B2:										
Clarksdale-------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
259C2:										
Assumption-------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
268B:										
Mt. Carroll------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
274A:										
Seaton-----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
274B:										
Seaton-----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
274C2:										
Seaton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
274D3:										
Seaton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
278A:										
Stronghurst	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
279B:										
Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279C2:										
Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280D2:										
Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
379B:										
Dakota	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
386B:										
Downs	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
417G:										
Derinda	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
440B:										
Jasper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
440C2:										
Jasper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
470C2:										
Keller	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
516:										
Faxon	Fair	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
605E3:										
Ursa	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
647A:										
Lawler	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
660C3:										
Coatsburg	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
785C:										
Lacrescent	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
785G:										
Lacrescent	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
802B:										
Orthents	Good	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
802F:										
Orthents	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
864:										
Pits.										
874F:										
Dickinson	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Hamburg	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
915D2:										
Elco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ursa	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
936F:										
Fayette	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
936G:										
Fayette	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Very poor.	Good	Very poor.
Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
937F:										
Seaton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
937G:										
Seaton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
971D3:										
Fishhook	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
1070: Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3070: Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3073: Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3107: Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3284: Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3331: Haymond	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor.
3333: Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3334: Birds	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
3415: Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	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.
3452: Riley	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3789: Volney	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
7349B: Zumbro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
7430: Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8070: Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
8071: Darwin	Poor	Poor	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.
8077: Huntsville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
8092: Sarpy	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

Table 10.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
8107: Sawmill	Good	Good	Good	Fair	Fair	Good	Fair	Good	Fair	Fair.
8162: Gorham	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
8284: Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
8304: Landes	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8404: Titus	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
8405: Zook	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good.
8415: Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
8451: Lawson	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
8452: Riley	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8682: Medway	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

Table 11.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
6C2:						
Fishhook	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Moderate: shrink-swell, slope, wetness.	Severe: frost action, low strength.	Moderate: wetness.
7C3:						
Atlas	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell.	Moderate: droughty, wetness.
8D2:						
Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
8F:						
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
8G:						
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17A:						
Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Slight.
17B:						
Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Slight.
17B2:						
Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Slight.
36B:						
Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
36B2:						
Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell. wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
37A:						
Worthen	Slight	Slight	Slight	Slight	Severe: frost action, low strength.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
37B:						
Worthen	Slight	Slight	Slight	Slight	Severe: frost action, low strength.	Slight.
41A:						
Muscatine	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
41B2:						
Muscatine	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
43A:						
Ipava	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
43B:						
Ipava	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
43B2:						
Ipava	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
46A:						
Herrick	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
50:						
Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
61A:						
Atterberry	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Moderate: wetness.
61B2:						
Atterberry	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Moderate: wetness.
68:						
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
112:						
Cowden	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
119C2:						
Elco	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
134B:						
Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
134C2:						
Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
138:						
Shiloh	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: too clayey, wetness.
250D2:						
Velma	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
257A:						
Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
257B:						
Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
257B2:						
Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
259C2:						
Assumption	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Severe: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
268B:						
Mt. Carroll	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: frost action, low strength.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
274A:						
Seaton----------	Moderate: cutbanks cave, wetness.	Slight---------	Moderate: wetness.	Slight---------	Severe: frost action, low strength.	Slight.
274B:						
Seaton----------	Moderate: cutbanks cave, wetness.	Slight---------	Moderate: wetness.	Slight---------	Severe: frost action, low strength.	Slight.
274C2:						
Seaton----------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action, low strength.	Slight.
274D3:						
Seaton----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
278A:						
Stronghurst-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
279B:						
Rozetta---------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
279C2:						
Rozetta---------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
280D2:						
Fayette---------	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
379B:						
Dakota----------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action, low strength.	Slight.
386B:						
Downs-----------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
417G:						
Derinda---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
440B:						
Jasper----------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action, low strength.	Slight.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
440C2:						
Jasper----------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action, low strength.	Slight.
470C2:						
Keller----------	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: shrink-swell, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope, wetness.
516:						
Faxon-----------	Severe: depth to rock, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
605E3:						
Ursa------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
647A:						
Lawler----------	Severe: cutbanks cave, wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action.	Slight.
660C3:						
Coatsburg-------	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
785C:						
Lacrescent------	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones, slope.	Moderate: frost action, large stones.	Moderate: large stones.
785G:						
Lacrescent------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
802B:						
Orthents--------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell.	Severe: low strength.	Slight.
802F:						
Orthents--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
864:						
Pits.						
874F:						
Dickinson-------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hamburg---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.	Severe: slope.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
915D2:						
Elco	Moderate: slope, too clayey, wetness.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
Ursa	Moderate: slope, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
936F:						
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
936G:						
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
937F:						
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
937G:						
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
971D3:						
Fishhook	Severe: wetness.	Moderate: shrink-swell, slope, wetness.	Severe: shrink-swell, wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope, wetness.
Atlas	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, slope, wetness.	Severe: low strength, shrink-swell.	Moderate: droughty, slope, wetness.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1070:						
Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding.
3070:						
Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding.
3073:						
Ross	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3107:						
Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.
3284:						
Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
3331:						
Haymond	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
3333:						
Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3334:						
Birds	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.
3415:						
Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action, low strength.	Severe: flooding.
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.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3452:						
Riley	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
3789:						
Volney	Moderate: dense layer, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, low strength.	Severe: flooding.
7349B:						
Zumbro	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
7430:						
Raddle	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
8070:						
Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, low strength, ponding.	Severe: ponding.
8071:						
Darwin	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
8077:						
Huntsville	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding.
8092:						
Sarpy	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding, too sandy.
8107:						
Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: wetness.
8162:						
Gorham	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: wetness.
8284:						
Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.

Table 11.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8304:						
Landes----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
8404:						
Titus-----------	Severe: wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
8405:						
Zook------------	Severe: wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: flooding, shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
8415:						
Orion-----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.
8451:						
Lawson----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: flooding, wetness.
8452:						
Riley-----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.
8682:						
Medway----------	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.

Table 12.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
6C2:					
Fishhook	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Moderate: wetness.	Poor: hard to pack, too clayey.
7C3:					
Atlas	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
8D2:					
Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, small stones, too clayey.
8F:					
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
8G:					
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17A:					
Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
17B:					
Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
17B2:					
Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
36B:					
Tama	Moderate: percs slowly, wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36B2:					
Tama	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
37A:					
Worthen	Slight	Moderate: seepage.	Slight	Slight	Good.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
37B:					
Worthen---------	Slight------------	Moderate: seepage, slope.	Slight------------	Slight------------	Good.
41A:					
Muscatine-------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
41B2:					
Muscatine-------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
43A:					
Ipava-----------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
43B:					
Ipava-----------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
43B2:					
Ipava-----------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
46A:					
Herrick---------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
50:					
Virden----------	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: hard to pack, ponding, too clayey.
61A:					
Atterberry------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
61B2:					
Atterberry------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
68:					
Sable-----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
112:					
Cowden----------	Severe: percs slowly, wetness.	Slight------------	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
119C2:					
Elco	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
134B:					
Camden	Slight	Moderate: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey.
134C2:					
Camden	Slight	Severe: slope.	Severe: seepage.	Slight	Fair: too clayey.
138:					
Shiloh	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
250D2:					
Velma	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
257A:					
Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
257B:					
Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
257B2:					
Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
259C2:					
Assumption	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
268B:					
Mt. Carroll	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Good.
274A:					
Seaton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
274B:					
Seaton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
274C2:					
Seaton----------	Slight------------	Severe: slope.	Slight------------	Slight------------	Good.
274D3:					
Seaton----------	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
278A:					
Stronghurst-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
279B:					
Rozetta---------	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
279C2:					
Rozetta---------	Moderate: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
280D2:					
Fayette---------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
379B:					
Dakota----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, small stones, too sandy.
386B:					
Downs-----------	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
417G:					
Derinda---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
440B:					
Jasper----------	Slight------------	Moderate: seepage, slope.	Moderate: too clayey.	Slight------------	Fair: thin layer, too clayey.
440C2:					
Jasper----------	Slight------------	Severe: slope.	Moderate: too clayey.	Slight------------	Fair: thin layer, too clayey.
470C2:					
Keller----------	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Moderate: slope, wetness.	Poor: hard to pack, too clayey.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
516:					
Faxon-----------	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
605E3:					
Ursa------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: hard to pack, slope, too clayey.
647A:					
Lawler----------	Severe: poor filter, wetness.	Severe: seepage, wetness.	Severe: depth to rock, seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
660C3:					
Coatsburg-------	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
785C:					
Lacrescent------	Moderate: large stones, percs slowly.	Severe: seepage, slope.	Severe: large stones, seepage.	Severe: seepage.	Poor: large stones.
785G:					
Lacrescent------	Severe: slope.	Severe: seepage, slope.	Severe: large stones, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
802B:					
Orthents--------	Severe: percs slowly.	Moderate: slope, wetness.	Moderate: too clayey.	Slight------------	Fair: too clayey.
802F:					
Orthents--------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
864:					
Pits.					
874F:					
Dickinson-------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, slope, too sandy.
Hamburg---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
915D2:					
Elco------------	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, too clayey, wetness.	Moderate: slope, wetness.	Fair: slope, too clayey, wetness.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
915D2:					
Ursa------------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: hard to pack, too clayey.
936F:					
Fayette---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hickory---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
936G:					
Fayette---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hickory---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
937F:					
Seaton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hickory---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
937G:					
Seaton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hickory---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
971D3:					
Fishhook--------	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Moderate: slope, wetness.	Poor: hard to pack, too clayey.
Atlas-----------	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
1070:					
Beaucoup--------	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3070:					
Beaucoup--------	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3073:					
Ross------------	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3107:					
Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3284:					
Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3331:					
Haymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
3333:					
Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3334:					
Birds	Severe: flooding, percs slowly, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3415:					
Orion	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3428:					
Coffeen	Severe: flooding, wetness.	Severe: flooding, seepage, 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.
3452:					
Riley	Severe: flooding, poor filter, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
3789:					
Volney	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: small stones.
7349B:					
Zumbro	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer, too sandy.
7430:					
Raddle	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8070:					
Beaucoup	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
8071:					
Darwin	Severe: flooding, percs slowly, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: hard to pack, ponding, too clayey.
8077:					
Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
8092:					
Sarpy	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
8107:					
Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8162:					
Gorham	Severe: flooding, percs slowly, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
8284:					
Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
8304:					
Landes	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
8404:					
Titus	Severe: flooding, percs slowly, wetness.	Severe: flooding.	Severe: flooding, too clayey, wetness.	Severe: flooding, wetness.	Poor: hard to pack, too clayey, wetness.
8405:					
Zook	Severe: flooding, percs slowly, wetness.	Severe: flooding.	Severe: flooding, too clayey, wetness.	Severe: flooding, wetness.	Poor: hard to pack, too clayey, wetness.
8415:					
Orion	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

Table 12.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8451:					
Lawson----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8452:					
Riley-----------	Severe: flooding, poor filter, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
8682:					
Medway----------	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.

Table 13.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
6C2:				
Fishhook--------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.
7C3:				
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: slope, small stones.
8G:				
Hickory---------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
17A:				
Keomah----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
17B:				
Keomah----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
17B2:				
Keomah----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
36B:				
Tama------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
36B2:				
Tama------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
37A:				
Worthen---------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
37B:				
Worthen---------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
41A:				
Muscatine-------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
41B2:				
Muscatine-------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
43A:				
Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
43B:				
Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
43B2:				
Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
46A:				
Herrick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
50:				
Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
61A:				
Atterberry	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
61B2:				
Atterberry	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
68:				
Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
112:				
Cowden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
119C2:				
Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
134B:				
Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
134C2:				
Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
138:				
Shiloh	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
250D2:				
Velma	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, too clayey.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
257A:				
Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
257B:				
Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
257B2:				
Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
259C2:				
Assumption	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.
268B:				
Mt. Carroll	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274A:				
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274B:				
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274C2:				
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274D3:				
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
278A:				
Stronghurst	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279B:				
Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279C2:				
Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280D2:				
Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
379B:				
Dakota	Good	Probable	Probable	Poor: area reclaim, small stones.
386B:				
Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
417G:				
Derinda	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
440B:				
Jasper	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
440C2:				
Jasper	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
470C2:				
Keller	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer.
516:				
Faxon	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
605E3:				
Ursa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
647A:				
Lawler	Fair: depth to rock, shrink-swell, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
660C3:				
Coatsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
785C:				
Lacrescent	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones.
785G:				
Lacrescent	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
802B:				
Orthents	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
802F:				
Orthents	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
864:				
Pits.				

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
874F:				
Dickinson	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope.
Hamburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
915D2:				
Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
Ursa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
936F:				
Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
936G:				
Fayette	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
937F:				
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
937G:				
Seaton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
971D3:				
Fishhook	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer, too clayey.
Atlas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
1070:				
Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
3070:				
Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3073:				
Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3107:				
Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3284:				
Tice	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3331:				
Haymond	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
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.
3415:				
Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
3428:				
Coffeen	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3451:				
Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
3452:				
Riley	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
3789:				
Volney	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
7349B:				
Zumbro	Good	Probable	Improbable: too sandy.	Fair: too sandy.
7430:				
Raddle	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
8070: Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8071: Darwin	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
8077: Huntsville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
8092: Sarpy	Good	Probable	Improbable: too sandy.	Poor: too sandy.
8107: Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8162: Gorham	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too clayey, wetness.
8284: Tice	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
8304: Landes	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer, too sandy.
8404: Titus	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
8405: Zook	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8415: Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
8451: Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8452: Riley	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.

Table 13.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
8682:				
Medway----------	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

Table 14.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
6C2:							
Fishhook	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, rooting depth.
7C3:							
Atlas	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Frost action, percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
8D2:							
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
8F:							
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
8G:							
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
17A:							
Keomah	Slight	Moderate: wetness.	Severe: slow refill.	Frost action, percs slowly.	Percs slowly, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
17B:							
Keomah	Moderate: slope.	Moderate: wetness.	Severe: slow refill.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
17B2:							
Keomah	Moderate: slope.	Moderate: wetness.	Severe: slow refill.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
36B:							
Tama	Moderate: seepage, slope.	Slight	Moderate: deep to water, slow refill.	Deep to water	Slope	Erodes easily	Erodes easily.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
36B2: Tama	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
37A: Worthen	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable	Erodes easily	Erodes easily.
37B: Worthen	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
41A: Muscatine	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
41B2: Muscatine	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
43A: Ipava	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
43B: Ipava	Moderate: slope.	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
43B2: Ipava	Moderate: slope.	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
46A: Herrick	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
50: Virden	Slight	Severe: ponding.	Severe: slow refill.	Frost action, ponding.	Ponding	Ponding	Wetness.
61A: Atterberry	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
61B2:							
Atterberry	Moderate: seepage, slope.	Severe: wetness.	Moderate: slow refill.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
68:							
Sable	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Frost action, ponding.	Ponding	Ponding	Wetness.
112:							
Cowden	Slight	Severe: wetness.	Severe: no water.	Frost action, percs slowly.	Percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
119C2:							
Elco	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: no water.	Frost action, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily.
134B:							
Camden	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
134C2:							
Camden	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
138:							
Shiloh	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Slow intake, wetness.	Wetness	Wetness.
250D2:							
Velma	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope	Slope	Slope.
257A:							
Clarksdale	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
257B:							
Clarksdale	Moderate: slope.	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
257B2:							
Clarksdale------	Moderate: slope.	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
259C2:							
Assumption------	Moderate: seepage, slope.	Moderate: wetness.	Severe: no water.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
268B:							
Mt. Carroll-----	Moderate: seepage, slope.	Moderate: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope----------	Erodes easily	Erodes easily.
274A:							
Seaton----------	Moderate: seepage.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
274B:							
Seaton----------	Moderate: seepage, slope.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
274C2:							
Seaton----------	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
274D3:							
Seaton----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
278A:							
Stronghurst-----	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Frost action---	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
279B:							
Rozetta---------	Moderate: seepage, slope.	Slight---------	Moderate: deep to water, slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
279C2:							
Rozetta---------	Moderate: seepage, slope.	Slight---------	Moderate: deep to water, slow refill.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
280D2:							
Fayette	Severe: slope.	Slight	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
379B:							
Dakota	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Slope	Too sandy	Favorable.
386B:							
Downs	Moderate: seepage, slope.	Slight	Moderate: deep to water, slow refill.	Deep to water	Slope	Erodes easily	Erodes easily.
417G:							
Derinda	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Depth to rock, percs slowly, slope.	Depth to rock, erodes easily, slope.	Depth to rock, erodes easily, slope.
440B:							
Jasper	Moderate: seepage, slope.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
440C2:							
Jasper	Moderate: seepage, slope.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
470C2:							
Keller	Severe: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, slope, wetness.	Erodes easily, percs slowly, slope.
516:							
Faxon	Moderate: depth to rock, seepage.	Severe: piping, wetness.	Severe: depth to rock.	Depth to rock, frost action.	Depth to rock, wetness.	Depth to rock, wetness.	Depth to rock, wetness.
605E3:							
Ursa	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Droughty, percs slowly, slope.	Erodes easily, percs slowly, slope.	Droughty, erodes easily, slope.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
647A:							
Lawler	Severe: seepage.	Moderate: piping, thin layer, wetness.	Severe: cutbanks cave.	Frost action	Wetness	Wetness	Favorable.
660C3:							
Coatsburg	Moderate: slope.	Severe: hard to pack, wetness.	Severe: no water.	Frost action, percs slowly, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
785C:							
Lacrescent	Severe: seepage.	Severe: large stones, piping, seepage.	Severe: no water.	Deep to water	Large stones, slope.	Large stones	Large stones, slope.
785G:							
Lacrescent	Severe: seepage, slope.	Severe: large stones, piping, seepage.	Severe: no water.	Deep to water	Droughty, large stones, slope.	Large stones, slope.	Droughty, large stones, slope.
802B:							
Orthents	Moderate: slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily, rooting depth, slope.	Erodes easily	Erodes easily, rooting depth.
802F:							
Orthents	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily, rooting depth, slope.	Erodes easily, slope.	Erodes easily, rooting depth, slope.
864:							
Pits.							
874F:							
Dickinson	Severe: seepage, slope.	Severe: piping, seepage.	Severe: no water.	Deep to water	Slope, soil blowing.	Slope, soil blowing, too sandy.	Slope.
Hamburg	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
915D2:							
Elco	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Frost action, slope.	Percs slowly, slope, wetness.	Erodes easily, slope, wetness.	Erodes easily, slope.
Ursa	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, slope.
936F:							
Fayette	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Erodes easily, slope.	Erodes easily, slope.
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
936G:							
Fayette	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Erodes easily, slope.	Erodes easily, slope.
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
937F:							
Seaton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
937G:							
Seaton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
971D3:							
Fishhook	Severe: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, slope, wetness.	Erodes easily, rooting depth, slope.
Atlas	Severe: slope.	Severe: hard to pack.	Severe: no water.	Frost action, percs slowly, slope.	Droughty, slope, wetness.	Erodes easily, slope, wetness.	Erodes easily, slope, wetness.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1070: Beaucoup	Slight	Severe: ponding.	Severe: slow refill.	Flooding, frost action, ponding.	Flooding, ponding.	Ponding	Wetness.
3070: Beaucoup	Slight	Severe: ponding.	Severe: slow refill.	Flooding, frost action, ponding.	Flooding, ponding.	Ponding	Wetness.
3073: Ross	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Flooding	Favorable	Favorable.
3107: Sawmill	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.
3284: Tice	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Wetness	Wetness	Favorable.
3331: Haymond	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
3333: Wakeland	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, flooding, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
3334: Birds	Slight	Severe: wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, flooding, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
3415: Orion	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
3428: Coffeen	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3451:							
Lawson	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
3452:							
Riley	Severe: seepage.	Severe: piping, seepage, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Wetness	Too sandy, wetness.	Favorable.
3789:							
Volney	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Rooting depth	Favorable	Rooting depth.
7349B:							
Zumbro	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Fast intake, slope, soil blowing.	Soil blowing, too sandy.	Favorable.
7430:							
Raddle	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Erodes easily	Erodes easily.
8070:							
Beaucoup	Slight	Severe: ponding.	Severe: slow refill.	Flooding, frost action, ponding.	Flooding, ponding.	Ponding	Wetness.
8071:							
Darwin	Slight	Severe: hard to pack, ponding.	Severe: slow refill.	Flooding, percs slowly, ponding.	Percs slowly, ponding, slow intake.	Percs slowly, ponding.	Percs slowly, wetness.
8077:							
Huntsville	Moderate: seepage.	Moderate: piping, thin layer.	Severe: no water.	Deep to water	Flooding	Favorable	Favorable.
8092:							
Sarpy	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Soil blowing, too sandy.	Droughty.
8107:							
Sawmill	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.

Table 14.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
8162: Gorham	Severe: seepage.	Severe: piping, seepage, wetness.	Severe: cutbanks cave, slow refill.	Flooding, frost action.	Wetness	Too sandy, wetness.	Rooting depth, wetness.
8284: Tice	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Wetness	Wetness	Favorable.
8304: Landes	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Deep to water	Favorable	Too sandy	Favorable.
8404: Titus	Slight	Severe: wetness.	Severe: slow refill.	Flooding, frost action, percs slowly.	Wetness	Percs slowly, wetness.	Rooting depth, wetness.
8405: Zook	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Flooding, frost action, percs slowly.	Percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
8415: Orion	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
8451: Lawson	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
8452: Riley	Severe: seepage.	Severe: piping, seepage, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Wetness	Too sandy, wetness.	Favorable.
8682: Medway	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Flooding, wetness.	Wetness	Favorable.

Table 15.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	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	
6C2:												
Fishhook--------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-15
	8-37	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	37-60	Clay loam, clay, silty clay loam.	CH, CL	A-7	0-1	0-5	95-100	90-100	80-90	75-85	40-60	20-35
7C3:												
Atlas-----------	0-5	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	75-100	40-60	25-40
	5-11	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	11-60	Silty clay loam, silty clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
8D2:												
Hickory---------	0-7	Loam-----------	CL	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	7-50	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	50-60	Clay loam, loam, gravelly clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8F:												
Hickory---------	0-13	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	13-46	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	46-60	Clay loam, loam, gravelly clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8G:												
Hickory---------	0-6	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	6-60	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
17A:												
Keomah----------	0-9	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	9-16	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	4-15
	16-46	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	46-73	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
17B:												
Keomah----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	6-45	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	45-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
17B2:												
Keomah----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	6-52	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	52-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
36B:												
Tama------------	0-15	Silt loam------	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	15-50	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	50-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
36B2:												
Tama------------	0-15	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
	15-51	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	51-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
37A:												
Worthen---------	0-30	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21
	30-60	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
37B:												
Worthen----------	0-32	Silt loam-------	CL	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21
	32-60	Silt loam-------	CL	A-4, A-6	0	0	100	100	95-100	80-100	25-40	7-21
41A:												
Muscatine--------	0-13	Silt loam-------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
	13-39	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
	39-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
41B2:												
Muscatine--------	0-9	Silt loam-------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
	9-37	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
	37-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
43A:												
Ipava------------	0-20	Silt loam-------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	20-57	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	57-66	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
43B:												
Ipava------------	0-15	Silt loam-------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	15-50	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	50-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
43B2:												
Ipava------------	0-8	Silt loam-------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	8-31	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	31-80	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
46A:												
Herrick----------	0-17	Silt loam-------	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	17-32	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	25-40
	32-41	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	20-35
	41-60	Silt loam, loam, clay loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
50:												
Virden-----------	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	30-45	10-25
	8-56	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
	56-64	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
61A:												
Atterberry-------	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
	8-14	Silt loam-------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	14-31	Silt loam, silty clay loam.	CH, CL	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-30
	31-70	Silt loam, loam	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
61B2:												
Atterberry-------	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
	8-35	Silt loam, silty clay loam.	CH, CL	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-30
	35-65	Silt loam, loam	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
68:												
Sable------------	0-12	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	12-19	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	19-57	Silty clay loam, silt loam.	CH, CL	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	57-60	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
112:												
Cowden----------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	3-15
	9-17	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	17-42	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
	42-60	Silt loam------	CL	A-6, A-7-6	0	0	100	100	95-100	95-100	30-45	10-20
119C2:												
Elco------------	0-4	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	4-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	25-45	10-30
	28-62	Silty clay loam, loam, clay.	CL	A-6, A-7	0	0	100	90-100	80-100	60-95	25-50	10-30
134B:												
Camden----------	0-13	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	13-27	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	27-53	Clay loam, loam, silt loam.	CL, ML, SC, SM	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	53-60	Stratified sandy loam to silt loam.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	0-25	3-10
134C2:												
Camden----------	0-7	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	7-25	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	25-55	Clay loam, loam, silt loam.	CL, ML, SC, SM	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	55-60	Stratified sandy loam to silt loam.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	0-25	3-10

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
138:												
Shiloh----------	0-22	Silty clay-----	CH, CL	A-7	0	0	100	100	95-100	90-100	45-55	25-35
	22-48	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	15-40
	48-64	Silty clay loam, silty clay, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-30
250D2:												
Velma-----------	0-8	Loam-----------	CL	A-4, A-6	0	0	100	100	90-100	70-90	20-40	8-25
	8-51	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0-1	0-5	100	85-100	80-95	55-75	30-50	15-30
	51-60	Sandy clay loam, clay loam, sandy loam.	CL, ML, SC, SM	A-2, A-4, A-6	0-1	0-5	90-100	75-100	60-90	30-80	20-40	3-20
257A:												
Clarksdale------	0-9	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	9-18	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-18
	18-42	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	42-60	Silt loam, silty clay loam.	CL	A-6	0	0	95-100	95-100	95-100	90-100	25-40	10-25
257B:												
Clarksdale------	0-9	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	9-13	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-18
	13-41	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	41-60	Silt loam, silty clay loam.	CL	A-6	0	0	95-100	95-100	95-100	90-100	25-40	10-25

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
257B2:												
Clarksdale------	0-8	Silt loam------	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	8-55	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	55-60	Silt loam, silty clay loam.	CL	A-6	0	0	95-100	95-100	95-100	90-100	25-40	10-25
259C2:												
Assumption------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	8-20
	7-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-30
	30-68	Clay loam, silty clay loam, clay.	CL	A-6, A-7	0	0-5	100	95-100	90-100	70-90	35-50	20-35
268B:												
Mt. Carroll-----	0-8	Silt loam------	CL	A-4, A-6	0	0	100	100	100	95-100	25-40	7-18
	8-12	Silt loam------	CL	A-4, A-6	0	0	100	100	100	90-100	25-40	7-18
	12-51	Silt loam------	CL	A-4, A-6	0	0	100	100	100	95-100	25-40	8-20
	51-70	Silt loam------	CL	A-4, A-6	0	0	100	100	100	90-100	25-40	7-17
274A:												
Seaton----------	0-14	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	6-16
	14-60	Silt loam------	CL	A-4, A-6	0	0	100	100	100	90-100	28-40	9-21
274B:												
Seaton----------	0-8	Silt-----------	CL-ML, ML	A-4	0	0	100	100	100	95-100	0-20	NP-5
	8-52	Silt loam------	CL	A-4, A-6	0	0	100	100	100	90-100	28-40	9-21
	52-73	Silt loam, silt	CL	A-4, A-6	0	0	100	100	100	90-100	25-40	7-17
274C2:												
Seaton----------	0-9	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	9-60	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
274D3:												
Seaton----------	0-5	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	5-44	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
	44-80	Silt loam, silt	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
278A:												
Stronghurst-----	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	6-14	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	14-43	Silty clay loam, silt loam.	CH, CL	A-7	0	0	100	100	100	98-100	40-55	20-35
	43-60	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-20
279B:												
Rozetta---------	0-6	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	6-12	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	12-45	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	15-30
	45-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	7-20
279C2:												
Rozetta---------	0-4	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	4-43	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	15-30
	43-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	7-20
280D2:												
Fayette---------	0-7	Silt loam------	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	7-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	40-60	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
379B:												
Dakota----------	0-15	Loam-----------	CL	A-4, A-6	0	0	95-100	85-100	75-95	50-75	25-35	7-15
	15-26	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	0	95-100	85-100	70-100	35-80	25-40	9-20
	26-30	Sandy loam, loamy sand, gravelly sandy loam.	GM, GP, SM, SP	A-1, A-2, A-3, A-4	0-1	0-5	55-100	45-100	20-75	2-40	0-21	NP-4
	30-60	Sand, gravelly coarse sand, very channery loamy sand.	GM, GP, SM, SP	A-1, A-2, A-3	0-1	0-5	50-100	45-100	20-75	2-30	0-14	NP

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
386B:												
Downs-----------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	8-11	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	11-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	44-62	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	11-20
417G:												
Derinda---------	0-3	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	3-36	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	36-60	Weathered bedrock.	CH, CL	A-6, A-7	0	0	90-100	85-100	80-90	65-90	30-55	15-30
440B:												
Jasper----------	0-16	Loam-----------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	16-51	Loam, clay loam, sandy clay loam.	CL, SC	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	51-60	Stratified silt loam to sand.	CL, CL-ML, SC, SC-SM	A-4	0	0	100	85-100	75-90	35-85	0-30	5-10
440C2:												
Jasper----------	0-7	Fine sandy loam	CL, CL-ML, SC, SC-SM	A-4	0	0	100	100	70-85	40-55	20-30	5-10
	7-13	Loam, fine sandy loam.	CL	A-6	0	0	100	100	85-95	60-75	20-35	10-20
	13-38	Sandy clay loam, clay loam, silty clay loam.	CL, SC	A-6	0	0	100	95-100	80-95	45-85	20-35	10-20
	38-56	Fine sandy loam, loam, sandy clay loam.	SC, SC-SM	A-2-4, A-4	0	0	100	85-100	60-70	30-40	20-30	5-10
	56-60	Stratified silt loam to sand.	CL, CL-ML, SC, SC-SM	A-4	0	0	100	85-100	75-90	35-85	0-30	5-10
470C2:												
Keller----------	0-8	Silt loam------	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	8-31	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	31-62	Silty clay loam, silty clay, clay.	CH, CL	A-6, A-7	0	0-5	95-100	90-100	80-95	75-90	35-55	15-30

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
516:												
Faxon-----------	0-11	Silty clay loam	CL	A-7	0	0-10	95-100	85-100	85-100	80-95	40-50	15-25
	11-21	Loam, sandy loam, gravelly clay loam.	CL, ML, SC, SM	A-6, A-7	0-10	0-30	95-100	70-100	65-95	40-85	30-50	10-20
	21-60	Unweathered bedrock, weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
605E3:												
Ursa------------	0-2	Clay loam------	CL	A-6, A-7	0	0	100	95-100	90-100	80-95	30-50	15-30
	2-39	Clay, clay loam, silty clay.	CH, CL	A-7	0	0-5	95-100	90-95	70-90	55-90	40-60	20-35
	39-75	Clay loam, loam, clay.	CH, CL	A-6, A-7	0-1	0-5	95-100	90-95	80-90	60-85	35-55	20-35
647A:												
Lawler----------	0-13	Clay loam------	CL, ML	A-6, A-7	0	0	100	90-100	70-90	55-75	35-45	10-20
	13-33	Loam, clay loam	CL	A-6	0	0	95-100	95-100	70-85	50-65	25-35	10-17
	33-45	Loamy sand, sand, very gravelly loamy sand.	SM, SP-SM	A-2, A-3	0	0-2	90-100	70-100	50-75	5-35	0-15	NP-3
	45	Unweathered bedrock.	---	---	0	0	0	0	0	0	---	NP
660C3:												
Coatsburg-------	0-5	Silty clay loam	CL	A-6, A-7	0	0	100	100	85-95	70-90	35-50	15-30
	5-63	Silty clay, clay, clay loam.	CH	A-7	0	0	100	95-100	75-90	65-85	50-70	35-55
785C:												
Lacrescent------	0-15	Silt loam------	CL, ML	A-6	0	0-15	90-100	80-100	60-95	50-90	30-40	10-15
	15-35	Cobbly silt loam, silt loam, very cobbly loam.	CL, ML, SC, SM	A-1, A-2, A-4, A-6	0	30-55	55-80	45-80	40-65	20-60	20-35	3-12
	35-60	Very cobbly loam, very cobbly silt loam, very cobbly fine sandy loam.	CL, ML, SC, SM	A-1, A-2, A-4, A-6	0	50-65	50-75	40-65	35-60	15-55	0-30	NP-12

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
785G:												
Lacrescent------	0-14	Cobbly silt loam.	CL, ML	A-6, A-7	0	15-30	80-100	70-100	60-95	50-90	30-45	10-20
	14-21	Cobbly silt loam, cobbly fine sandy loam, very cobbly loam.	CL, ML, SC, SM	A-1, A-2, A-4, A-6	0	30-55	55-80	45-80	40-65	20-60	20-35	3-12
	21-60	Very cobbly loam, very cobbly silt loam, very cobbly fine sandy loam.	CL, ML, SC, SM	A-1, A-2, A-4, A-6	0	50-65	50-75	40-65	35-60	15-55	0-30	NP-12
802B:												
Orthents--------	0-60	Loam, silt loam, clay loam.	CL	A-6	0-1	0-5	95-100	90-100	85-95	60-90	20-40	10-20
802F:												
Orthents--------	0-6	Loam, silt loam, clay loam.	CL	A-6	0-1	0-5	95-100	90-100	85-95	60-90	20-40	10-20
	6-60	Loam, silt loam, clay loam.	CL	A-6	0-1	0-5	95-100	90-100	85-95	60-90	20-40	10-20
864:												
Pits.												
874F:												
Dickinson-------	0-8	Fine sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	85-95	30-50	15-30	NP-10
	8-16	Fine sandy loam, sandy loam.	SC, SC-SM, SM	A-2, A-4	0	0	100	100	85-95	30-50	15-30	NP-10
	16-30	Fine sandy loam, sandy loam.	SC, SC-SM, SM	A-4	0	0	100	100	85-95	35-50	15-30	NP-10
	30-37	Loamy sand, loamy fine sand, fine sand.	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	80-95	5-20	10-20	NP-5
	37-60	Sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-20	---	NP

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
874F:												
Hamburg----------	0-5	Silt-----------	CL-ML, ML	A-4	0	0	100	100	100	95-100	0-25	NP-5
	5-74	Silt loam, very fine sandy loam, silt.	CL-ML, ML	A-4	0	0	100	100	100	95-100	0-25	NP-5
915D2:												
Elco-------------	0-7	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	7-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	25-45	10-30
	30-36	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	85-95	75-95	25-45	10-30
	36-71	Silty clay loam, loam, clay loam.	CL	A-6, A-7	0	0	100	90-100	80-100	60-95	25-50	10-30
Ursa-------------	0-4	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-100	20-40	5-20
	4-41	Clay, clay loam, silty clay.	CH, CL	A-7	0	0-5	95-100	90-95	70-90	55-90	40-60	20-35
	41-60	Clay loam, loam, clay.	CH, CL	A-6, A-7	0-1	0-5	95-100	90-95	80-90	60-85	35-55	20-35
936F:												
Fayette----------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	8-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	44-60	Silt loam------	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
Hickory----------	0-7	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	7-41	Clay loam, silty clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	41-60	Clay loam, loam, gravelly clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
936G:												
Fayette---------	0-5	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	5-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
Hickory---------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	9-60	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
937F:												
Seaton----------	0-7	Silt loam------	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	100	95-100	20-45	5-20
	7-47	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
	47-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
Hickory---------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	8-60	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
937G:												
Seaton----------	0-6	Silt loam------	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	100	95-100	20-45	5-20
	6-44	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
	44-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
Hickory---------	0-12	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	12-42	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	42-60	Clay loam, loam, gravelly clay loam.	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
971D3:												
Fishhook--------	0-5	Silty clay loam	ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-20
	5-23	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	23-60	Clay loam, clay, silty clay loam.	CH, CL	A-7	0-1	0-5	95-100	90-100	80-90	75-85	40-60	20-35

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
971D3:												
Atlas-----------	0-3	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	75-100	40-60	25-40
	3-10	Silty clay loam, silty clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	10-43	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	43-60	Clay loam, clay, loam.	CH, CL	A-6, A-7	0	0	95-100	90-100	90-100	65-95	35-55	20-30
1070:												
Beaucoup--------	0-14	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	14-28	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-30
	28-40	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	65-95	25-45	5-25
	40-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	60-95	20-40	5-20
3070:												
Beaucoup--------	0-14	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	14-50	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-30
	50-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	65-95	25-45	5-25
3073:												
Ross------------	0-18	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-100	65-95	20-35	NP-12
	18-32	Loam, silt loam, gravelly loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	32-60	Stratified very gravelly sandy loam to silt loam.	CL, GM, ML, SM	A-2, A-4, A-6	0	0-5	65-100	45-100	30-100	25-80	0-30	NP-12

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
3107:												
Sawmill---------	0-17	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	17-28	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	28-60	Silty clay loam, clay loam, loam.	CL	A-4, A-6, A-7	0	0	100	100	85-100	70-95	25-50	8-25
3284:												
Tice------------	0-22	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	22-36	Silty clay loam, silt loam.	CH, CL	A-7	0	0	100	100	95-100	85-95	40-55	15-30
	36-60	Stratified silty clay loam to loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	60-95	55-80	25-45	5-20
3331:												
Haymond---------	0-6	Silt loam------	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	4-10
	6-47	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	20-32	4-13
	47-68	Fine sandy loam, silt loam, loam.	CL, ML, SC, SM	A-4, A-6	0	0	95-100	90-100	80-100	35-90	15-35	NP-15
3333:												
Wakeland--------	0-7	Silt loam------	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
	7-60	Silt loam------	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
3334:												
Birds-----------	0-7	Silt loam------	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
	7-60	Silt loam, loam.	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
3415:												
Orion-----------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	80-100	25-35	4-12
	8-30	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	0	100	100	90-100	70-80	20-30	4-10
	30-62	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	85-100	20-40	4-18
3428:												
Coffeen---------	0-18	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	25-40	5-20
	18-44	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	80-95	20-35	3-10
	44-60	Stratified silt loam to sandy loam.	CL, ML, SC, SM	A-2, A-4	0	0	100	90-100	85-100	30-85	15-30	NP-10

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
3451:												
Lawson----------	0-11	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	11-28	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	28-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25
3452:												
Riley-----------	0-13	Loam-----------	CL	A-6	0	0	100	100	95-100	80-100	30-40	15-25
	13-27	Sandy clay loam, silty clay loam, loam.	CL, SC	A-6, A-7	0	0	100	100	90-100	40-85	35-50	15-25
	27-76	Loamy fine sand, sand, loamy sand.	SC-SM, SM, SP-SM	A-2, A-4	0	0	100	100	90-100	10-40	0-25	NP-7
3789:												
Volney----------	0-7	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
	7-46	Channery silt loam, very channery loam, very channery silt loam.	GC, GM, SC, SM	A-1, A-2, A-4	30-50	15-45	40-75	30-65	20-50	15-40	20-30	3-10
	46	Unweathered bedrock.	---	---	0	0	0	0	0	0	---	NP
7349B:												
Zumbro----------	0-11	Loamy fine sand	SM	A-2	0	0	100	95-100	60-95	15-35	10-21	NP
	11-19	Loamy sand, loamy fine sand.	SM	A-2	0	0	100	95-100	60-95	15-30	10-21	NP
	19-31	Sand, fine sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3	0	0	95-100	85-100	60-95	4-30	---	NP
	31-60	Sand, fine sand, coarse sand.	SM, SP, SP-SM	A-2, A-3	0	0	90-100	80-100	50-80	4-20	---	NP
7430:												
Raddle----------	0-18	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	8-15
	18-49	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	20-30	4-14
	49-65	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
8070:												
Beaucoup--------	0-18	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	18-45	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-30
	45-52	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	65-95	25-45	5-25
	52-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	60-95	20-40	5-20
8071:												
Darwin----------	0-17	Silty clay-----	CH, CL	A-7	0	0	100	100	100	90-100	45-85	25-55
	17-39	Silty clay, clay.	CH, CL	A-7	0	0	100	100	100	85-100	45-85	25-55
	39-60	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	90-100	35-70	20-45
8077:												
Huntsville------	0-28	Silt loam------	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-20
	28-43	Silt loam------	CL	A-6	0	0	100	95-100	90-100	85-100	20-35	10-20
	43-60	Silt loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	85-95	30-85	20-35	5-20
8092:												
Sarpy-----------	0-9	Sand-----------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	60-80	2-15	---	NP
	9-60	Fine sand, loamy fine sand, sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	60-80	2-35	---	NP
8107:												
Sawmill---------	0-13	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	13-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	33-60	Silty clay loam, clay loam, loam.	CL	A-4, A-6, A-7	0	0	100	100	85-100	70-95	25-50	8-25

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
8162:												
Gorham----------	0-13	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	70-90	35-50	15-25
	13-36	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	100	90-95	40-55	15-30
	36-60	Clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	0	100	80-90	70-80	50-80	30-45	10-20
8284:												
Tice------------	0-22	Silt loam------	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	22-53	Silty clay loam, silt loam.	CH, CL	A-7	0	0	100	100	95-100	85-95	40-55	15-30
	53-60	Stratified silty clay loam to loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	60-95	55-80	25-45	5-20
8304:												
Landes----------	0-14	Loam-----------	CL, CL-ML	A-4, A-6	0	0	100	90-100	85-100	50-75	20-35	5-15
	14-33	Loam, fine sandy loam, loamy fine sand.	CL-ML, SC, SC-SM, SM	A-2-4, A-4	0	0	100	85-100	70-100	15-60	0-25	NP-10
	33-60	Stratified fine sand to silt loam.	SC, SC-SM, SM, SP-SM	A-2-4, A-4	0	0	100	85-100	70-85	10-50	0-30	NP-10
8404:												
Titus-----------	0-15	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
	15-57	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
	57-60	Silty clay loam, silt loam, sandy loam.	CL	A-6	0	0	100	90-100	70-90	55-85	20-40	10-25
8405:												
Zook------------	0-22	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
	22-58	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
	58-68	Silty clay loam, silty clay, silt loam.	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	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	
8415:												
Orion-----------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	80-100	25-35	4-12
	8-29	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	0	100	100	90-100	70-80	20-30	4-10
	29-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	85-100	20-40	4-18
8451:												
Lawson----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	6-42	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	42-60	Stratified silty clay loam to sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	100	100	60-100	35-85	20-35	5-20
8452:												
Riley-----------	0-11	Silt loam------	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
	11-25	Silty clay loam, silt loam, loam.	CL, SC	A-6, A-7	0	0	100	100	90-100	40-85	35-50	15-25
	25-60	Loamy fine sand, sand, loamy sand.	SC-SM, SM, SP-SM	A-2, A-4	0	0	100	100	90-100	10-40	0-25	NP-7
8682:												
Medway----------	0-15	Loam-----------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-100	70-90	20-40	3-15
	15-44	Loam, silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	95-100	80-95	75-90	70-90	20-45	4-20
	44-53	Stratified sandy loam to silty clay loam.	CL, ML, SC-SM, SM	A-2, A-4, A-6	0	0	90-100	75-100	45-95	25-75	15-30	NP-15
	53-60	Stratified gravelly sandy loam to silty clay loam.	CL, ML, SC, SM	A-1-b, A-2, A-4, A-6	0	0-5	80-100	50-100	30-95	15-75	15-30	NP-15

Table 16.--Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
6C2:												
Fishhook--------	0-8	20-27	1.30-1.50	0.60-2.00	0.22-0.24	14.0-22.0	5.1-7.3	Low------	1.0-3.0	0.43	4	6
	8-37	27-35	1.40-1.60	0.60-2.00	0.18-0.20	16.0-23.0	4.5-7.3	Moderate	0.0-1.0	0.37		
	37-60	35-45	1.55-1.75	0.06-0.20	0.09-0.16	21.0-29.0	4.5-7.8	High-----	0.0-1.0	0.28		
7C3:												
Atlas-----------	0-5	30-40	1.35-1.55	0.06-0.20	0.14-0.19	19.0-26.0	4.5-7.3	High-----	0.5-1.0	0.28	2	7
	5-11	35-45	1.35-1.55	0.00-0.06	0.07-0.19	21.0-29.0	4.5-7.3	High-----	0.0-1.0	0.28		
	11-60	30-45	1.35-1.55	0.00-0.06	0.07-0.19	18.0-29.0	4.5-7.8	High-----	0.0-1.0	0.28		
8D2:												
Hickory---------	0-7	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.32	5	6
	7-50	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-6.0	Moderate	0.0-0.5	0.32		
	50-60	15-32	1.50-1.70	0.60-2.00	0.11-0.19	9.0-19.0	5.1-8.4	Low------	0.0-0.2	0.32		
8F:												
Hickory---------	0-13	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.32	5	6
	13-46	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
	46-60	15-32	1.50-1.70	0.60-2.00	0.11-0.19	9.0-19.0	5.1-8.4	Low------	0.0-0.2	0.32		
8G:												
Hickory---------	0-6	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.32	5	6
	6-60	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
17A:												
Keomah----------	0-9	16-26	1.30-1.40	0.60-2.00	0.22-0.24	15.0-20.0	4.5-7.3	Low------	1.0-3.0	0.43	3	6
	9-16	16-26	1.35-1.45	0.20-0.60	0.18-0.20	15.0-20.0	4.5-7.3	Low------	0.2-1.0	0.37		
	16-46	35-42	1.30-1.45	0.06-0.60	0.18-0.20	25.0-30.0	4.5-5.5	High-----	0.0-0.5	0.37		
	46-73	24-38	1.40-1.55	0.20-0.60	0.18-0.20	15.0-20.0	5.1-7.3	Moderate	0.0-0.5	0.49		
17B:												
Keomah----------	0-6	16-26	1.30-1.40	0.60-2.00	0.22-0.24	15.0-20.0	4.5-7.3	Low------	1.0-3.0	0.43	3	6
	6-45	35-42	1.30-1.45	0.06-0.60	0.18-0.20	25.0-30.0	4.5-5.5	High-----	0.0-0.5	0.37		
	45-60	24-38	1.40-1.55	0.20-0.60	0.18-0.20	15.0-20.0	5.1-7.3	Moderate	0.0-0.5	0.49		
17B2:												
Keomah----------	0-6	16-26	1.30-1.40	0.60-2.00	0.22-0.24	15.0-20.0	4.5-7.3	Low------	1.0-3.0	0.43	3	6
	6-52	35-42	1.30-1.45	0.06-0.60	0.18-0.20	25.0-30.0	4.5-5.5	High-----	0.0-0.5	0.37		
	52-60	24-38	1.40-1.55	0.20-0.60	0.18-0.20	15.0-20.0	5.1-7.3	Moderate	0.0-0.5	0.49		
36B:												
Tama------------	0-15	20-26	1.25-1.30	0.60-2.00	0.22-0.24	---	5.1-7.3	Moderate	3.0-4.0	0.28	5	6
	15-50	27-35	1.30-1.35	0.60-2.00	0.18-0.20	---	5.1-6.5	Moderate	---	0.37		
	50-60	20-30	1.35-1.40	0.60-2.00	0.18-0.20	---	5.6-7.3	Moderate	---	0.49		
36B2:												
Tama------------	0-15	24-27	1.25-1.30	0.60-2.00	0.22-0.24	25.0-30.0	5.1-7.3	Moderate	2.0-3.0	0.28	5	6
	15-51	27-35	1.30-1.35	0.60-2.00	0.18-0.20	25.0-30.0	5.1-6.5	Moderate	0.5-1.0	0.37		
	51-60	22-28	1.35-1.40	0.60-2.00	0.18-0.20	25.0-30.0	5.6-7.3	Moderate	0.0-0.5	0.49		
37A:												
Worthen---------	0-30	15-22	1.20-1.40	0.60-2.00	0.22-0.24	15.0-21.0	5.6-7.3	Low------	3.0-4.0	0.32	5	6
	30-60	18-24	1.20-1.40	0.60-2.00	0.20-0.22	11.0-14.0	5.6-7.8	Low------	0.2-1.0	0.49		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
37B:												
Worthen---------	0-32	15-22	1.20-1.40	0.60-2.00	0.22-0.24	15.0-21.0	5.6-7.3	Low------	3.0-4.0	0.32	5	6
	32-60	18-24	1.20-1.40	0.60-2.00	0.20-0.22	11.0-14.0	5.6-7.8	Low------	0.2-1.0	0.49		
41A:												
Muscatine-------	0-13	24-27	1.28-1.32	0.60-2.00	0.22-0.24	30.0-36.0	5.1-7.3	Moderate	4.0-6.0	0.28	5	6
	13-39	30-35	1.28-1.35	0.60-2.00	0.18-0.20	30.0-36.0	5.1-7.3	Moderate	1.0-2.0	0.37		
	39-60	22-30	1.35-1.40	0.60-2.00	0.18-0.20	30.0-36.0	6.6-7.8	Moderate	0.5-1.0	0.37		
41B2:												
Muscatine-------	0-9	24-27	1.28-1.32	0.60-2.00	0.22-0.24	30.0-36.0	5.1-7.3	Moderate	4.0-6.0	0.28	5	6
	9-37	30-35	1.28-1.35	0.60-2.00	0.18-0.20	30.0-36.0	5.1-7.3	Moderate	1.0-2.0	0.37		
	37-60	22-30	1.35-1.40	0.60-2.00	0.18-0.20	30.0-36.0	6.6-7.8	Moderate	0.5-1.0	0.37		
43A:												
Ipava-----------	0-20	20-27	1.15-1.35	0.60-2.00	0.22-0.24	20.0-27.0	5.6-7.3	Moderate	4.0-5.0	0.28	5	6
	20-57	35-43	1.25-1.50	0.20-0.60	0.11-0.20	22.0-27.0	5.6-7.8	High-----	0.5-1.0	0.37		
	57-66	20-30	1.30-1.55	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
43B:												
Ipava-----------	0-15	20-27	1.15-1.35	0.60-2.00	0.22-0.24	20.0-27.0	5.6-7.3	Moderate	4.0-5.0	0.28	5	6
	15-50	35-43	1.25-1.50	0.20-0.60	0.11-0.20	22.0-27.0	5.6-7.8	High-----	0.5-1.0	0.37		
	50-60	20-30	1.30-1.55	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
43B2:												
Ipava-----------	0-8	20-27	1.15-1.35	0.60-2.00	0.22-0.24	20.0-27.0	5.6-7.3	Moderate	4.0-5.0	0.28	5	6
	8-31	35-43	1.25-1.50	0.20-0.60	0.11-0.20	22.0-27.0	5.6-7.8	High-----	0.5-1.0	0.37		
	31-80	20-30	1.30-1.55	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
46A:												
Herrick---------	0-17	20-27	1.15-1.30	0.60-2.00	0.22-0.24	18.0-24.0	5.1-7.3	Moderate	3.0-4.0	0.28	5	6
	17-32	35-42	1.20-1.40	0.20-0.60	0.12-0.17	21.0-25.0	4.5-6.0	High-----	0.2-1.0	0.37		
	32-41	25-40	1.20-1.40	0.20-0.60	0.16-0.20	15.0-25.0	5.6-7.3	Moderate	0.0-0.4	0.37		
	41-60	20-30	1.30-1.50	0.20-0.60	0.16-0.21	12.0-18.0	5.6-8.4	Moderate	0.0-0.2	0.37		
50:												
Virden----------	0-8	27-30	1.20-1.40	0.60-2.00	0.21-0.24	24.0-30.0	5.6-7.8	Moderate	4.0-6.0	0.24	5	7
	8-56	35-42	1.20-1.45	0.20-0.60	0.11-0.20	21.0-27.0	5.6-7.8	High-----	0.2-1.0	0.37		
	56-64	25-33	1.25-1.55	0.20-0.60	0.18-0.22	15.0-20.0	6.1-8.4	Moderate	0.2-0.5	0.49		
61A:												
Atterberry------	0-8	20-26	1.35-1.55	0.60-2.00	0.22-0.25	16.0-24.0	5.6-7.3	Low------	2.0-4.0	0.37	5	6
	8-14	15-26	1.40-1.60	0.60-2.00	0.21-0.24	10.0-18.0	5.1-7.3	Low------	0.5-1.0	0.43		
	14-31	25-35	1.40-1.60	0.60-2.00	0.14-0.24	15.0-22.0	5.1-7.3	Moderate	0.1-0.5	0.37		
	31-70	18-27	1.40-1.65	0.60-2.00	0.14-0.24	11.0-17.0	5.6-7.8	Low------	0.1-0.5	0.37		
61B2:												
Atterberry------	0-8	20-26	1.35-1.55	0.60-2.00	0.22-0.25	16.0-24.0	5.6-7.3	Low------	2.0-4.0	0.37	5	6
	8-35	25-35	1.40-1.60	0.60-2.00	0.14-0.24	15.0-22.0	5.1-7.3	Moderate	0.1-0.5	0.37		
	35-65	18-27	1.40-1.65	0.60-2.00	0.14-0.24	11.0-17.0	5.6-7.8	Low------	0.1-0.5	0.37		
68:												
Sable-----------	0-12	27-35	1.15-1.35	0.60-2.00	0.21-0.23	26.0-33.0	5.6-7.3	Moderate	5.0-6.0	0.24	5	7
	12-19	27-35	1.20-1.40	0.60-2.00	0.18-0.20	20.0-30.0	5.6-7.3	Moderate	2.0-4.0	0.37		
	19-57	24-35	1.30-1.50	0.60-2.00	0.18-0.20	15.0-23.0	5.6-7.8	Moderate	0.2-1.0	0.37		
	57-60	20-28	1.30-1.50	0.60-2.00	0.20-0.22	12.0-18.0	6.6-8.4	Low------	0.2-0.5	0.37		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
112:												
Cowden----------	0-9	17-27	1.30-1.50	0.60-2.00	0.22-0.25	14.0-22.0	5.6-7.3	Low------	2.0-3.0	0.37	5	6
	9-17	17-27	1.25-1.45	0.06-0.20	0.18-0.20	10.0-17.0	4.5-6.0	Low------	0.0-0.5	0.43		
	17-42	35-42	1.35-1.60	0.06-0.20	0.12-0.20	21.0-27.0	4.5-7.3	High-----	0.0-1.0	0.37		
	42-60	20-27	1.50-1.70	0.20-0.60	0.17-0.22	12.0-17.0	5.6-7.8	Moderate	0.0-0.5	0.37		
119C2:												
Elco------------	0-4	20-27	1.20-1.35	0.60-2.00	0.22-0.24	14.0-22.0	5.6-7.3	Low------	1.0-3.0	0.43	5	6
	4-28	23-35	1.25-1.45	0.60-2.00	0.18-0.21	14.0-22.0	5.1-7.8	Moderate	0.0-0.5	0.37		
	28-62	25-45	1.45-1.70	0.06-0.60	0.14-0.20	15.0-27.0	5.1-7.8	High-----	0.0-0.2	0.28		
134B:												
Camden----------	0-13	14-27	1.35-1.55	0.60-2.00	0.21-0.25	10.0-20.0	5.1-7.3	Low------	1.0-2.0	0.43	5	6
	13-27	22-35	1.40-1.60	0.60-2.00	0.14-0.24	13.0-22.0	5.1-7.3	Moderate	0.1-0.5	0.37		
	27-53	18-30	1.45-1.65	0.60-2.00	0.11-0.22	10.0-19.0	5.1-7.3	Low------	0.0-0.5	0.32		
	53-60	5-20	1.40-1.70	0.60-6.00	0.12-0.22	3.0-12.0	5.6-8.4	Low------	0.0-0.5	0.24		
134C2:												
Camden----------	0-7	14-27	1.35-1.55	0.60-2.00	0.21-0.25	10.0-20.0	5.1-7.3	Low------	1.0-2.0	0.43	5	6
	7-25	22-35	1.40-1.60	0.60-2.00	0.14-0.24	13.0-22.0	5.1-7.3	Moderate	0.1-0.5	0.37		
	25-55	18-30	1.45-1.65	0.60-2.00	0.11-0.22	10.0-19.0	5.1-7.3	Low------	0.0-0.5	0.32		
	55-60	5-20	1.40-1.70	0.60-6.00	0.12-0.22	3.0-12.0	5.6-8.4	Low------	0.0-0.5	0.24		
138:												
Shiloh----------	0-22	40-45	1.30-1.50	0.20-0.60	0.12-0.18	32.0-39.0	6.1-7.3	High-----	4.0-6.0	0.24	5	4
	22-48	35-45	1.35-1.55	0.20-0.60	0.09-0.18	22.0-31.0	6.1-7.8	High-----	0.5-2.0	0.37		
	48-64	25-45	1.30-1.50	0.20-0.60	0.18-0.20	15.0-28.0	6.1-8.4	High-----	0.2-0.5	0.37		
250D2:												
Velma-----------	0-8	20-27	1.30-1.50	0.60-2.00	0.20-0.24	18.0-24.0	5.1-7.3	Low------	3.0-4.0	0.28	5	6
	8-51	25-35	1.45-1.65	0.60-2.00	0.15-0.19	15.0-23.0	4.5-7.3	Moderate	0.2-1.0	0.28		
	51-60	20-30	1.50-1.70	0.60-2.00	0.06-0.09	12.0-19.0	7.4-8.4	Low------	0.2-0.5	0.28		
257A:												
Clarksdale------	0-9	20-27	1.30-1.50	0.60-2.00	0.22-0.25	10.0-22.0	5.1-7.3	Moderate	2.0-3.0	0.37	5	6
	9-18	15-27	1.25-1.50	0.20-0.60	0.20-0.22	9.0-18.0	5.1-6.5	Low------	0.0-1.0	0.43		
	18-42	35-45	1.30-1.50	0.20-0.60	0.11-0.20	21.0-28.0	5.1-7.3	High-----	0.0-0.5	0.37		
	42-60	20-30	1.40-1.60	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
257B:												
Clarksdale------	0-9	20-27	1.30-1.50	0.60-2.00	0.22-0.25	10.0-22.0	5.1-7.3	Moderate	2.0-3.0	0.37	5	6
	9-13	15-27	1.25-1.50	0.20-0.60	0.20-0.22	9.0-18.0	5.1-6.5	Low------	0.0-1.0	0.43		
	13-41	35-45	1.30-1.50	0.20-0.60	0.11-0.20	21.0-28.0	5.1-7.3	High-----	0.0-0.5	0.37		
	41-60	20-30	1.40-1.60	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
257B2:												
Clarksdale------	0-8	20-27	1.30-1.50	0.60-2.00	0.22-0.25	10.0-22.0	5.1-7.3	Moderate	2.0-3.0	0.37	5	6
	8-55	35-45	1.30-1.50	0.20-0.60	0.11-0.20	21.0-28.0	5.1-7.3	High-----	0.0-0.5	0.37		
	55-60	20-30	1.40-1.60	0.20-0.60	0.20-0.22	12.0-19.0	6.1-8.4	Moderate	0.0-0.5	0.37		
259C2:												
Assumption------	0-7	20-27	1.25-1.45	0.60-2.00	0.23-0.25	18.0-24.0	5.6-7.3	Low------	3.0-4.0	0.28	5	6
	7-30	25-35	1.20-1.40	0.60-2.00	0.18-0.22	15.0-23.0	5.1-7.3	Moderate	0.0-1.0	0.37		
	30-68	30-45	1.45-1.65	0.06-0.60	0.14-0.20	18.0-28.0	5.1-7.3	High-----	0.0-0.5	0.28		
268B:												
Mt. Carroll-----	0-8	15-22	1.10-1.20	0.60-2.00	0.22-0.24	10.0-18.0	5.6-7.3	Low------	2.0-3.0	0.37	5	6
	8-12	15-22	1.15-1.30	0.60-2.00	0.20-0.22	10.0-16.0	5.6-7.3	Low------	0.2-0.5	0.43		
	12-51	18-27	1.15-1.30	0.60-2.00	0.20-0.22	10.0-18.0	5.1-7.3	Low------	0.2-1.0	0.37		
	51-70	16-24	1.20-1.40	0.60-2.00	0.20-0.22	10.0-15.0	5.6-8.4	Low------	0.2-0.5	0.37		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
274A:												
Seaton----------	0-14	10-22	1.10-1.40	0.60-2.00	0.22-0.24	10.0-19.0	5.6-7.3	Low------	2.0-3.0	0.43	5	5
	14-60	15-27	1.20-1.60	0.60-2.00	0.20-0.22	9.0-16.0	4.5-7.3	Low------	0.2-1.0	0.37		
274B:												
Seaton----------	0-8	10-12	1.10-1.40	0.60-2.00	0.22-0.24	6.0-15.0	5.6-7.3	Low------	2.0-3.0	0.37	5	5
	8-52	15-27	1.20-1.60	0.60-2.00	0.20-0.22	9.0-16.0	4.5-7.3	Low------	0.2-1.0	0.37		
	52-73	10-25	1.20-1.50	0.60-2.00	0.20-0.22	6.0-15.0	5.6-8.4	Low------	0.2-0.5	0.37		
274C2:												
Seaton----------	0-9	15-22	1.10-1.20	0.60-2.00	0.22-0.24	11.0-19.0	5.6-7.3	Low------	1.0-3.0	0.43	5-4	5
	9-60	18-27	1.15-1.30	0.60-2.00	0.20-0.22	11.0-16.0	4.5-7.3	Low------	0.5-1.0	0.49		
274D3:												
Seaton----------	0-5	15-22	1.10-1.20	0.60-2.00	0.22-0.24	11.0-19.0	5.6-7.3	Low------	1.0-3.0	0.49	5-4	5
	5-44	18-27	1.15-1.30	0.60-2.00	0.20-0.22	11.0-16.0	4.5-7.3	Low------	0.5-1.0	0.49		
	44-80	15-25	1.20-1.40	0.60-2.00	0.20-0.22	9.0-15.0	5.6-8.4	Low------	0.2-0.5	0.49		
278A:												
Stronghurst-----	0-6	20-27	1.25-1.45	0.60-2.00	0.22-0.24	14.0-22.0	5.1-7.3	Low------	1.0-3.0	0.43	5	6
	6-14	20-27	1.30-1.50	0.60-2.00	0.20-0.22	13.0-18.0	5.1-7.3	Low------	0.5-1.0	0.43		
	14-43	22-35	1.30-1.55	0.60-2.00	0.18-0.20	17.0-23.0	5.1-7.3	Moderate	0.5-1.0	0.37		
	43-60	20-27	1.35-1.60	0.60-2.00	0.20-0.22	12.0-17.0	5.6-7.8	Low------	0.2-0.5	0.37		
279B:												
Rozetta---------	0-6	15-27	1.20-1.40	0.60-2.00	0.22-0.24	10.0-22.0	5.1-7.3	Low------	1.0-3.0	0.43	5	6
	6-12	12-27	1.20-1.40	0.60-2.00	0.22-0.24	7.0-17.0	4.5-7.3	Low------	0.2-0.5	0.43		
	12-45	27-35	1.35-1.55	0.60-2.00	0.18-0.22	16.0-22.0	4.5-6.0	Moderate	0.2-0.5	0.37		
	45-60	20-30	1.40-1.60	0.60-2.00	0.20-0.22	12.0-17.0	5.6-7.8	Low------	0.2-0.5	0.37		
279C2:												
Rozetta---------	0-4	15-27	1.20-1.40	0.60-2.00	0.22-0.24	10.0-22.0	5.1-7.3	Low------	1.0-3.0	0.43	5	6
	4-43	27-35	1.35-1.55	0.60-2.00	0.18-0.22	16.0-22.0	4.5-6.0	Moderate	0.2-0.5	0.37		
	43-60	20-30	1.40-1.60	0.60-2.00	0.20-0.22	12.0-17.0	5.6-7.8	Low------	0.2-0.5	0.37		
280D2:												
Fayette---------	0-7	25-27	1.35-1.45	0.60-2.00	0.18-0.20	18.0-25.0	5.1-7.3	Moderate	1.0-2.0	0.43	5	6
	7-40	25-35	1.30-1.45	0.60-2.00	0.18-0.20	15.0-20.0	4.5-6.0	Moderate	0.0-0.5	0.37		
	40-60	22-26	1.45-1.50	0.60-2.00	0.18-0.20	15.0-20.0	5.1-7.8	Moderate	0.0-0.5	0.37		
379B:												
Dakota----------	0-15	14-27	1.40-1.50	0.60-2.00	0.20-0.22	7.0-30.0	5.1-7.3	Low------	2.0-5.0	0.24	4	5
	15-26	18-32	1.30-1.55	0.60-2.00	0.15-0.19	5.0-30.0	5.1-7.3	Low------	0.5-2.0	0.32		
	26-30	4-11	1.55-1.65	2.00-6.00	0.02-0.14	1.0-10.0	5.1-7.3	Low------	0.0-0.5	0.20		
	30-60	1-4	1.55-1.65	6.00-20.00	0.02-0.10	0.0-4.0	5.1-7.8	Low------	0.0-0.5	0.02		
386B:												
Downs-----------	0-8	15-25	1.25-1.30	2.00-6.00	0.21-0.23	20.0-25.0	5.1-7.3	Low------	2.0-3.0	0.37	5	6
	8-11	15-27	1.30-1.35	0.60-2.00	0.18-0.20	20.0-25.0	5.1-7.3	Low------	0.5-1.0	0.43		
	11-44	26-35	1.30-1.35	0.60-2.00	0.18-0.20	20.0-25.0	5.1-7.3	Moderate	0.5-1.0	0.37		
	44-62	18-27	1.35-1.45	0.60-2.00	0.18-0.20	20.0-25.0	5.6-7.3	Moderate	0.0-0.5	0.37		
417G:												
Derinda---------	0-3	22-27	1.30-1.50	0.60-2.00	0.22-0.24	15.0-22.0	5.6-6.5	Low------	1.0-3.0	0.43	3	6
	3-36	35-40	1.35-1.55	0.06-0.20	0.18-0.20	22.0-26.0	5.6-7.3	Moderate	0.5-1.0	0.43		
	36-60	35-45	1.45-1.70	0.00-0.06	---	20.0-24.0	7.4-8.4	Low------	---	---		
440B:												
Jasper----------	0-16	10-22	1.30-1.45	0.60-2.00	0.20-0.24	10.0-24.0	5.1-7.3	Low------	3.0-5.0	0.28	5	5
	16-51	20-32	1.40-1.60	0.60-2.00	0.16-0.18	8.0-21.0	5.1-7.3	Low------	0.0-0.5	0.28		
	51-60	5-20	1.50-1.70	0.60-2.00	0.19-0.21	2.0-12.0	7.4-8.4	Low------	---	0.24		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
440C2:												
Jasper----------	0-7	10-20	1.35-1.50	0.60-2.00	0.16-0.18	10.0-22.0	5.1-7.3	Low------	3.0-5.0	0.15	5	3
	7-13	18-25	1.35-1.50	0.60-2.00	0.17-0.19	8.0-17.0	5.1-6.5	Low------	0.5-1.0	0.28		
	13-38	20-32	1.40-1.60	0.60-2.00	0.16-0.18	8.0-21.0	5.1-7.3	Low------	0.0-0.5	0.28		
	38-56	12-20	1.40-1.60	0.60-2.00	0.14-0.16	4.0-12.0	5.6-7.8	Low------	---	0.28		
	56-60	5-20	1.50-1.70	0.60-2.00	0.19-0.21	2.0-12.0	7.4-8.4	Low------	---	0.24		
470C2:												
Keller----------	0-8	20-27	1.30-1.40	0.60-2.00	0.22-0.24	18.0-26.0	5.6-7.8	Low------	3.0-5.0	0.28	4	6
	8-31	27-35	1.35-1.50	0.60-2.00	0.18-0.20	16.0-22.0	5.1-7.3	Moderate	0.0-1.0	0.37		
	31-62	30-42	1.50-1.70	0.06-0.20	0.10-0.19	18.0-25.0	5.1-7.8	High-----	0.0-0.4	0.28		
516:												
Faxon-----------	0-11	28-30	1.20-1.40	0.60-2.00	0.20-0.24	---	6.6-7.8	Moderate	5.0-15	0.28	2	7
	11-21	18-30	1.40-1.60	0.60-2.00	0.12-0.19	---	6.6-7.8	Moderate	---	0.28		
	21	--	---	2.00-20.00	---	---	---	---------	---	---		
605E3:												
Ursa------------	0-2	35-40	1.40-1.60	0.20-0.60	0.11-0.19	22.0-26.0	4.5-7.3	Moderate	0.5-1.0	0.43	2	4
	2-39	35-45	1.50-1.70	0.06-0.20	0.09-0.17	21.0-27.0	4.5-7.3	High-----	0.5-1.0	0.28		
	39-75	25-45	1.55-1.75	0.20-0.60	0.08-0.18	15.0-27.0	5.6-7.8	Moderate	0.2-0.5	0.28		
647A:												
Lawler----------	0-13	27-30	1.35-1.55	0.60-2.00	0.20-0.22	---	5.6-7.8	Moderate	4.0-5.0	0.24	4	6
	13-33	18-30	1.35-1.55	0.60-2.00	0.16-0.19	---	5.6-8.4	Moderate	---	0.28		
	33-45	3-7	1.50-1.60	>20.00	0.05-0.10	---	5.6-8.4	Low------	---	0.05		
	45	---	---	---	---	---	---	---------	---	---		
660C3:												
Coatsburg-------	0-5	27-35	1.25-1.45	0.06-0.20	0.15-0.19	20.0-29.0	5.1-7.8	Moderate	2.0-4.0	0.28	2	7
	5-63	35-45	1.50-1.70	0.00-0.06	0.09-0.13	21.0-29.0	5.1-6.5	High-----	0.0-1.0	0.28		
785C:												
Lacrescent------	0-15	18-27	1.25-1.35	0.60-2.00	0.18-0.24	15.0-24.0	6.6-7.3	Low------	3.0-5.0	0.28	3	6
	15-35	8-23	1.30-1.50	0.60-6.00	0.06-0.09	5.0-16.0	6.6-7.3	Low------	0.5-2.0	0.32		
	35-60	8-20	1.30-1.50	2.00-6.00	0.05-0.08	4.0-11.0	7.4-7.8	Low------	0.0-0.5	0.32		
785G:												
Lacrescent------	0-14	18-33	1.25-1.40	0.60-2.00	0.15-0.22	15.0-27.0	6.6-7.3	Low------	3.0-5.0	0.20	3	8
	14-21	8-23	1.30-1.50	0.60-6.00	0.06-0.09	5.0-16.0	6.6-7.3	Low------	0.5-2.0	0.32		
	21-60	8-20	1.30-1.50	2.00-6.00	0.05-0.08	4.0-11.0	7.4-7.8	Low------	0.0-0.5	0.32		
802B:												
Orthents--------	0-60	22-30	1.70-1.80	0.20-0.60	0.16-0.20	10.0-20.0	5.6-7.8	Moderate	0.2-1.0	0.43	5	4
802F:												
Orthents--------	0-6	22-30	1.70-1.75	0.20-0.60	0.18-0.22	10.0-25.0	5.6-7.8	Moderate	0.5-2.0	0.43	5	4
	6-60	22-30	1.70-1.80	0.20-0.60	0.16-0.20	10.0-20.0	5.6-7.8	Moderate	0.2-1.0	0.43		
864:												
Pits.												
874F:												
Dickinson-------	0-8	10-18	1.50-1.55	2.00-6.00	0.12-0.15	15.0-20.0	5.6-7.3	Low------	1.0-2.0	0.15	4	3
	8-16	10-18	1.50-1.55	2.00-6.00	0.12-0.15	15.0-20.0	5.6-7.3	Low------	0.5-1.0	0.20		
	16-30	10-15	1.45-1.55	2.00-6.00	0.12-0.15	15.0-20.0	5.1-6.5	Low------	0.5-1.0	0.24		
	30-37	4-10	1.55-1.65	6.00-20.00	0.08-0.10	5.0-10.0	5.1-6.5	Low------	0.0-0.5	0.20		
	37-60	4-10	1.60-1.70	6.00-20.00	0.02-0.04	5.0-10.0	5.6-7.3	Low------	0.0-0.5	0.15		
Hamburg---------	0-5	6-12	1.20-1.30	0.60-2.00	0.20-0.24	---	6.6-8.4	Low------	0.5-2.0	0.43	5	4L
	5-74	6-12	1.20-1.30	0.60-2.00	0.17-0.22	---	7.4-8.4	Low------	---	0.49		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
915D2:												
Elco------------	0-7	20-27	1.20-1.35	0.60-2.00	0.22-0.24	14.0-22.0	5.6-7.3	Low------	1.0-3.0	0.43	5	6
	7-30	23-35	1.25-1.45	0.60-2.00	0.18-0.21	14.0-22.0	5.1-7.8	Moderate	0.0-0.5	0.37		
	30-36	23-35	1.40-1.60	0.20-0.60	0.16-0.20	14.0-21.0	5.1-7.8	Moderate	0.0-0.2	0.37		
	36-71	25-45	1.45-1.70	0.06-0.60	0.14-0.20	15.0-27.0	5.1-7.8	High-----	0.0-0.2	0.28		
Ursa------------	0-4	15-27	1.30-1.50	0.60-2.00	0.20-0.24	11.0-22.0	4.5-7.3	Low------	1.0-3.0	0.43	3	6
	4-41	35-45	1.50-1.70	0.06-0.20	0.09-0.17	21.0-27.0	4.5-7.3	High-----	0.5-1.0	0.28		
	41-60	25-45	1.55-1.75	0.20-0.60	0.08-0.18	15.0-27.0	5.6-7.8	Moderate	0.2-0.5	0.28		
936F:												
Fayette---------	0-8	15-27	1.30-1.35	0.60-2.00	0.20-0.22	15.0-20.0	5.1-7.3	Low------	2.0-3.0	0.43	5	6
	8-44	25-35	1.30-1.45	0.60-2.00	0.18-0.20	15.0-20.0	4.5-6.5	Moderate	0.0-1.0	0.37		
	44-60	22-26	1.45-1.50	0.60-2.00	0.18-0.20	15.0-20.0	5.1-7.8	Moderate	0.0-0.5	0.37		
Hickory---------	0-7	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.43	5	6
	7-41	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
	41-60	15-32	1.50-1.70	0.60-2.00	0.11-0.19	9.0-19.0	5.1-8.4	Low------	0.0-0.2	0.32		
936G:												
Fayette---------	0-5	15-27	1.30-1.35	0.60-2.00	0.20-0.22	15.0-20.0	5.1-7.3	Low------	2.0-3.0	0.43	5	6
	5-60	25-35	1.30-1.45	0.60-2.00	0.18-0.20	15.0-20.0	4.5-6.5	Moderate	0.0-1.0	0.37		
Hickory---------	0-9	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.43	5	6
	9-60	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
937F:												
Seaton----------	0-7	10-22	1.10-1.45	0.60-2.00	0.22-0.24	8.0-19.0	5.6-7.3	Low------	1.0-3.0	0.43	5	5
	7-47	18-27	1.20-1.60	0.60-2.00	0.20-0.22	11.0-16.0	4.5-7.3	Low------	0.5-1.0	0.49		
	47-60	10-25	1.20-1.50	0.60-2.00	0.20-0.22	6.0-15.0	5.6-8.4	Low------	0.2-0.5	0.49		
Hickory---------	0-8	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.43	5	6
	8-60	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.28		
937G:												
Seaton----------	0-6	10-22	1.10-1.45	0.60-2.00	0.22-0.24	8.0-19.0	5.6-7.3	Low------	1.0-3.0	0.43	5	5
	6-44	18-27	1.20-1.60	0.60-2.00	0.20-0.22	11.0-16.0	4.5-7.3	Low------	0.5-1.0	0.49		
	44-60	10-25	1.20-1.50	0.60-2.00	0.20-0.22	6.0-15.0	5.6-8.4	Low------	0.2-0.5	0.49		
Hickory---------	0-12	19-25	1.30-1.50	0.60-2.00	0.20-0.22	14.0-19.0	4.5-7.3	Low------	1.0-2.0	0.37	5	6
	12-42	27-35	1.45-1.65	0.60-2.00	0.15-0.19	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.28		
	42-60	15-32	1.50-1.70	0.60-2.00	0.11-0.19	9.0-19.0	5.1-8.4	Low------	0.0-0.2	0.28		
971D3:												
Fishhook--------	0-5	27-35	1.35-1.55	0.60-2.00	0.20-0.22	17.0-23.0	5.1-7.3	Moderate	0.5-1.0	0.37	3	7
	5-23	27-35	1.40-1.60	0.60-2.00	0.18-0.20	16.0-23.0	4.5-7.3	Moderate	0.0-1.0	0.37		
	23-60	35-45	1.55-1.75	0.06-0.20	0.09-0.16	21.0-29.0	4.5-7.8	High-----	0.0-1.0	0.28		
Atlas-----------	0-3	30-40	1.35-1.55	0.06-0.20	0.14-0.19	19.0-26.0	4.5-7.3	High-----	0.5-1.0	0.28	2	7
	3-10	35-45	1.35-1.55	0.00-0.06	0.07-0.19	21.0-29.0	4.5-7.3	High-----	0.0-1.0	0.28		
	10-43	30-45	1.35-1.55	0.00-0.06	0.07-0.19	18.0-29.0	4.5-7.8	High-----	0.0-1.0	0.28		
	43-60	20-30	1.35-1.60	0.06-0.20	0.07-0.18	12.0-20.0	6.1-7.8	Moderate	0.0-1.0	0.28		
1070:												
Beaucoup--------	0-14	27-35	1.15-1.35	0.20-0.60	0.15-0.20	26.0-33.0	5.6-7.8	Moderate	5.0-6.0	0.28	5	7
	14-28	27-35	1.30-1.50	0.20-0.60	0.18-0.20	16.0-25.0	5.6-7.8	Moderate	0.0-2.0	0.32		
	28-40	15-30	1.35-1.55	0.20-0.60	0.18-0.22	9.0-20.0	5.6-7.8	Moderate	0.0-1.0	0.32		
	40-60	10-30	1.40-1.65	0.20-0.60	0.18-0.22	6.0-20.0	6.1-8.4	Moderate	0.0-1.0	0.32		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
3070:												
Beaucoup--------	0-14	27-35	1.15-1.35	0.20-0.60	0.15-0.20	26.0-33.0	5.6-7.8	Moderate	5.0-6.0	0.28	5	7
	14-50	27-35	1.30-1.50	0.20-0.60	0.18-0.20	16.0-25.0	5.6-7.8	Moderate	0.0-2.0	0.32		
	50-60	15-30	1.35-1.55	0.20-0.60	0.18-0.22	9.0-20.0	5.6-7.8	Moderate	0.0-1.0	0.32		
3073:												
Ross------------	0-18	15-27	1.20-1.45	0.60-2.00	0.19-0.24	---	6.1-7.8	Low------	3.0-5.0	0.32	5	5
	18-32	18-32	1.20-1.50	0.60-2.00	0.16-0.22	---	6.1-8.4	Low------	---	0.32		
	32-60	5-25	1.35-1.60	0.60-6.00	0.05-0.18	---	6.1-8.4	Low------	---	0.24		
3107:												
Sawmill---------	0-22	27-35	1.20-1.40	0.60-2.00	0.21-0.23	24.0-31.0	6.1-7.8	Moderate	4.0-5.0	0.28	5	7
	22-28	27-35	1.20-1.40	0.60-2.00	0.21-0.23	17.0-27.0	6.1-7.8	Moderate	1.0-3.0	0.32		
	28-60	25-35	1.30-1.45	0.60-2.00	0.17-0.20	16.0-25.0	6.1-7.8	Moderate	0.0-2.0	0.32		
3284:												
Tice------------	0-14	27-35	1.25-1.45	0.60-2.00	0.21-0.24	20.0-27.0	6.1-7.8	Moderate	2.0-3.0	0.28	5	7
	14-36	24-35	1.30-1.50	0.60-2.00	0.18-0.20	16.0-23.0	5.6-7.8	Moderate	0.0-1.0	0.32		
	36-60	15-30	1.40-1.60	0.60-2.00	0.11-0.18	9.0-20.0	5.6-7.8	Moderate	0.0-1.0	0.32		
3331:												
Haymond---------	0-6	10-20	1.30-1.50	0.60-2.00	0.22-0.24	10.0-17.0	5.6-7.8	Low------	1.0-3.0	0.43	5	5
	6-47	10-22	1.30-1.50	0.60-2.00	0.20-0.22	10.0-15.0	5.6-7.8	Low------	0.5-2.0	0.49		
	47-68	5-26	1.30-1.50	0.60-2.00	0.20-0.22	7.0-15.0	6.1-7.8	Low------	0.3-1.0	0.55		
3333:												
Wakeland--------	0-7	10-17	1.30-1.50	0.60-2.00	0.22-0.24	6.0-17.0	5.6-7.3	Low------	1.0-3.0	0.43	5	5
	7-60	10-17	1.30-1.50	0.60-2.00	0.20-0.22	4.0-13.0	5.6-7.8	Low------	0.2-1.0	0.55		
3334:												
Birds-----------	0-7	15-25	1.30-1.50	0.20-0.60	0.21-0.25	11.0-21.0	5.6-7.8	Low------	1.0-3.0	0.37	5	6
	7-60	18-27	1.40-1.60	0.20-0.60	0.20-0.22	11.0-20.0	5.1-7.8	Low------	0.0-2.0	0.49		
3415:												
Orion-----------	0-8	10-18	1.20-1.30	0.60-2.00	0.22-0.24	7.0-20.0	5.6-7.8	Low------	1.0-3.0	0.43	5	5
	8-30	10-18	1.20-1.30	0.60-2.00	0.20-0.22	7.0-20.0	5.6-7.8	Low------	1.0-3.0	0.55		
	30-62	10-30	1.25-1.45	0.60-2.00	0.18-0.22	10.0-35.0	5.6-7.8	Low------	3.0-8.0	0.49		
3428:												
Coffeen---------	0-18	15-27	1.35-1.55	0.60-2.00	0.22-0.25	13.0-22.0	5.6-7.8	Low------	2.0-3.0	0.32	5	6
	18-44	10-18	1.40-1.60	0.60-2.00	0.20-0.22	6.0-15.0	5.6-7.3	Low------	0.0-2.0	0.49		
	44-60	5-15	1.50-1.70	0.60-6.00	0.11-0.19	3.0-13.0	5.6-7.3	Low------	0.0-2.0	0.49		
3451:												
Lawson----------	0-11	10-27	1.20-1.55	0.60-2.00	0.22-0.24	11.0-28.0	6.1-7.8	Low------	3.0-7.0	0.32	5	5
	11-28	10-30	1.20-1.55	0.60-2.00	0.18-0.22	11.0-29.0	6.1-7.8	Low------	3.0-7.0	0.32		
	28-60	18-30	1.55-1.65	0.60-2.00	0.18-0.20	11.0-23.0	6.1-7.8	Moderate	1.0-4.0	0.49		
3452:												
Riley-----------	0-13	22-27	1.15-1.35	0.60-2.00	0.17-0.23	---	5.6-7.8	Moderate	3.0-4.0	0.32	4	7
	13-27	24-35	1.25-1.45	0.60-2.00	0.16-0.20	---	5.6-7.8	Moderate	---	0.28		
	27-76	2-10	1.65-1.80	6.00-20.00	0.05-0.10	---	6.6-8.4	Low------	---	0.02		
3789:												
Volney----------	0-7	18-24	1.35-1.45	2.00-6.00	0.13-0.16	20.0-25.0	7.9-8.4	Low------	0.5-1.0	0.37	4	8
	7-46	12-25	1.70-1.90	>20.00	0.02-0.08	15.0-25.0	7.9-8.4	Low------	0.0-1.0	0.24		
	46	---	---	---	---	---	---	---------	---	---		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
7349B:												
Zumbro----------	0-11	2-10	1.45-1.55	6.00-20.00	0.10-0.12	3.0-13.0	5.6-7.8	Low------	1.0-2.0	0.02	5	2
	11-19	2-10	1.45-1.55	6.00-20.00	0.10-0.12	3.0-13.0	5.6-7.8	Low------	1.0-2.0	0.02		
	19-31	0-10	1.45-1.60	6.00-20.00	0.06-0.11	0.0-9.0	6.1-7.8	Low------	0.0-2.0	0.02		
	31-60	0-5	1.55-1.65	6.00-20.00	0.02-0.07	0.0-7.0	6.1-7.8	Low------	0.0-1.0	0.02		
7430:												
Raddle----------	0-18	18-24	1.20-1.40	0.60-2.00	0.22-0.24	11.0-22.0	5.6-7.3	Low------	2.0-4.0	0.32	5	6
	18-49	18-24	1.20-1.40	0.60-2.00	0.20-0.22	12.0-18.0	5.6-7.3	Low------	0.5-2.0	0.49		
	49-65	22-35	1.35-1.55	0.60-2.00	0.16-0.20	15.0-23.0	5.6-7.8	Moderate	0.1-1.0	0.49		
8070:												
Beaucoup--------	0-18	27-35	1.15-1.35	0.20-0.60	0.15-0.20	26.0-33.0	5.6-7.8	Moderate	5.0-6.0	0.28	5	7
	18-45	27-35	1.30-1.50	0.20-0.60	0.18-0.20	16.0-25.0	5.6-7.8	Moderate	0.0-2.0	0.32		
	45-52	15-30	1.35-1.55	0.20-0.60	0.18-0.22	9.0-20.0	5.6-7.8	Moderate	0.0-1.0	0.32		
	52-60	10-30	1.40-1.65	0.20-0.60	0.18-0.22	6.0-20.0	6.1-8.4	Moderate	0.0-1.0	0.32		
8071:												
Darwin----------	0-17	40-45	1.20-1.40	0.00-0.06	0.11-0.14	32.0-37.0	6.1-7.8	Very high	4.0-5.0	0.24	5	4
	17-39	45-60	1.30-1.50	0.00-0.06	0.11-0.14	27.0-40.0	6.1-7.8	Very high	0.0-2.0	0.28		
	39-60	30-55	1.40-1.60	0.06-0.20	0.10-0.20	18.0-34.0	6.6-8.4	High-----	0.0-0.5	0.28		
8077:												
Huntsville------	0-28	18-27	1.15-1.35	0.60-2.00	0.22-0.24	17.0-24.0	5.6-7.8	Moderate	3.0-4.0	0.32	5	6
	28-43	18-27	1.20-1.40	0.60-2.00	0.20-0.22	11.0-17.0	5.6-7.8	Moderate	0.2-0.5	0.49		
	43-60	10-25	1.20-1.50	0.60-2.00	0.17-0.21	6.0-17.0	5.6-7.8	Low------	0.2-1.0	0.49		
8092:												
Sarpy-----------	0-9	2-5	1.20-1.50	6.00-20.00	0.05-0.09	2.0-6.0	6.6-8.4	Low------	0.5-1.0	0.02	5	1
	9-60	2-5	1.20-1.50	6.00-20.00	0.05-0.09	2.0-6.0	6.6-8.4	Low------	0.5-1.0	0.02		
8107:												
Sawmill---------	0-13	27-35	1.20-1.40	0.60-2.00	0.21-0.23	24.0-31.0	6.1-7.8	Moderate	4.0-5.0	0.28	5	7
	13-33	27-35	1.20-1.40	0.60-2.00	0.21-0.23	17.0-27.0	6.1-7.8	Moderate	1.0-3.0	0.32		
	33-60	25-35	1.30-1.45	0.60-2.00	0.17-0.20	16.0-25.0	6.1-7.8	Moderate	0.0-2.0	0.32		
8162:												
Gorham----------	0-13	27-42	1.30-1.50	0.20-0.60	0.13-0.20	24.0-35.0	5.1-7.8	Moderate	4.0-5.0	0.28	5	4
	13-36	27-42	1.35-1.55	0.20-0.60	0.11-0.18	16.0-26.0	6.1-7.8	Moderate	0.2-1.0	0.32		
	36-60	22-30	1.40-1.65	0.60-2.00	0.15-0.19	13.0-19.0	6.1-7.8	Moderate	0.0-0.5	0.32		
8284:												
Tice------------	0-22	22-27	1.25-1.45	0.60-2.00	0.21-0.24	17.0-22.0	6.1-7.8	Moderate	2.0-3.0	0.28	5	6
	22-53	24-35	1.30-1.50	0.60-2.00	0.18-0.20	16.0-23.0	5.6-7.8	Moderate	0.0-1.0	0.32		
	53-60	15-30	1.40-1.60	0.60-2.00	0.11-0.18	9.0-20.0	5.6-7.8	Moderate	0.0-1.0	0.32		
8304:												
Landes----------	0-14	10-22	1.20-1.40	0.60-6.00	0.20-0.22	8.0-17.0	5.6-8.4	Low------	1.0-2.0	0.32	4	5
	14-33	5-18	1.60-1.70	2.00-6.00	0.10-0.15	3.0-13.0	5.6-8.4	Low------	0.0-2.0	0.24		
	33-60	5-18	1.60-1.80	6.00-20.00	0.05-0.15	3.0-13.0	5.6-8.4	Low------	0.0-2.0	0.02		
8404:												
Titus-----------	0-15	35-40	1.30-1.50	0.06-0.20	0.18-0.22	25.0-32.0	6.1-7.3	High-----	2.0-4.0	0.32	5	4
	15-57	35-45	1.30-1.60	0.06-0.20	0.11-0.22	21.0-29.0	6.1-7.8	High-----	0.2-1.0	0.32		
	57-60	20-30	1.45-1.75	0.20-0.60	0.15-0.20	12.0-19.0	6.1-7.8	Moderate	0.2-0.5	0.49		
8405:												
Zook------------	0-22	35-40	1.30-1.35	0.20-0.60	0.21-0.23	36.0-41.0	5.6-7.3	High-----	5.0-7.0	0.32	5	7
	22-58	36-45	1.30-1.45	0.06-0.20	0.11-0.13	36.0-41.0	5.6-7.8	High-----	2.0-4.0	0.28		
	58-68	20-45	1.30-1.45	0.06-0.60	0.11-0.22	30.0-36.0	5.6-7.8	High-----	0.0-1.0	0.32		

Table 16.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Cation- exchange capacity	Soil reaction	Shrink- swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodi- bility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
8415:												
Orion-----------	0-8	10-18	1.20-1.30	0.60-2.00	0.22-0.24	7.0-20.0	5.6-7.8	Low------	1.0-3.0	0.43	5	5
	8-29	10-18	1.20-1.30	0.60-2.00	0.20-0.22	7.0-20.0	5.6-7.8	Low------	1.0-3.0	0.55		
	29-60	10-30	1.25-1.45	0.60-2.00	0.18-0.22	10.0-35.0	5.6-7.8	Low------	3.0-8.0	0.49		
8451:												
Lawson----------	0-6	10-27	1.20-1.55	0.60-2.00	0.22-0.24	11.0-28.0	6.1-7.8	Low------	3.0-7.0	0.32	5	5
	6-42	10-30	1.20-1.55	0.60-2.00	0.18-0.22	11.0-29.0	6.1-7.8	Low------	3.0-7.0	0.32		
	42-60	18-30	1.50-1.70	0.60-2.00	0.11-0.15	9.0-17.0	6.1-7.8	Moderate	0.1-1.0	0.49		
8452:												
Riley-----------	0-11	24-27	1.20-1.40	0.60-2.00	0.18-0.24	---	5.6-7.8	Moderate	3.0-4.0	0.32	4	6
	11-25	24-35	1.25-1.45	0.60-2.00	0.16-0.20	---	5.6-7.8	Moderate	---	0.28		
	25-60	2-10	1.65-1.80	6.00-20.00	0.05-0.10	---	6.6-8.4	Low------	---	0.02		
8682:												
Medway----------	0-15	18-27	1.20-1.45	0.60-2.00	0.20-0.24	---	6.1-7.8	Low------	3.0-6.0	0.32	5	6
	15-44	18-32	1.20-1.50	0.60-2.00	0.14-0.18	---	6.1-8.4	Low------	---	0.32		
	44-53	5-30	1.20-1.60	0.60-6.00	0.11-0.15	---	6.1-8.4	Low------	---	0.32		
	53-60	5-30	1.20-1.60	0.60-6.00	0.08-0.15	---	6.1-8.4	Low------	---	0.32		

Table 17.--Soil and Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Water table depth	High water table: Kind of water table	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
6C2: Fishhook	D	---	---	---	1.5-3.0	Perched	Dec-Jun	High	High	High.
7C3: Atlas	D	---	---	---	1.0-2.0	Perched	Dec-Jun	High	High	Moderate.
8D2: Hickory	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
8F: Hickory	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
8G: Hickory	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
17A: Keomah	C	---	---	---	2.0-4.0	Apparent	Mar-Jun	High	High	Moderate.
17B: Keomah	C	---	---	---	2.0-4.0	Apparent	Mar-Jun	High	High	Moderate.
17B2: Keomah	C	---	---	---	2.0-4.0	Apparent	Mar-Jun	High	High	Moderate.
36B: Tama	B	---	---	---	4.0-6.0	Apparent	Mar-May	High	Moderate	Moderate.
36B2: Tama	B	---	---	---	4.0-6.0	Apparent	Mar-May	High	Moderate	Moderate.
37A: Worthen	B	---	---	---	>6.0	---	---	High	Low	Low.
37B: Worthen	B	---	---	---	>6.0	---	---	High	Low	Low.
41A: Muscatine	B	---	---	---	2.0-4.0	Apparent	Mar-Jun	High	High	Moderate.
41B2: Muscatine	B	---	---	---	2.0-4.0	Apparent	Mar-Jun	High	High	Moderate.
43A: Ipava	B	---	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
43B: Ipava	B	---	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
43B2: Ipava	B	---	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
46A: Herrick	B	---	---	---	1.5-3.0	Apparent	Mar-Jun	High	High	High.
50: Virden	B/D	---	---	---	+.5-2.0	Apparent	Dec-Jun	High	High	Moderate.

Table 17.--Soil and Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months		Uncoated steel	Concrete
					Ft					
61A:										
Atterberry------	B	---	---	---	1.5-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
61B2:										
Atterberry------	B	---	---	---	1.5-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
68:										
Sable-----------	B/D	---	---	---	+.5-2.0	Apparent---	Dec-Jun	High------	High-----	Low.
112:										
Cowden----------	D	---	---	---	0.0-1.0	Apparent---	Dec-Jun	High------	High-----	Moderate.
119C2:										
Elco------------	B	---	---	---	2.5-4.5	Apparent---	Dec-Jul	High------	High-----	Moderate.
134B:										
Camden----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
134C2:										
Camden----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
138:										
Shiloh----------	B/D	---	---	---	+1.0-1.0	Apparent---	Dec-Jun	High------	High-----	Low.
250D2:										
Velma-----------	B	---	---	---	>6.0	---	---	Moderate	High-----	High.
257A:										
Clarksdale------	C	---	---	---	1.0-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
257B:										
Clarksdale------	C	---	---	---	1.0-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
257B2:										
Clarksdale------	C	---	---	---	1.0-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
259C2:										
Assumption------	B	---	---	---	2.5-4.5	Apparent---	Dec-Jul	High------	High-----	Moderate.
268B:										
Mt. Carroll-----	B	---	---	---	4.0-6.0	Apparent---	Mar-may	High------	Moderate	Moderate.
274A:										
Seaton----------	B	---	---	---	3.0-6.0	Apparent---	Mar-May	High------	Low------	Moderate.
274B:										
Seaton----------	B	---	---	---	3.0-6.0	Apparent---	Mar-May	High------	Low------	Moderate.
274C2:										
Seaton----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
274D3:										
Seaton----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
278A:										
Stronghurst-----	B	---	---	---	1.0-3.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
279B:										
Rozetta---------	B	---	---	---	4.0-6.0	Apparent---	Mar-May	High------	Moderate	Moderate.
279C2:										
Rozetta---------	B	---	---	---	4.0-6.0	Apparent---	Mar-May	High------	Moderate	Moderate.

Table 17.--Soil and Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Water table depth	High water table: Kind of water table	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
280D2:										
Fayette----------	B	---	---	---	>6.0	---	---	High------	Moderate	Moderate.
379B:										
Dakota-----------	B	---	---	---	>6.0	---	---	Moderate	Low------	Moderate.
386B:										
Downs------------	B	---	---	---	4.0-6.0	Apparent---	Mar-May	High------	Moderate	Moderate.
417G:										
Dorinda----------	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
440B:										
Jasper-----------	B	---	---	---	>6.0	---	---	Moderate	Moderate	High.
440C2:										
Jasper-----------	B	---	---	---	>6.0	---	---	Moderate	Moderate	High.
470C2:										
Keller-----------	C	---	---	---	1.5-3.0	Apparent---	Dec-Jul	High------	High-----	Moderate.
516:										
Faxon------------	B/D	---	---	---	0.0-1.0	Apparent---	Dec-Jun	High------	High-----	Low.
605E3:										
Ursa-------------	C	---	---	---	>6.0	---	---	Moderate	High-----	Moderate.
647A:										
Lawler-----------	B	---	---	---	2.0-4.0	Apparent---	Mar-Jun	High------	High-----	Moderate.
660C3:										
Coatsburg--------	D	---	---	---	0.0-1.0	Perched----	Dec-Jul	High------	High-----	Moderate.
785C:										
Lacrescent-------	B	---	---	---	>6.0	---	---	Moderate	Low------	Low.
785G:										
Lacrescent-------	B	---	---	---	>6.0	---	---	Moderate	Low------	Low.
802B:										
Orthents---------	B	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
802F:										
Orthents---------	B	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
864:										
Pits.										
874F:										
Dickinson--------	B	---	---	---	>6.0	---	---	Moderate	Low------	Moderate.
Hamburg----------	B	---	---	---	>6.0	---	---	High------	Low------	Low.
915D2:										
Elco-------------	B	---	---	---	2.5-4.5	Perched----	Dec-Jul	High------	High-----	Moderate.
Ursa-------------	C	---	---	---	>6.0	---	---	Moderate	High-----	Moderate.
936F:										
Fayette----------	B	---	---	---	>6.0	---	---	High------	Moderate	Moderate.
Hickory----------	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.

Table 17.--Soil and Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months		Uncoated steel	Concrete
					Ft					
936G:										
Fayette----------	B	---	---	---	>6.0	---	---	High------	Moderate	Moderate.
Hickory----------	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
937F:										
Seaton-----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
Hickory----------	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
937G:										
Seaton-----------	B	---	---	---	>6.0	---	---	High------	Low------	Moderate.
Hickory----------	C	---	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
971D3:										
Fishhook---------	D	---	---	---	1.5-3.0	Perched----	Dec-Jul	High------	High-----	High.
Atlas------------	D	---	---	---	1.0-2.0	Perched----	Dec-Jul	High------	High-----	Moderate.
1070:										
Beaucoup---------	B/D	Frequent---	Long------	Nov-Jun	+.5-1.0	Apparent---	Jan-Dec	High------	High-----	Low.
3070:										
Beaucoup---------	B/D	Frequent---	Brief-----	Nov-Jun	+.5-1.0	Apparent---	Nov-Jul	High------	High-----	Low.
3073:										
Ross-------------	B	Frequent---	Brief-----	Nov-Jun	4.0-6.0	Apparent---	Mar-May	Moderate	Low------	Low.
3107:										
Sawmill----------	B/D	Frequent---	Brief-----	Nov-Jun	0.0-2.0	Apparent---	Nov-Jul	High------	High-----	Low.
3284:										
Tice-------------	B	Frequent---	Brief-----	Nov-Jun	1.5-3.0	Apparent---	Nov-Jul	High------	High-----	Low.
3331:										
Haymond----------	B	Frequent---	Brief-----	Nov-Jun	>6.0	---	---	High------	Low------	Low.
3333:										
Wakeland---------	C	Frequent---	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Nov-Jul	High------	High-----	Low.
3334:										
Birds------------	C/D	Frequent---	Brief-----	Nov-Jun	0-1.0	Apparent---	Nov-Jul	High------	High-----	Moderate.
3415:										
Orion------------	C	Frequent---	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Nov-Jul	High------	High-----	Low.
3428:										
Coffeen----------	B	Frequent---	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Nov-Jul	High------	High-----	Moderate.
3451:										
Lawson-----------	C	Frequent---	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Nov-Jul	High------	Moderate	Low.
3452:										
Riley------------	B	Frequent---	Brief-----	Nov-Jun	1.5-3.0	Apparent---	Nov-Jul	High------	High-----	Low.
3789:										
Volney-----------	B	Frequent---	Very brief	Nov-Jun	>6.0	---	---	Low-------	Low------	Low.
7349B:										
Zumbro-----------	A	Rare-------	---	---	>6.0	---	---	Low-------	Low------	Low.

Table 17.--Soil and Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months		Uncoated steel	Concrete
					Ft					
7430: Raddle----------	B	Rare-------	---	---	>6.0	---	---	High------	Moderate	Moderate.
8070: Beaucoup--------	B/D	Occasional	Brief-----	Nov-Jun	+.5-1.0	Apparent---	Dec-Jun	High------	High-----	Low.
8071: Darwin----------	D	Occasional	Brief-----	Nov-Jun	+1.0-1.5	Apparent---	Dec-Jun	Moderate	High-----	Low.
8077: Huntsville------	B	Occasional	Brief-----	Nov-Jun	>6.0	---	---	High------	Low------	Low.
8092: Sarpy-----------	A	Occasional	Brief-----	Nov-Jun	>6.0	---	---	Low-------	Low------	Low.
8107: Sawmill---------	B/D	Occasional	Brief-----	Nov-Jun	0.0-2.0	Apparent---	Dec-Jun	High------	High-----	Low.
8162: Gorham----------	B/D	Occasional	Brief-----	Nov-Jun	0.0-3.0	Apparent---	Dec-Jun	High------	High-----	Low.
8284: Tice------------	B	Occasional	Brief-----	Nov-Jun	1.5-3.0	Apparent---	Mar-Jun	High------	High-----	Low.
8304: Landes----------	B	Occasional	Brief-----	Nov-Jun	>6.0	---	---	Moderate	Low------	Low.
8404: Titus-----------	B/D	Occasional	Brief-----	Nov-Jun	0.0-2.0	Apparent---	Dec-Jun	High------	High-----	Low.
8405: Zook------------	C/D	Occasional	Brief-----	Nov-Jun	0.0-1.0	Apparent---	Dec-Jun	High------	High-----	Moderate.
8415: Orion-----------	C	Occasional	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Mar-Jun	High------	High-----	Low.
8451: Lawson----------	C	Occasional	Brief-----	Nov-Jun	1.0-3.0	Apparent---	Mar-Jun	High------	Moderate	Low.
8452: Riley-----------	B	Occasional	Brief-----	Nov-Jun	1.5-3.0	Apparent---	Mar-Jun	High------	High-----	Low.
8682: Medway----------	B	Occasional	Brief-----	Nov-Jun	1.5-3.0	Apparent---	Mar-Jun	High------	High-----	Low.

Table 18.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
*Assumption	Fine-silty, mixed, mesic Typic Argiudolls
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Atterberry	Fine-silty, mixed, mesic Udollic Ochraqualfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Clarksdale	Fine, montmorillonitic, mesic Udollic Ochraqualfs
*Coatsburg	Fine, montmorillonitic, mesic, sloping Typic Argiaquolls
Coffeen	Coarse-silty, mixed, mesic Fluvaquentic Hapludolls
Cowden	Fine, montmorillonitic, mesic Mollic Albaqualfs
Dakota	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Darwin	Fine, montmorillonitic, mesic Vertic Haplaquolls
Derinda	Fine, mixed, mesic Typic Hapludalfs
Dickinson	Coarse-loamy, mixed, mesic Typic Hapludolls
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
Faxon	Fine-loamy, mixed, mesic Typic Haplaquolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Fishhook	Fine-silty, mixed, mesic Aquic Hapludalfs
Gorham	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Hamburg	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Haymond	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Herrick	Fine, montmorillonitic, mesic Aquic Argiudolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
*Keller	Fine-silty, mixed, mesic Aquic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Lacrescent	Loamy-skeletal, mixed, mesic Typic Hapludolls
Landes	Coarse-loamy, mixed, mesic Fluventic Hapludolls
Lawler	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Hapludolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Mt. Carroll	Fine-silty, mixed, mesic Mollic Hapludalfs
*Muscatine	Fine-silty, mixed, mesic Aquic Hapludolls
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Fine-loamy, mixed, mesic Typic Udorthents
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Riley	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Fluvaquentic Hapludolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sarpy	Mixed, mesic Typic Udipsamments
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Stronghurst	Fine-silty, mixed, mesic Aeric Ochraqualfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Titus	Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls
Ursa	Fine, montmorillonitic, mesic Typic Hapludalfs
*Velma	Fine-loamy, mixed, mesic Typic Argiudolls
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls
Volney	Loamy-skeletal, mixed, mesic Cumulic Hapludolls
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Worthen	Fine-silty, mixed, mesic Cumulic Hapludolls
Zook	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Zumbro	Sandy, mixed, mesic Entic Hapludolls

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