United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Illinois Agricultural Experiment Station

Soil Survey of Crawford County, Illinois

How To Use This Soil Survey

General Soil Map

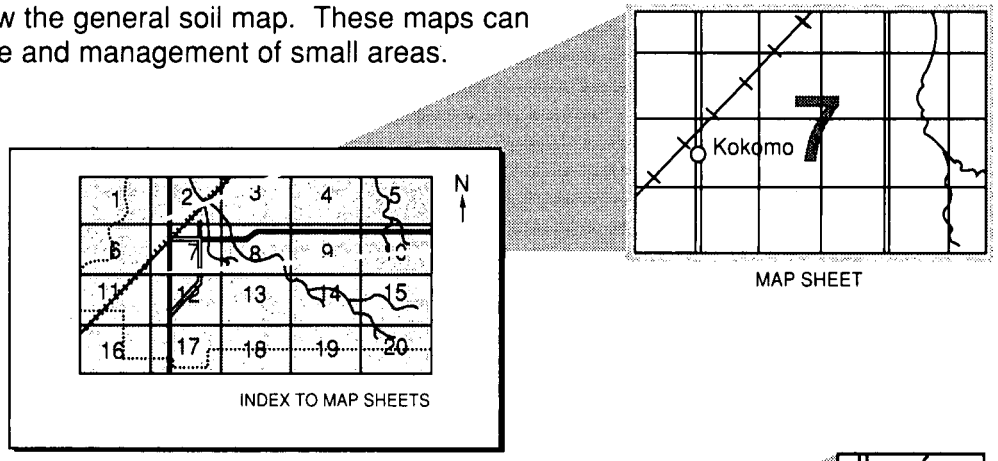
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

Detailed Soil Maps

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

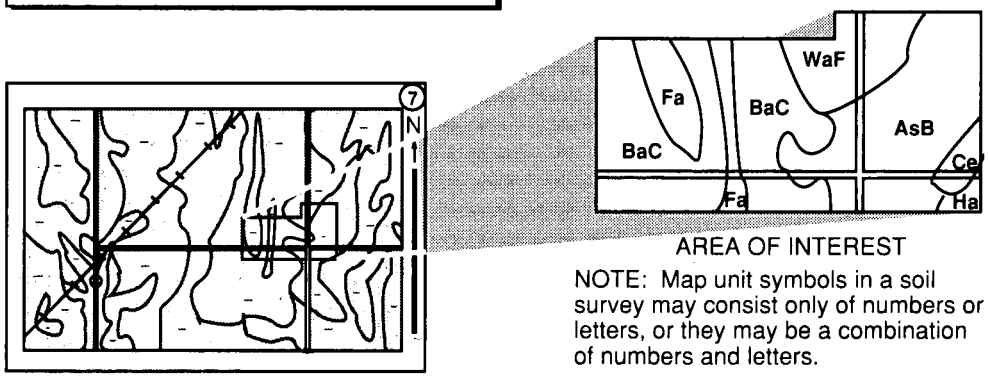
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

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



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1989. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1989. 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 Crawford County Soil and Water Conservation District. The Crawford County Board and the Illinois Department of Agriculture provided financial assistance.

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

This soil survey is Illinois Agricultural Experiment Station Soil Report 154.

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

Cover: The diversity of vegetation in this area of Ava soils and the nearby source of water provide good habitat for a number of wildlife species in Crawford County.

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Issued April 1996

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Summary of Tables

Foreword

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

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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow 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.

Thomas W. Christenson
State Conservationist
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Soil Survey of Crawford County, Illinois

By Fred L. Awalt, Natural Resources Conservation Service

Soils surveyed by Fred L. Awalt and Randall A. Leeper, Natural Resources Conservation Service, and Kevin T. Matthews, Roger T. Risley, and Douglas E. Walk, Crawford County

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

CRAWFORD COUNTY is in eastern Illinois (fig. 1). It has an area of 285,320 acres, or about 446 square miles. It is bounded by Clark County on the north, Jasper County on the west, Lawrence and Richland Counties on the south, and the State of Indiana on the east. In 1980, the population of the county was 20,818 *(13)*. Robinson is the county seat.

General Nature of the County

This section provides general information about Crawford County. It describes natural resources; physiography, relief, and drainage; settlement and farming; and climate.

Natural Resources

In addition to the soils, the natural resources in the county include oil, coal, clay, sand and gravel, timber, and water. Oil production began in the county in the early 1900's. In 1979, 1,309,213 barrels of oil were produced. This number amounts to 6 percent of the total production in Illinois *(14)*. Coal production has been limited to a small strip mine along Brushy Creek, which operated many years ago *(8)*. The county has an estimated 130 million tons of Herrin (No. 6) coal reserves *(1)*. Clay products include vitreous china plumbing fixtures. Active sand and gravel pits are on stream terraces in the eastern part of the county. Some sand deposits are also in the western part of the county near the North Fork River. Timber resources include about 50,000 acres of woodland. Most of the woodland

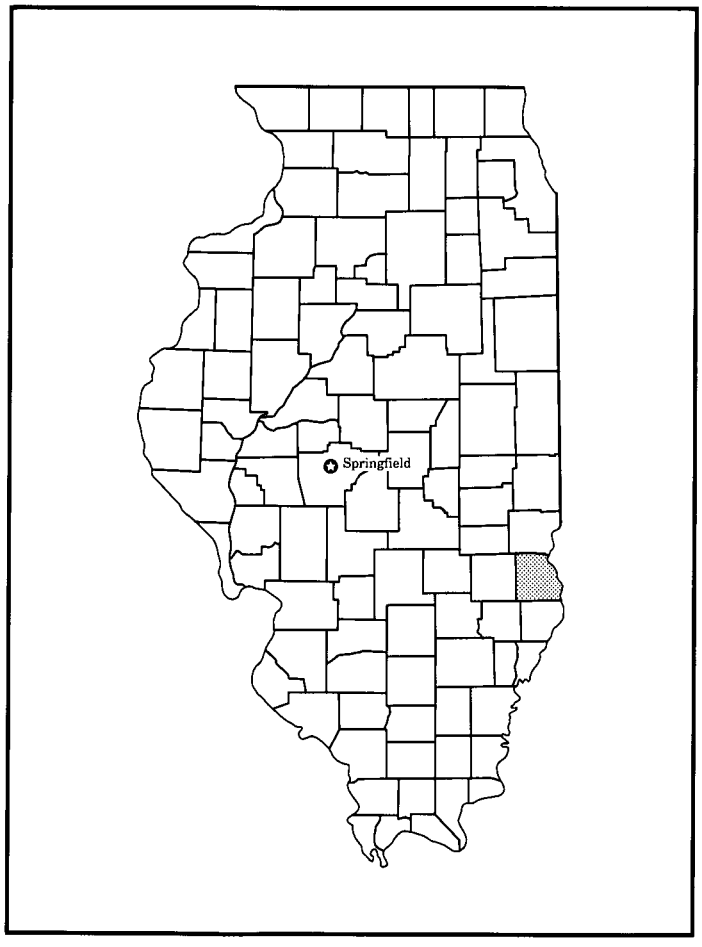

Figure 1.—Location of Crawford County in Illinois.

is on private land. Water resources include the Wabash River and its tributaries. Aquifers in valley fill provide irrigation water for crops and for municipal use. Most of the gravel pits contain water. Shallow wells, cisterns, and ponds supply water for farmers and others in rural areas.

Physiography, Relief, and Drainage

Crawford County is in the Springfield Plain region. Glacial till deposits were left by the Illinoian glacier. The action of the glacier smoothed the formerly rough bedrock surface. The result is a broad till plain covering most of the county. The till plain is dissected by shallow drainageways. Windblown silt, or loess, covered the landscape after the glaciation. This material ranges to more than 10 feet in thickness. The southeastern portion of the county is more rolling than the rest of the county. Bedrock influenced the surface features in this area. Shale bedrock is exposed in several areas. Nearly level flood plains and stream terraces are along the larger streams.

Crawford County has relatively little relief. The elevation ranges from less than 410 feet above sea level in the southeast, where the Wabash River leaves the county, to more than 640 feet above sea level in the south-central part of the county.

The entire county drains into the Wabash River watershed. The western half drains into the North Fork Embarras River and the Embarras River. Both of these rivers are tributaries of the Wabash River. The eastern half of the county drains into the smaller tributaries of the Wabash River.

Settlement and Farming

In the early 1800's, settlement was near the Wabash River in the Palestine area. The river provided access to settlements to the south. The county boundaries were established by the Territorial Legislature during the 1816-1817 session. The current boundaries were established in 1831 *(9)*.

Farming has been a major enterprise in Crawford County since its settlement. Early crops included corn, potatoes, beans, tobacco, flax, and cotton. The main crops grown today include corn, soybeans, and wheat.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Effingham in nearby Effingham County during the period 1951 to 1980. 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 30.6 degrees F and the average daily minimum temperature is 21.6 degrees. The lowest temperature on record, which occurred at Effingham in January 1977, is -24 degrees. In summer, the average temperature is 74.9 degrees and the average daily maximum temperature is 86.8 degrees. The highest recorded temperature, which occurred at Effingham on July 14, 1954, is 111 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (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 38.25 inches. Of this, 21.94 inches, or 57 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 16.05 inches. The heaviest 1-day rainfall during the period of record was 5.66 inches.

The average seasonal snowfall is 19.9 inches. The greatest snow depth at any one time during the period of record was 13 inches. On the average, 27 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a

concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

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

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

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

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

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

The soil maps of Crawford County join with those of Clark, Jasper, Lawrence, and Richland Counties. Some of the soil names on the maps do not agree across county lines. Differences are the result of variations in the extent of the soils in the survey areas. They do not significantly affect the use of the maps for general planning.

Map Unit Composition

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

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit

descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

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

General Soil Map Units

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

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

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

Soil Descriptions

1. Alford-Muren-Iva Association

Nearly level to steep, somewhat poorly drained to well drained soils that formed in loess; on uplands

This association is on interfluves and side slopes on till plains. The native vegetation was deciduous forests. Slopes range from 0 to 30 percent.

This association makes up about 10 percent of the county. It is about 33 percent Alford soils, 31 percent Muren soils, 16 percent Iva soils, and 20 percent soils of minor extent (fig. 2).

The very gently sloping to steep Alford soils are on narrow interfluves and side slopes. They are well drained. Typically, the surface layer is dark yellowish brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 7 inches. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, firm silty clay loam. The next part is yellowish brown, friable silty clay loam. The lower part is yellowish brown, friable silt loam.

The nearly level to gently sloping Muren soils are on interfluves and side slopes. They are moderately well drained. Typically, the surface layer is dark yellowish brown, friable silt loam mixed with common pockets of yellowish brown subsoil material. Erosion has thinned the surface layer to a thickness of about 8 inches. The subsoil is yellowish brown, mottled, firm silty clay loam about 27 inches thick. The substratum to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam.

The nearly level Iva soils are on interfluves. They are somewhat poorly drained. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 7 inches thick. The subsoil is about 43 inches thick. The upper part is mottled yellowish brown and dark grayish brown, friable and firm silty clay loam. The next part is mottled yellowish brown and dark grayish brown, firm silt loam. The lower part is strong brown and brown, mottled, friable silt loam. The substratum to a depth of 60 inches or more is brownish yellow and strong brown, mottled, friable silt loam.

Of minor extent in this association are Elco, Hickory, Virden, and Wakeland soils. The moderately well drained Elco soils are on moderately sloping and moderately steep side slopes. They formed in loess and glacial till. The well drained Hickory soils are on moderately steep to very steep side slopes. They formed in glacial till. The poorly drained Virden soils are on broad, nearly level interfluves. The somewhat poorly drained Wakeland soils formed in alluvium. They are on flood plains.

Most areas of this association are used for corn, soybeans, or wheat. The nearly level to gently sloping areas are well suited to cultivated crops. The more sloping areas are moderately suited or poorly suited to cultivated crops. Controlling water erosion and improving fertility are the main management concerns. Some of the more sloping areas are used for pasture or woodland. The soils in these areas are well suited to pasture and woodland.

Some areas of this association are used as sites for dwellings or for septic tank absorption fields. The soils range from well suited to poorly suited to these uses, but the soils in the steeper areas are generally

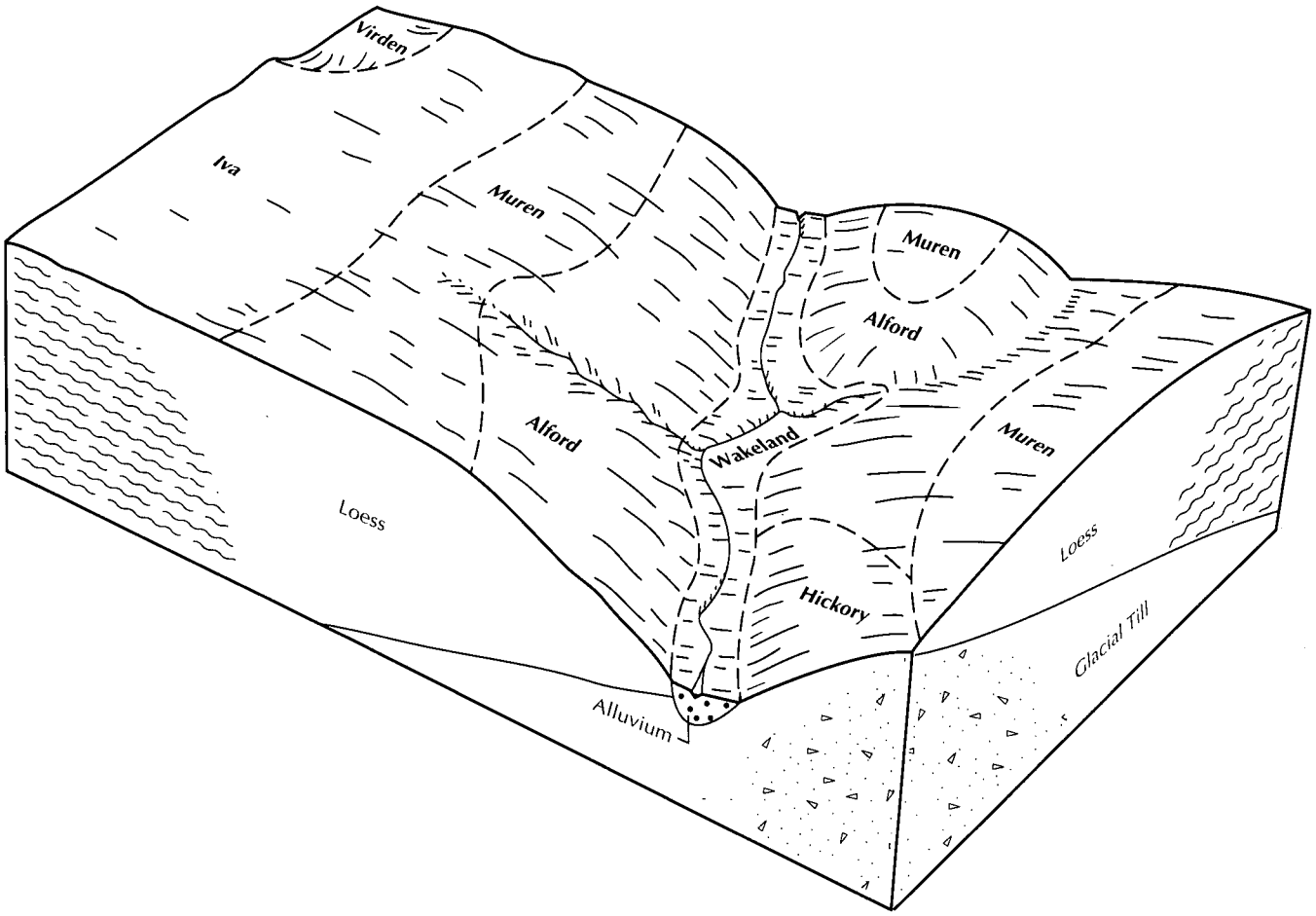

Figure 2.—Typical pattern of soils and parent material in the Alford-Muren-Iva association.

unsuited because of the slope. Seasonal wetness, the shrink-swell potential, restricted permeability, and the slope are the main management concerns.

2. Stoy-Hosmer-Hickory Association

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

This association is on interfluves and side slopes on till plains. The native vegetation was deciduous forests. Slopes range from 0 to 50 percent.

This association makes up about 14 percent of the county. It is about 25 percent Stoy soils, 24 percent Hosmer soils, 23 percent Hickory soils, and 28 percent soils of minor extent.

The nearly level to gently sloping, somewhat poorly drained Stoy soils are on interfluves. They formed in loess. Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, mottled, friable silt loam about 8 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is yellowish brown, firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is pale brown, very firm and brittle silty clay loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam.

The very gently sloping to moderately sloping, moderately well drained Hosmer soils are on narrow interfluves and side slopes. They formed in loess. Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is brown, friable silt loam about 2 inches thick. The subsoil is about 43 inches thick. The upper part is yellowish brown, mottled, firm silt loam and silty clay loam. The next part is yellowish brown, mottled, friable silty clay loam. The lower part is yellowish brown, mottled, firm and brittle silty clay loam. The substratum to a depth of 60 inches or more is yellowish brown, firm silt loam.

The moderately steep to very steep, well drained Hickory soils are on side slopes. They formed in glacial till. Typically, the surface layer is dark grayish brown,

friable loam about 4 inches thick. The subsurface layer is yellowish brown, friable loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown and dark yellowish brown, firm and very firm clay loam. The lower part is yellowish brown, firm gravelly clay loam.

Of minor extent in this association are Atlas, Cowden, Elco, Wakeland, and Weir soils. The somewhat poorly drained Atlas and moderately well drained Elco soils are on moderately sloping and moderately steep side slopes. They formed in loess and glacial till. The poorly drained Cowden and Weir soils are on broad interfluves. They formed in loess. The somewhat poorly drained Wakeland soils formed in alluvium. They are on flood plains.

Most areas of this association are used for corn, soybeans, or wheat. The soils are generally well suited or moderately suited to cultivated crops. Controlling water erosion, maintaining existing drainage systems, and improving fertility are the main management concerns. Some of the more sloping areas are poorly suited or generally unsuited to cultivated crops because of the slope. These areas are generally used as pasture or woodland. The soils in this association are well suited or moderately suited to pasture and woodland. An equipment limitation and the hazard of erosion are the main management concerns in areas used as woodland.

Some areas of this association are used as sites for dwellings or for septic tank absorption fields. The soils are poorly suited or moderately suited to these uses, but soils in steep or very steep areas are generally unsuited because of the slope. Seasonal wetness, the shrink-swell potential, restricted permeability, and the slope are the main management concerns.

3. Bluford-Ava-Wynoose Association

Nearly level to moderately sloping, poorly drained to moderately well drained soils that formed in loess and in the underlying sediments; on uplands

This association is on interfluves and side slopes on till plains. The native vegetation was deciduous forests. Slopes range from 0 to 10 percent.

This association makes up about 36 percent of the county. It is about 34 percent Bluford soils, 18 percent Ava soils, 17 percent Wynoose soils, and 31 percent soils of minor extent (fig. 3).

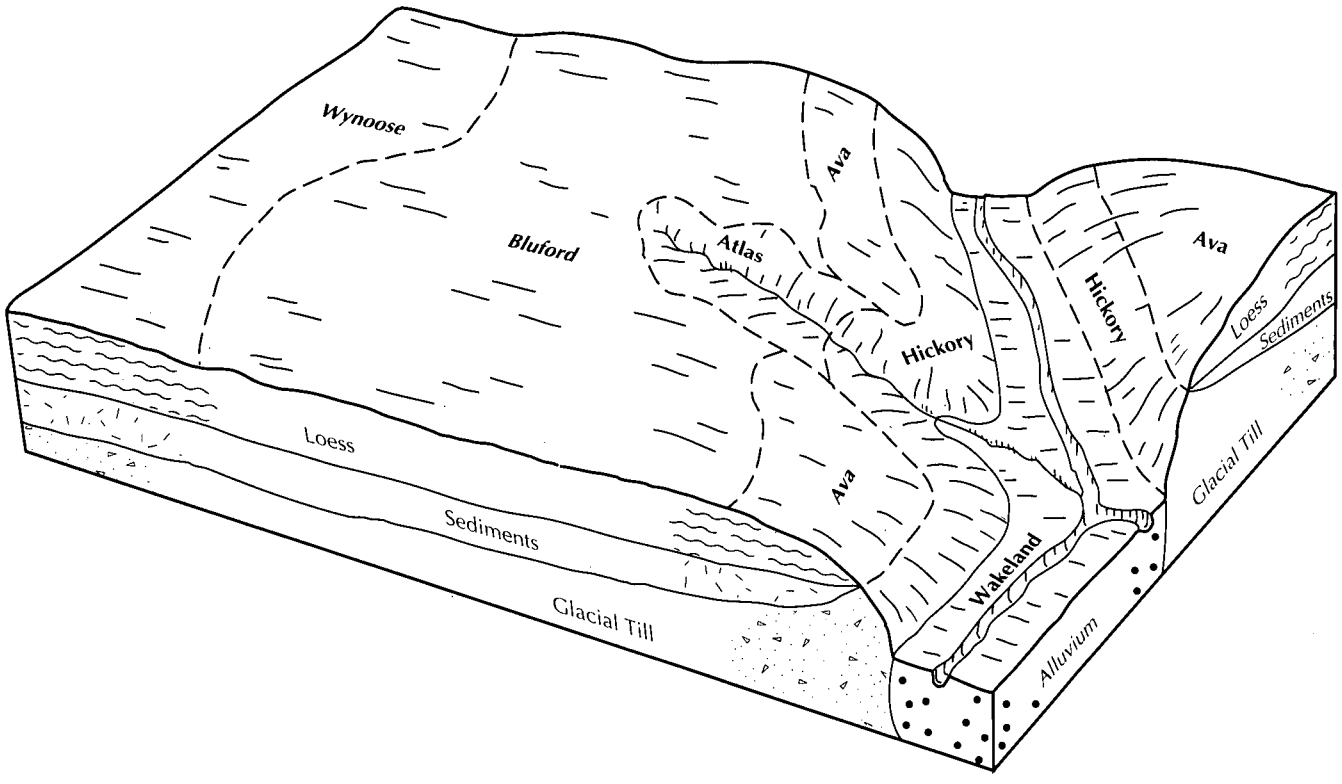

Figure 3.—Typical pattern of soils and parent material in the Bluford-Ava-Wynoose association.

The nearly level to gently sloping Bluford soils are on interfluves and side slopes. They are somewhat poorly drained. Typically, the surface layer is dark brown, very friable silt loam about 7 inches thick. The subsurface layer is light brownish gray and pale brown, mottled, very friable silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is grayish brown, firm silty clay. The next part is grayish brown, firm and brittle silty clay loam. The lower part is gray, very firm silty clay loam.

The very gently sloping to moderately sloping Ava soils are on narrow interfluves and side slopes. They are moderately well drained. Typically, the surface layer is dark yellowish brown, friable silt loam about 7 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown and brownish yellow, firm silty clay loam and light yellowish brown, firm silt. The next part is brownish yellow and yellowish brown, mottled, very firm and brittle silty clay loam and clay loam. The lower part is brownish yellow, mottled, friable clay loam.

The nearly level Wynoose soils are on broad interfluves. They are poorly drained. Typically, the surface layer is dark grayish brown and dark brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown and light brownish gray, mottled, friable silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is gray, firm silty clay loam. The next part is light brownish gray, firm and very firm silty clay loam. The lower part is light brownish gray, friable clay loam.

Of minor extent in this association are Atlas, Hickory, and Wakeland soils. The somewhat poorly drained Atlas soils are on moderately sloping and moderately steep side slopes. They formed in loess and glacial till. The well drained Hickory soils are on moderately steep to very steep side slopes. They formed in glacial till. The somewhat poorly drained Wakeland soils formed in alluvium. They are on flood plains.

Most areas of this association are used for corn, soybeans, or wheat. The soils are well suited or moderately suited to cultivated crops. Controlling water erosion, maintaining existing drainage systems, and improving fertility are the main management concerns. Some areas are used for pasture or woodland. The soils are generally well suited to these uses.

Some areas of this association are used as sites for dwellings or for septic tank absorption fields. The soils are poorly suited to these uses. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns.

4. Cisne-Hoyleton Association

Nearly level to gently sloping, poorly drained and somewhat poorly drained soils that formed in loess and in the underlying sediments; on uplands

This association is on interfluves on till plains. The native vegetation was prairie grasses and widely scattered deciduous trees. Slopes range from 0 to 5 percent.

This association makes up about 18 percent of the county. It is about 60 percent Cisne soils, 15 percent Hoyleton soils, and 25 percent soils of minor extent (fig. 4).

The nearly level Cisne soils are on broad interfluves. They are poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is grayish brown, friable silty clay loam and white, friable silt. The next part is light brownish gray and grayish brown, firm silty clay loam. The lower part is light gray, firm silty clay loam.

The nearly level to gently sloping Hoyleton soils are on interfluves. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil is about 37 inches thick. It is mottled. The upper part is brown, firm silty clay loam. The next part is pale brown and light yellowish brown, firm silty clay loam. The lower part is light brownish gray, firm loam. The substratum to a depth of 60 inches or more is light brownish gray, mottled, firm loam.

Of minor extent in this association are Atlas, Darmstadt, Fishhook, and Newberry soils. The somewhat poorly drained Atlas and Fishhook soils formed in loess and glacial till. Atlas soils are on moderately sloping and moderately steep side slopes. Fishhook soils are on gently sloping side slopes. Darmstadt soils have a high content of exchangeable sodium in the subsoil. They are somewhat poorly drained and are on nearly level parts of interfluves. The poorly drained Newberry soils are in slight depressions on interfluves.

Most areas of this association are used for corn, soybeans, or wheat. The soils are moderately suited or well suited to cultivated crops. Controlling water erosion, maintaining existing drainage systems, and improving fertility are the main management concerns.

Some areas of this association are used as sites for dwellings or for septic tank absorption fields. The soils are poorly suited to these uses. Seasonal wetness, the

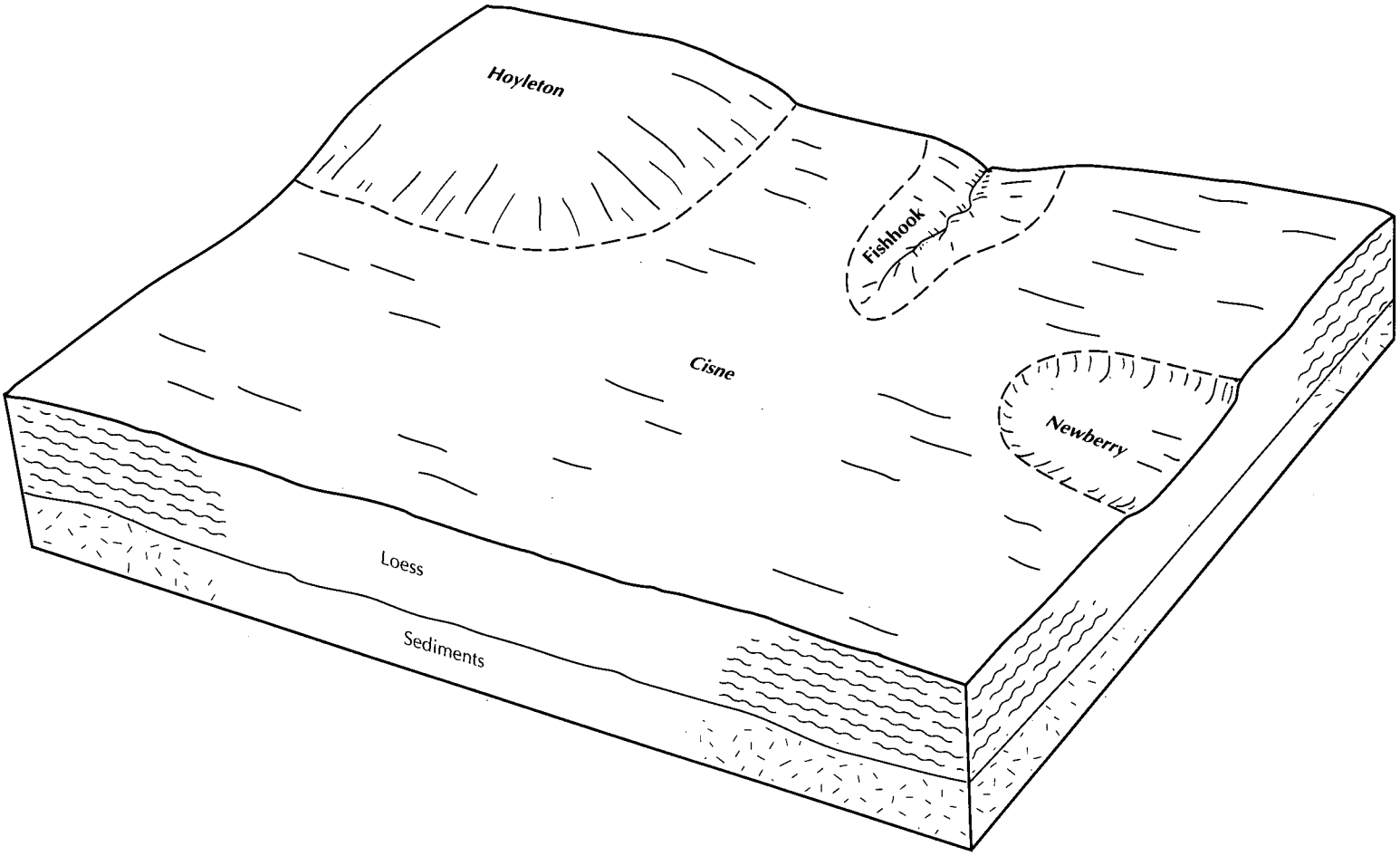

Figure 4.—Typical pattern of soils and parent material in the Cisne-Hoyleton association.

shrink-swell potential, and restricted permeability are the main management concerns.

5. Carmi-Alvin-Westland Association

Nearly level to steep, very poorly drained and well drained soils that formed in glacial outwash and in eolian sands; on terraces

This association is in large stream valleys on terraces. The native vegetation was prairie grasses and deciduous forests. Slopes range from 0 to 30 percent.

This association makes up about 9 percent of the county. It is about 35 percent Carmi soils, 18 percent Alvin soils, 14 percent Westland soils, and 33 percent soils of minor extent.

The nearly level to gently sloping, well drained Carmi soils are on terrace treads. They formed in glacial outwash. Typically, the surface layer is very dark brown, friable sandy loam about 7 inches thick. The subsurface layer is very dark brown and very dark grayish brown, friable sandy loam about 16 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark brown, friable sandy loam. The next part is dark brown, firm and friable gravelly sandy clay loam and gravelly sandy loam. The lower part is dark brown, very friable loamy sand, gravelly loamy sand, and coarse sand.

The nearly level to steep, well drained Alvin soils are on terrace treads and risers. They formed in eolian sands. Typically, the surface layer is dark brown and strong brown, friable fine sandy loam. Erosion has thinned the surface layer to a thickness of about 10 inches. The subsoil is about 40 inches thick. The upper part is strong brown, friable and very friable fine sandy loam. The next part is strong brown, very friable loamy fine sand. The lower part is brownish yellow and strong brown, loose loamy fine sand. The substratum to a depth of 60 inches or more is brownish yellow, loose fine sand.

The nearly level, very poorly drained Westland soils are on terrace treads. They formed in glacial outwash. Typically, the surface layer is black, firm silty clay loam

about 11 inches thick. The subsoil is about 37 inches thick. It is mottled. The upper part is very dark gray and very dark grayish brown, firm clay loam. The lower part is dark grayish brown, friable, stratified gravelly clay loam and loamy sand. The substratum to a depth of 60 inches or more is dark brown, friable, stratified very gravelly sand and sand.

Of minor extent in this association are Camden, Roby, Ruark, Stockland, and Titus soils. The well drained Camden soils formed in loess and glacial outwash. They are on nearly level to moderately sloping parts of terraces. The Roby, Ruark, and Stockland soils formed in glacial outwash. The somewhat poorly drained Roby and poorly drained Ruark soils are on nearly level parts of terraces. The well drained Stockland soils are in nearly level to moderately sloping positions. The poorly drained Titus soils formed in alluvium. They are on flood plains adjacent to the terraces.

Most areas of this association are used for corn, soybeans, or wheat. The soils are well suited or moderately suited to cultivated crops. Droughtiness and the hazard of soil blowing are management concerns. Some of the more sloping areas are poorly suited or generally unsuited to cultivated crops because of the slope. This association is mainly well suited or moderately suited to woodland and pasture, but the soils in steep areas are generally unsuited to these uses because of the slope. Some areas are used as sand and gravel pits.

Some areas of this association are used as sites for dwellings or for septic tank absorption fields. The soils are generally well suited to dwellings and are moderately suited or poorly suited to septic tank absorption fields. Areas of Westland soils, however, are generally unsuited to these uses because of ponding. The slope, seasonal wetness, a poor filtering capacity, and rapid or very rapid permeability are the main management concerns. Also, flooding is a hazard on some of the lower parts of the landscape during periods of unusually heavy rainfall or snowmelt.

6. Wakeland-Titus-Haymond Association

Nearly level, poorly drained, somewhat poorly drained, and well drained soils that formed in alluvium; on flood plains

This association is on flood plains along the major streams and tributaries. The soils are frequently flooded for brief to long periods. The native vegetation was deciduous forests and prairie grasses. Slopes range from 0 to 2 percent.

This association makes up about 13 percent of the county. It is about 30 percent Wakeland soils, 16 percent Titus soils, 14 percent Haymond soils, and 40 percent soils of minor extent.

The somewhat poorly drained Wakeland soils are on meander belts. They are subject to frequent flooding for brief periods from January through May in most years. Typically, the surface layer is dark brown, friable silt loam about 12 inches thick. The substratum extends to a depth of 60 inches or more. It is mottled. The upper part is dark grayish brown, firm, stratified silt loam. The next part is grayish brown, firm and friable silt loam. The lower part is light brownish gray, friable silt loam.

The poorly drained Titus soils are in backswamps. They are subject to frequent flooding for long periods from March through June in most years. Typically, the surface layer is very dark grayish brown, firm silty clay loam about 4 inches thick. The subsurface layer is very dark gray, firm silty clay about 6 inches thick. The subsoil to a depth of 60 inches or more is mottled, firm silty clay. The upper part is dark gray, and the lower part is gray.

The well drained Haymond soils are on meander belts and on natural levees along stream channels. They are subject to frequent flooding for brief periods from January through May in most years. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is about 34 inches thick. It is dark brown, friable silt loam. The substratum to a depth of 60 inches or more is dark brown, friable silt loam and very friable fine sandy loam.

Of minor extent in this association are Birds, Petrolia, Shoals, and Stonelick soils. The poorly drained Birds and Petrolia soils, the somewhat poorly drained Shoals soils, and the well drained Stonelick soils have a light-colored surface layer. Shoals soils formed in silty and loamy alluvium. Stonelick soils formed in calcareous alluvium.

Most areas of this association are used for corn, soybeans, pasture, or woodland. The soils are generally well suited to these uses, but Titus soils are poorly suited or moderately suited. Maintaining existing drainage systems, improving fertility, and controlling flooding are the main management concerns in cultivated areas. Equipment limitations, seedling mortality, and the windthrow hazard are the main management concerns in areas used as woodland.

This association is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

Broad Land Use Considerations

Most of the soils in Crawford County are used for cultivated crops, dominantly corn, soybeans, and wheat. Other uses include pasture, woodland, wildlife habitat,

recreational development, and urban development. The suitability of the soils for these uses varies significantly.

Cropland areas are scattered throughout the county. Seasonal wetness is the main limitation in associations 3 and 4. Water erosion is the main hazard in associations 1 and 2. Water erosion, soil blowing, and droughtiness are concerns in association 5, and frequent flooding is a hazard in association 6. The flooding occurs mainly during the winter and spring and can cause crop damage.

Pastured areas are also scattered throughout the county, but they are mainly in associations 1, 2, and 3. Wetness is the main limitation in the nearly level areas of these associations. Erosion is a hazard in the more sloping areas.

Woodland is mainly in associations 1, 2, 3, and 6. Erosion is a hazard in sloping areas in associations 1, 2, and 3. Wetness is a limitation in some nearly level areas in associations 1, 3, and 6. Flooding is a hazard in association 6.

The potential of the soils as habitat for selected types of wildlife is good throughout the county. Associations 1, 2, 3, and 6 are well suited or moderately suited to habitat for openland or woodland wildlife. Associations 4 and 5 are moderately suited to habitat for openland wildlife. Westland soils in association 5 and Titus soils in association 6 are well suited to habitat for wetland wildlife.

The suitability for recreational uses varies widely, depending on the type and intensity of the intended use. Associations 1 and 5 are moderately suited to recreational development, such as camp areas, playgrounds, hiking trails, and bridle paths. Wetness is a limitation in some nearly level areas, and erosion is a hazard in the more sloping areas. Wetness, restricted permeability, and the slope are major limitations in associations 2, 3, and 4. Flooding is a major hazard in association 6.

The suitability for dwellings and septic tank absorption fields is generally poor in associations 1, 2, 3, 4, and 5 because of the slope or seasonal wetness. Small areas in associations 1, 2, and 5 are moderately suited or well suited to dwellings and septic tank absorption fields. Additional information concerning the suitability of individual soil types for dwellings and for septic tank absorption fields is provided in tables 11 and 12. Association 6 is generally unsuited to dwellings and septic tank absorption fields because of flooding.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Hickory silt loam, 10 to 15 percent slopes, eroded, is a phase of the Hickory series.

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

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

Soil Descriptions

2—Cisne silt loam

Composition

Cisne and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Broad interfluves
Size of areas: 3 to 4,315 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess and loamy and silty sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable silt loam
Subsurface layer:
7 to 17 inches—grayish brown, mottled, friable silt loam
Subsoil:
17 to 20 inches—grayish brown, mottled, friable silty clay loam and white, friable silt
20 to 49 inches—light brownish gray and grayish brown, mottled, firm silty clay loam
49 to 60 inches—light gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Hoyleton soils in the slightly higher landscape positions
- The somewhat poorly drained Darmstadt soils in the slightly higher positions and on side slopes of small drainageways below the Cisne soil
- The somewhat poorly drained Bluford soils on side slopes of small drainageways below the Cisne soil
- Soils that have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Cisne soil

Similar inclusions:
- Soils that have a thicker surface layer
- Soils that do not have an abrupt textural change
- Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- A combination of surface ditches and land leveling reduces the wetness.
- Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration.
- Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and improve tilth.
- Winter wheat and hay crops are subject to frost heave in some years.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
- Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains around the footings helps to lower the water table.
- Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

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 are installed.
- Sewage lagoons and mounds are alternative methods of waste disposal.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4W
Windbreak suitability group: 2

3A—Hoyleton silt loam, 0 to 2 percent slopes

Composition

Hoyleton and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 300 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess and silty or loamy sediments
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

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

Subsoil:
10 to 14 inches—brown, mottled, firm silty clay loam
14 to 37 inches—pale brown and light yellowish brown, mottled, firm silty clay loam
37 to 47 inches—light brownish gray, mottled, firm loam

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

Inclusions

Contrasting inclusions:
- The poorly drained Cisne and Newberry soils in the lower positions
- The moderately well drained Ava soils in the higher positions

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

• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Surface ditches or subsurface drains help to lower the seasonal high water table.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface drains around the footings helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

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 are installed.
• Sewage lagoons function well on this soil.

Interpretive Groups

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

3B—Hoyleton silt loam, 2 to 5 percent slopes

Composition

Hoyleton and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 85 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess and silty or loamy sediments
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

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

Subsoil:
14 to 31 inches—yellowish brown and pale brown, mottled, firm silty clay loam
31 to 42 inches—yellowish brown, mottled, friable silty clay loam
42 to 50 inches—light brownish gray, mottled, friable clay loam

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

Inclusions

Contrasting inclusions:
• The poorly drained Cisne and Newberry soils in the lower positions
• Darmstadt soils, which have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Hoyleton soil

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion.
• Maintaining surface ditches helps to remove excess surface water.
• Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil and regularly adding other organic

material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

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 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 are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

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

6B2—Fishhook silt loam, 2 to 5 percent slopes, eroded

Composition

Fishhook and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 140 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess and glacial till
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—yellowish brown, friable silt loam
Subsoil:
5 to 22 inches—yellowish brown, mottled, firm silty clay loam
22 to 31 inches—light brownish gray, mottled, firm silty clay loam
31 to 58 inches—dark gray and gray, mottled, firm silty clay loam and clay loam
Substratum:
58 to 60 inches—gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• Atlas soils, which have more clay in the subsoil than the Fishhook soil; on moderately sloping side slopes
• The well drained Hosmer soils on narrow interfluves in the higher positions
• Soils that have a surface layer of silty clay loam; in landscape positions similar to those of the Fishhook soil
• Soils that have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Fishhook soil
Similar inclusions:
• Soils that do not have a paleosol that formed in glacial till in the lower part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Moderately suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.

• 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 reduce the hazard of erosion.

Woodland

Suitability: Moderately suited
Management measures:
• In openings where timber has been harvested, competition from undesirable plants can be controlled by chemical or mechanical means.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• 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: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slope than the absorption field helps to intercept seepage water.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the slow permeability.

Interpretive Groups

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

7C2—Atlas silt loam, 5 to 10 percent slopes, eroded

Composition

Atlas and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 135 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 2 feet
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—dark brown, friable silt loam

Subsoil:
4 to 9 inches—yellowish brown and dark brown, mottled, firm silty clay loam
9 to 52 inches—gray and light gray, mottled, very firm clay loam
52 to 60 inches—light gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The well drained Hickory soils on moderately steep side slopes
• Soils that have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Atlas soil

Similar inclusions:
• Fishhook soils, which have less clay in the upper part of the subsoil; on gently sloping side slopes
• Soils that have a darker colored surface layer
• Soils that have more than 20 inches of loess overlying glacial till
• Soils that have a surface layer of silty clay loam

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more

Figure 5.—Erosion in a pastured area of Atlas silt loam, 5 to 10 percent slopes, eroded.

years of forage crops reduce the hazard of further erosion.

- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Moderately suited
Management measures:

- Establishing grasses and legumes on this soil helps to control erosion and improves tilth (fig. 5).
- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
- Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.

Woodland

Suitability: Moderately suited
Management measures:

- Using mature planting stock reduces the seedling mortality rate. Some replanting may be necessary.
- Using harvesting methods that do not leave the

remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• 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: Poorly suited
Management measures:
• Installing tile drains near the foundations or installing interceptor drains higher on the side slopes than the building helps to lower the water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces wetness.
• Installing specially designed systems that include sand filters helps to overcome the very slow permeability.

Interpretive Groups

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

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

Composition

Atlas and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 60 acres
Major uses: Cropland and pasture and hay
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 2 inches—yellowish brown, friable silty clay loam
Subsoil:
2 to 16 inches—grayish brown and gray, mottled, very firm silty clay loam
16 to 48 inches—gray and grayish brown, mottled, very firm clay loam
48 to 60 inches—grayish brown, mottled, very firm clay

Inclusions

Contrasting inclusions:
• The well drained Hickory soils on moderately steep side slopes
• Bluford soils on gently sloping side slopes
• Soils that have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Atlas soil
Similar inclusions:
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that is dominated by forage crops.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Poorly suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface

compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Although yields are low, bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing tile drains near the foundations or installing interceptor drains higher on the side slopes than the building helps to lower the water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces wetness.
• Installing specially designed systems that include sand filters helps to overcome the very slow permeability.

Interpretive Groups

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

7D2—Atlas silt loam, 10 to 15 percent slopes, eroded

Composition

Atlas and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 30 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and glacial till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsoil:
7 to 12 inches—yellowish brown, mottled, friable silty clay loam
12 to 29 inches—grayish brown and gray, mottled, firm silty clay loam
29 to 44 inches—light gray, mottled, firm clay loam

Substratum:
44 to 53 inches—grayish brown, mottled, firm gravelly sandy loam
53 to 60 inches—light gray, mottled, firm sandy clay loam

Inclusions

Contrasting inclusions:
• The well drained Hickory soils in landscape positions similar to those of the Atlas soil or on the steeper side slopes
• The moderately well drained Ava soils on narrow interfluves above the Atlas soil
• The moderately well drained Elco soils in landscape positions similar to those of the Atlas soil or on the less sloping side slopes

Similar inclusions:
• Soils that have less clay in the upper part of the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Further erosion can be controlled by using a cropping system that is dominated by forage crops.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Moderately suited

Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management measures:
• Using mature planting stock reduces the seedling mortality rate. Some replanting may be necessary.
• Using harvesting methods that do not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• 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: Poorly suited
Management measures:
• Installing tile drains near the foundations or installing interceptor drains higher on the side slopes than the building helps to lower the water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces wetness.
• Installing specially designed systems that include sand filters helps to overcome the very slow permeability.

Interpretive Groups

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

8D2—Hickory silt loam, 10 to 15 percent slopes, eroded

Composition

Hickory and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 75 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 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 6 inches—dark brown and yellowish brown, friable silt loam

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

Subsoil:
10 to 15 inches—yellowish brown, friable clay loam
15 to 54 inches—strong brown, friable and firm clay loam and gravelly clay loam
54 to 60 inches—strong brown, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils on the less sloping side slopes
• The somewhat poorly drained Wakeland and Shoals soils on narrow flood plains below the Hickory soil

Similar inclusions:
• Soils that have a layer of loess above the glacial till
• Soils that have a paleosol in the glacial till and contain more clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop

residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Moderately suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Land shaping by cutting and filling helps to overcome the slope.
• 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: Moderately suited
Management measures:
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate 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: IIIe
Woodland ordination symbol: 5A
Windbreak suitability group: 3

8E2—Hickory silt loam, 15 to 20 percent slopes, eroded

Composition

Hickory and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 160 acres
Major uses: Pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 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—dark yellowish brown, friable silt loam
Subsoil:
5 to 14 inches—strong brown, firm silty clay loam
14 to 46 inches—strong brown, firm clay loam
Substratum:
46 to 60 inches—yellowish brown, firm loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland and Shoals soils on narrow flood plains below the Hickory soil
• Soils that have a surface layer of silty clay loam or clay loam; in landscape positions similar to those of the Hickory soil

• The moderately well drained Ava soils, which formed in loess and silty or loamy sediments; on narrow interfluves above the Hickory soil

Similar inclusions:
• Soils that have a paleosol in the glacial till and contain more clay in the subsoil

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Moderately suited
Management measures:
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• In areas where the pasture is established, seeding legumes on the contour with a no-till seeder improves the forage quality.
• The plants should not be grazed or clipped until they are sufficiently established.
• A permanent cover of pasture plants helps to control erosion and maintains tilth.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management measures:
• The slope increases the hazard of erosion and limits the use of equipment.
• Placing logging roads and skid trails on or near 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.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

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

8F—Hickory loam, 20 to 50 percent slopes

Composition

Hickory and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 325 acres
Major uses: Woodland, pasture and hay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 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 4 inches—dark grayish brown, friable loam

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

Subsoil:
10 to 53 inches—yellowish brown and dark yellowish brown, firm and very firm clay loam
53 to 60 inches—yellowish brown, firm gravelly clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland and Shoals soils on narrow flood plains below the Hickory soil
• The moderately well drained Ava soils, which formed in loess and silty or loamy sediments; on narrow interfluves above the Hickory soil

Similar inclusions:
• Soils that have a surface layer of silt loam
• Soils that have a paleosol in the glacial till and contain more clay in the subsoil

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management measures:
• Measures that reduce the hazard of erosion are needed when grasses and legumes are established in the pastured areas.
• A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
• Bromegrass, orchardgrass, tall fescue, Korean lespedeza, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• The plants should not be grazed or clipped until they are sufficiently established.
• Operating machinery is difficult on the steeper slopes.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Poorly suited
Management measures:
• The slope increases the hazard of erosion and limits the use of equipment.
• Placing logging roads and skid trails on or near 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.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

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

12—Wynoose silt loam

Composition

Wynoose and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Broad interfluves
Size of areas: 4 to 1,220 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess and loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsurface layer:
9 to 22 inches—grayish brown and light brownish gray, mottled, friable silt loam

Subsoil:
22 to 28 inches—gray, mottled, firm silty clay loam
28 to 57 inches—light brownish gray, mottled, firm and very firm silty clay loam
57 to 60 inches—light brownish gray, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Bluford soils in the slightly higher positions
• The somewhat poorly drained Darmstadt soils, which have a high concentration of sodium in the subsoil; in the slightly higher positions

Similar inclusions:
• Soils that have a darker colored surface layer
• Soils that are thicker over the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management measures:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. A combination of surface ditches and land leveling reduces the wetness.
• Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and improve tilth.
• Winter wheat and hay crops are subject to frost heave in some years.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth.
• The wetness limits the choice of plants and the period of grazing or cutting.
• Reed canarygrass, tall fescue, ladino, and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Shallow ditches and land smoothing can reduce wetness.
• Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and deferred grazing help to keep the pasture or hayland in good condition.

Woodland

Suitability: Poorly 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.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Poorly suited
Management measures:
• Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
• Installing subsurface drains around the footings helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

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 are installed.
• Sewage lagoons and mounds are alternative methods of waste disposal.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4W
Windbreak suitability group: 2

13A—Bluford silt loam, 0 to 2 percent slopes

Composition

Bluford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 655 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and slow in the lower part
Parent material: Loess and loamy sediments
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsurface layer:
7 to 20 inches—light brownish gray and pale brown, mottled, very friable silt loam
Subsoil:
20 to 35 inches—grayish brown, mottled, firm silty clay
35 to 42 inches—grayish brown, mottled, firm and brittle silty clay loam
42 to 60 inches—gray, mottled, very firm silty clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Ava soils on the narrower interfluves
• The poorly drained Wynoose soils on the broader interfluves
• Darmstadt soils, which have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Bluford soil
Similar inclusions:
• Soils that have a thicker dark surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Surface ditches or subsurface drains help to lower the seasonal high water table.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth.
• The wetness limits the choice of plants and the period of grazing or cutting.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Shallow ditches and land smoothing can reduce the wetness.
• Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and deferred grazing help to keep the pasture or hayland in good condition.

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: Poorly suited
Management measures:
• Installing subsurface drains around the footings helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.
• Reinforcing 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 are installed.
• Sewage lagoons function well on this soil.

Interpretive Groups

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

13B2—Bluford silt loam, 2 to 5 percent slopes, eroded

Composition

Bluford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 140 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and slow in the lower part
Parent material: Loess and loamy sediments

Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark brown, friable silt loam
Subsoil:
6 to 43 inches—brown, mottled, firm silty clay loam
43 to 60 inches—grayish brown, mottled, firm and brittle silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Wynoose soils in nearly level positions at the head of small drainageways
• The moderately well drained Ava soils on moderately sloping side slopes
• Soils that have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Bluford soil
Similar inclusions:
• Soils that have more clay in the lower part of the subsoil
• Soils that are slightly eroded, have a thicker surface layer, and have a subsurface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Further erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces.
• Maintaining surface ditches helps to remove excess surface water.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• 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 reduce the hazard of erosion.

Woodland

Suitability: Well suited
• 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: 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 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 are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

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

14B—Ava silt loam, 1 to 5 percent slopes

Composition

Ava and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Narrow interfluves
Size of areas: 3 to 3,600 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Moderately well drained

Permeability: Moderate in upper part; moderately slow in the next part; very slow in the fragipan
Parent material: Loess and silty or loamy sediments
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1.5 to 3.5 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown, friable silt loam
Subsurface layer:
7 to 11 inches—yellowish brown, friable silt loam
Subsoil:
11 to 33 inches—yellowish brown and brownish yellow, firm silty clay loam and light yellowish brown, firm silt
33 to 50 inches—brownish yellow and yellowish brown, mottled, very firm and brittle silty clay loam and clay loam
50 to 60 inches—brownish yellow, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Bluford soils on the broader parts of the interfluve
Similar inclusions:
• Soils that have a thicker, darker surface layer
• Soils that are moderately eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming reduce the hazard of erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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 reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately suited to dwellings without basements
Management measures:
• 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: Poorly suited
Management measures:
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

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

14C2—Ava silt loam, 5 to 10 percent slopes, eroded

Composition

Ava and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands

Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 75 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part; moderately slow in the next part; very slow in the fragipan
Parent material: Loess and silty or loamy sediments
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1.5 to 3.5 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—dark brown, friable silt loam
Subsurface layer:
6 to 10 inches—yellowish brown, friable silt loam
Subsoil:
10 to 14 inches—yellowish brown, friable silt loam
14 to 28 inches—yellowish brown, firm silty clay loam
28 to 44 inches—yellowish brown and brown, mottled, firm and brittle silty clay loam
44 to 60 inches—yellowish brown, mottled, friable loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which formed in a thin layer of loess and glacial till; in landscape positions similar to those of the Ava soil
• The somewhat poorly drained Bluford soils on gently sloping side slopes
Similar inclusions:
• Soils that are only slightly eroded and have a thicker surface layer
• Soils that formed in a thinner layer of loess

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately suited to dwellings without basements
Management measures:
• Installing tile drains near the foundations or installing interceptor drains higher on the side slopes than the building helps to lower the water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces wetness.
• Installing specially designed systems that include sand filters helps to overcome the restricted permeability.

Interpretive Groups

Land capability classification: IIIe

Woodland ordination symbol: 4A
Windbreak suitability group: 4F

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded

Composition

Sylvan and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 45 acres
Major uses: Cropland, pasture and hay
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown, firm silty clay loam
Subsoil:
7 to 14 inches—yellowish brown, firm silty clay loam
14 to 22 inches—yellowish brown, mottled, firm silty clay loam
22 to 31 inches—yellowish brown, mottled, friable silt loam
Substratum:
31 to 60 inches—pale brown, light brownish gray, and yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils, which formed in loess and glacial till; in landscape positions similar to those of the Sylvan soil
• The well drained Hickory soils, which formed in glacial till; in landscape positions similar to those of the Sylvan soil
Similar inclusions:
• Soils that have a surface layer of silt loam
• Soils that are not calcareous in the substratum

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Erosion can be controlled by using a cropping system that is dominated by forage crops.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil improves tilth and reduces the hazard of erosion.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• A good seedbed is difficult to prepare because of surface crusting and cloddiness.
• Using a no-till method of pasture renovation and seeding on the contour help to prevent further erosion.

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 foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

Interpretive Groups

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

50—Virden silty clay loam

Composition

Virden and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Broad interfluves
Ponding duration: Brief
Size of areas: 3 to 900 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff: 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: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—black, very firm silty clay loam

Subsurface layer:
9 to 15 inches—black, very firm silty clay loam

Subsoil:
15 to 25 inches—dark grayish brown, mottled, firm silty clay loam
25 to 36 inches—dark grayish brown and olive brown, mottled, firm silty clay loam
36 to 46 inches—light olive brown and grayish brown, mottled, firm silty clay loam

Substratum:
46 to 60 inches—grayish brown, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Oconee soils in the slightly higher positions

Similar inclusions:
• Soils that have a lighter colored surface layer
• Soils have a thinner dark surface layer
• Soils that have a surface layer of silt loam

Use and Management

Cropland

Suitability: Well suited

Management measures:
• A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to prevent ponding.
• Using 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 increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

112—Cowden silt loam

Composition

Cowden and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Broad interfluves
Size of areas: 3 to 655 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Loess
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: At the surface to 2 feet below the surface
Organic matter content: Moderate
Erosion hazard: Slight
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 15 inches—gray, mottled, very friable silt loam
Subsoil:
15 to 23 inches—gray, mottled, firm silty clay loam
23 to 47 inches—gray, mottled, very firm and firm silty clay
47 to 60 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Oconee soils in the slightly higher positions
- The somewhat poorly drained Stoy soils in the slightly higher positions

Similar inclusions:
- Soils that have a thicker dark surface layer
- Soils that have a lighter colored surface layer
- Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
- Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. A combination of surface ditches and land leveling reduces the wetness.
- Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and improve tilth.
- Winter wheat and hay crops are subject to frost heave in some years.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
- Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains around the footings helps to lower the water table.
- Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

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 are installed.
- Sewage lagoons and mounds are alternative methods of waste disposal.

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

113A—Oconee silt loam, 0 to 2 percent slopes

Composition

Oconee and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

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

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam
Subsurface layer:
8 to 13 inches—grayish brown, friable silt loam
Subsoil:
13 to 22 inches—brown, mottled, firm silty clay loam
22 to 31 inches—yellowish brown, mottled, firm silty clay loam
31 to 53 inches—olive brown, mottled, firm silty clay loam
Substratum:
53 to 60 inches—olive brown, mottled, friable loam

Inclusions

Contrasting inclusions:
- The poorly drained Virden soils in the lower positions
- The well drained Alford and moderately well drained Muren soils on narrow interfluves and in the higher positions

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Surface ditches or subsurface drains help to lower the seasonal high water table.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

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 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 are installed.
• Sewage lagoons function well on this soil.

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 4L

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

Composition

Elco and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 180 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess and glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2.5 to 4.5 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
7 to 18 inches—yellowish brown, friable silt loam and firm silty clay loam
18 to 37 inches—yellowish brown, mottled, firm silty clay loam
37 to 60 inches—light brownish gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Atlas soils in landscape positions similar to those of the Elco soil
• The somewhat poorly drained Wakeland and Shoals soils on flood plains below the Elco soil
• Soils that have a surface layer of silty clay loam; in landscape positions similar to those of the Elco soil

Similar inclusions:
• Soils that formed in a thinner layer of loess

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

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

119D2—Elco silt loam, 10 to 15 percent slopes, eroded

Composition

Elco and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 100 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Loess and glacial till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 2.5 to 4.5 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
7 to 11 inches—yellowish brown, friable silt loam
11 to 21 inches—yellowish brown, firm silty clay loam
21 to 28 inches—grayish brown, mottled, firm silty clay loam
28 to 60 inches—light olive brown and grayish brown, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The well drained Hickory soils on the steeper side slopes
• The somewhat poorly drained Atlas soils on moderately sloping side slopes
• Soils that have a surface layer of silty clay loam; in landscape positions similar to those of the Elco soil

Similar inclusions:
• Soils that formed in a thinner layer of loess

Use and Management

Cropland

Suitability: Moderately suited

Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

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

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water.
• Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

Interpretive Groups

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

131A—Alvin fine sandy loam, 0 to 2 percent slopes

Composition

Alvin and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces and uplands
Landform: Terraces and till plains
Landform position: Terrace treads and interfluves
Size of areas: 3 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Eolian sands
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

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

Subsoil:
8 to 12 inches—dark yellowish brown, very friable loamy fine sand
12 to 28 inches—dark yellowish brown and strong brown, friable fine sandy loam
28 to 60 inches—yellowish brown, loose fine sand and strong brown, friable loamy fine sand

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Roby, poorly drained Patton, and very poorly drained Westland soils in the lower positions

Similar inclusions:
• Soils that have more silt and clay and less sand in the upper part of the subsoil
• Soils that contain less clay in the subsoil
• Soils that have a surface layer of very fine sandy loam or sandy loam

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion, improves tilth, and conserves soil moisture.
• Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIs
Woodland ordination symbol: 4A
Windbreak suitability group: 5

131B—Alvin loamy fine sand, 2 to 5 percent slopes

Composition

Alvin and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces and uplands
Landform: Terraces and till plains
Landform position: Terrace treads and interfluves
Size of areas: 3 to 85 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Parent material: Eolian sands
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Moderate
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—dark brown, very friable loamy fine sand

Subsurface layer:
8 to 13 inches—yellowish brown, very friable loamy fine sand

Subsoil:
13 to 41 inches—strong brown, friable fine sandy loam
41 to 60 inches—yellowish brown and strong brown, very friable loamy fine sand and fine sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Roby and poorly drained Ruark soils in the lower positions

Similar inclusions:
• Soils that have more silt and clay and less sand in the upper part of the subsoil
• Soils that have less clay in the subsoil
• Soils that have a surface layer of very fine sandy loam or sandy loam

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming helps to control erosion, improves tilth, and conserves soil moisture.
• Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent overgrazing and thus reduces the hazard of erosion.

• The plants should not be grazed until they are sufficiently established.
• Applications of fertilizer are needed.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Windbreak suitability group: 5

131C2—Alvin fine sandy loam, 5 to 10 percent slopes, eroded

Composition

Alvin and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces and uplands
Landform: Terraces and till plains
Landform position: Terrace risers and side slopes
Size of areas: 3 to 60 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Eolian sands
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Typical Profile

Surface layer:
0 to 10 inches—dark brown and strong brown, friable fine sandy loam

Subsoil:
10 to 30 inches—strong brown, friable and very friable fine sandy loam
30 to 42 inches—strong brown, very friable loamy fine sand
42 to 50 inches—brownish yellow and strong brown, loose loamy fine sand

Substratum:
50 to 60 inches—brownish yellow, loose fine sand

Inclusions

Contrasting inclusions:
• Hickory soils, which formed in glacial till; on moderately sloping side slopes

Similar inclusions:
• Soils that have more silt and clay and less sand in the upper part of the subsoil
• Soils that have less clay in the subsoil
• Soils that have a surface layer of very fine sandy loam or sandy loam

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 conserve moisture.
• Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, minimize crusting, and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and reduces the hazard of erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction, reduces the runoff rate, and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 5

131D2—Alvin loamy fine sand, 10 to 18 percent slopes, eroded

Composition

Alvin and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces and uplands
Landform: Terraces and till plains
Landform position: Terrace risers and side slopes
Size of areas: 3 to 50 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Eolian sands
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 5 inches—dark brown, very friable loamy fine sand

Subsurface layer:
5 to 10 inches—yellowish brown, very friable loamy fine sand

Subsoil:
10 to 24 inches—strong brown, friable fine sandy loam
24 to 60 inches—light yellowish brown and strong brown, very friable fine sand and fine sandy loam

Inclusions

Contrasting inclusions:
• Hickory soils, which formed in glacial till; on steep side slopes

Similar inclusions:
• Soils that have more silt and clay and less sand in the upper part of the subsoil
• Soils that have less clay in the subsoil
• Soils that have a surface layer of very fine sandy loam or sandy loam

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 conserve moisture.
• Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
• Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, minimize crusting, and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes helps to control erosion and improves tilth.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent overgrazing and thus reduces the hazard of erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Planting on the contour helps to control erosion.

Woodland

Suitability: Well suited

Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

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

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Windbreak suitability group: 5

131E—Alvin loamy fine sand, 18 to 30 percent slopes

Composition

Alvin and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces and uplands
Landform: Terraces and till plains
Landform position: Terrace risers and side slopes
Size of areas: 3 to 30 acres
Major uses: Pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Eolian sands
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—dark grayish brown, very friable loamy fine sand

Subsurface layer:
8 to 14 inches—yellowish brown, very friable loamy fine sand

Subsoil:
14 to 25 inches—dark brown, very friable fine sandy loam
25 to 47 inches—strong brown, friable fine sandy loam

Substratum:
47 to 60 inches—dark yellowish brown, friable fine sandy loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained and poorly drained soils that formed in alluvium; on flood plains below the Alvin soil
• Hickory soils, which formed in glacial till; in landscape positions similar to those of the Alvin soil or on the steeper side slopes

Similar inclusions:
• Soils that contain more silt and clay and less sand in the upper part of the subsoil
• Soils that contain less clay in the subsoil
• Soils that have a surface layer of very fine sandy loam or sandy loam

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Moderately suited
Management measures:
• Establishing grasses and legumes helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, Korean lespedeza, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Proper stocking rates, rotation grazing, and deferred grazing help to prevent overgrazing, reduce the runoff rate, and reduce the hazard of erosion.
• The plants should not be grazed or clipped until they are sufficiently established.
• Planting on the contour helps to control erosion.

Woodland

Suitability: Moderately suited
Management measures:
• Plant competition affects the seedlings of desirable species. In openings where timber has been harvested,

competition from undesirable vegetation can be controlled by chemical or mechanical means.
• Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture reduce the hazard of erosion.
• Skidding logs and trees uphill with a cable and winch helps to overcome the slope.
• Firebreaks should be the grass type.
• Machinery should be used only when the soil is firm enough to support the equipment.
• Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 4R
Windbreak suitability group: 5

134A—Camden silt loam, 0 to 2 percent slopes

Composition

Camden and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 3 to 115 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and glacial outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 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 12 inches—dark brown, friable silt loam

Subsoil:
12 to 17 inches—dark yellowish brown and yellowish brown, friable silt loam
17 to 37 inches—yellowish brown, firm silty clay loam
37 to 54 inches—yellowish brown, firm clay loam

Substratum:
54 to 60 inches—yellowish brown, friable and loose, stratified fine sandy loam, loam, loamy sand, and sand

Inclusions

Contrasting inclusions:
• Poorly drained soils in the lower positions
• The somewhat poorly drained Roby soils in the lower positions

Similar inclusions:
• Soils that contain more sand in the upper part of the solum
• Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Well suited

Interpretive Groups

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

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

Composition

Camden and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 3 to 30 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

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

Subsoil:
15 to 33 inches—yellowish brown and dark yellowish brown, firm silty clay loam
33 to 44 inches—strong brown, friable clay loam
44 to 53 inches—strong brown, very friable fine sandy loam

Substratum:
53 to 60 inches—strong brown, very friable fine sandy loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained and poorly drained soils that formed in alluvium; on flood plains below the Camden soil
• Poorly drained soils in the lower positions on the terrace

Similar inclusions:
• Soils that have more sand in the upper part of the solum
• Soils that have a darker 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, or contour farming reduces the hazard of erosion.
• Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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 reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Well suited

Interpretive Groups

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

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

Composition

Camden and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace risers
Size of areas: 4 to 70 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and glacial outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 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 5 inches—dark brown, friable silt loam

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

Subsoil:
9 to 28 inches—strong brown, friable silty clay loam
28 to 44 inches—strong brown, friable loam
44 to 60 inches—strong brown, friable sandy loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained and poorly drained soils that formed in alluvium; on flood plains below the Camden soil
• Soils that formed in loess and are calcareous within a depth of 60 inches; in landscape positions similar to those of the Camden soil

Similar inclusions:
• Soils that have more sand in the upper part of the solum
• Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops reduce the hazard of further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Well suited

Interpretive Groups

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

138—Shiloh silty clay loam

Composition

Shiloh and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landform: Till plains
Landform position: Slight depressions
Ponding duration: Brief
Size of areas: 3 to 45 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff: Very slow or ponded
Available water capacity: High
Seasonal high water table: 1 foot above to 2 feet below the surface
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsurface layer:
5 to 14 inches—very dark gray, mottled, very firm silty clay loam

Subsoil:
14 to 27 inches—very dark gray, mottled, very firm silty clay
27 to 44 inches—dark gray, mottled, very firm silty clay
44 to 60 inches—dark gray, mottled, very firm silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Hoyleton soils in the slightly higher positions

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Measures that maintain the drainage system are needed. The drainage system may need improvement in some areas. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to prevent ponding.
• 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.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

142—Patton silty clay loam

Composition

Patton and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Lake plains
Landform position: Terrace treads
Ponding duration: Brief
Size of areas: 4 to 220 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Parent material: Lacustrine deposits
Runoff: 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: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface soil:
0 to 12 inches—black, firm silty clay loam

Subsoil:
12 to 31 inches—dark gray, mottled, firm silty clay loam
31 to 40 inches—olive gray, mottled, firm silty clay loam

Substratum:
40 to 60 inches—light olive gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Iva soils in the higher positions
- The well drained Camden soils on the higher parts of the terrace

Similar inclusions:
- Soils that have a surface layer of silt loam
- Soils that have more sand and gravel in the subsoil
- Soils that have a thicker surface layer
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
- A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Land grading helps to prevent ponding.
- 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 increase the rate of water infiltration.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

155A—Stockland loam, 0 to 2 percent slopes

Composition

Stockland and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 6 to 180 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 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 12 inches—very dark brown, friable loam

Subsoil:
12 to 36 inches—dark brown, friable gravelly sandy loam and very gravelly sandy loam
36 to 50 inches—dark brown, very friable gravelly loamy coarse sand

Substratum:
50 to 60 inches—yellowish brown and brown, loose coarse sand

Inclusions

Contrasting inclusions:
- The very poorly drained Westland soils in the lower positions
- The poorly drained Titus soils in backswamps on flood plains below the terraces

Similar inclusions:
- Soils that contain less gravel 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, or contour farming reduces the hazard of erosion, improves tilth, and conserves soil moisture.
- Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited

Management measures:
• This soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field.

Interpretive Groups

Land capability classification: IIIs
Windbreak suitability group: 6G

155B—Stockland sandy loam, 2 to 5 percent slopes

Composition

Stockland and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 3 to 245 acres
Major uses: Cropland, pasture and hay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 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 10 inches—very dark brown, very friable sandy loam

Subsoil:
10 to 16 inches—very dark brown, friable sandy clay loam
16 to 31 inches—dark brown, friable very gravelly clay loam
31 to 42 inches—dark brown, very friable very gravelly loamy sand

Substratum:
42 to 60 inches—dark yellowish brown, loose gravelly sand

Inclusions

Contrasting inclusions:
• The very poorly drained Westland soils on the lower parts of the terraces
• The poorly drained Titus soils in backswamps on flood plains adjacent to the terraces

Similar inclusions:
• Soils that contain less gravel in the subsoil
• Soils that are moderately eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, or contour farming reduces the hazard of erosion, improves tilth, and conserves soil moisture.
• Field windbreaks and a tillage system that leaves the surface rough reduce the hazard of soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent overgrazing and thus reduces the hazard of erosion.
• The plants should not be grazed until they are sufficiently established.
• Applications of fertilizer are needed.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• This soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field.

Interpretive Groups

Land capability classification: IIIs
Windbreak suitability group: 6G

155C—Stockland loam, 5 to 10 percent slopes

Composition

Stockland and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace risers
Size of areas: 4 to 45 acres
Major uses: Cropland, pasture and hay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Glacial outwash
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 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 6 inches—black, very friable loam

Subsurface layer:
6 to 12 inches—black, very friable gravelly loam

Subsoil:
12 to 24 inches—black, very friable gravelly sandy clay loam
24 to 29 inches—very dark grayish brown, very friable very gravelly clay loam
29 to 36 inches—dark brown, very friable extremely gravelly coarse sandy loam

Substratum:
36 to 54 inches—dark brown, very friable gravelly coarse sand
54 to 60 inches—dark brown, very friable very gravelly sandy clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Roby soils on terrace treads above the Stockland soil
• The poorly drained Titus soils in backswamps on flood plains below the terraces

Similar inclusions:
• Soils that are moderately eroded and have a thinner surface layer
• Soils that have less gravel 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 control erosion, improve tilth, and conserve moisture.
• Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and reduces the hazard of erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction, reduces the runoff rate, and reduces the hazard of erosion.
• Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
• Applications of fertilizer are needed.
• The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• This soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field.

Interpretive Groups

Land capability classification: IIIe
Windbreak suitability group: 6G

164A—Stoy silt loam, 0 to 2 percent slopes

Composition

Stoy and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands

Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 910 acres
Major use: Cropland

Soil Properties and Qualities

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

Typical Profile

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

Subsurface layer:
8 to 16 inches—yellowish brown, mottled, friable silt loam

Subsoil:
16 to 24 inches—yellowish brown, mottled, firm silty clay loam
24 to 35 inches—grayish brown, mottled, firm silty clay loam
35 to 47 inches—pale brown, mottled, very firm and brittle silty clay loam

Substratum:
47 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Cowden, Virden, and Weir soils in the lower positions on broad interfluves

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Surface ditches or subsurface drains help to lower the seasonal high water table.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

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 are installed.
• Sewage lagoons function well on this soil.

Interpretive Groups

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

164B—Stoy silt loam, 2 to 5 percent slopes

Composition

Stoy and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landform: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 70 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

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

Typical Profile

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

Subsoil:
10 to 32 inches—yellowish brown, mottled, firm silty clay loam
32 to 45 inches—grayish brown, mottled, very firm and brittle silty clay loam
45 to 54 inches—yellowish brown, mottled, firm silty clay loam

Substratum:
54 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Weir soils on the broader interfluves
• The moderately well drained Hosmer soils on the narrower interfluves

Similar inclusions:
• Soils that are eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, or contour farming reduces the hazard of erosion.
• Maintaining surface ditches helps to remove excess surface water.
• Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• 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 reduce 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.
• Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

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 are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

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

165—Weir silt loam

Composition

Weir and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Broad interfluves
Ponding duration: Brief
Size of areas: 3 to 320 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess
Runoff: 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: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

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

Subsoil:
16 to 35 inches—grayish brown, mottled, firm and very firm silty clay loam
35 to 50 inches—yellowish brown, mottled, friable silty clay loam

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

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Stoy soils on narrow interfluves

Similar inclusions:
• Soils that have a thicker, darker surface layer
• Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. A combination of surface ditches and land leveling reduces the wetness.
• Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and improve tilth.
• Winter wheat and hay crops are subject to frost heave in some years.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4W
Windbreak suitability group: 2

173B—McGary silt loam, 2 to 5 percent slopes

Composition

McGary and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Lake plains
Landform position: Interfluves
Size of areas: 3 to 260 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Lacustrine deposits
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

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

Subsoil:
6 to 12 inches—yellowish brown, mottled, firm silty clay loam
12 to 26 inches—olive brown, mottled, firm silty clay and silty clay loam

Substratum:
26 to 60 inches—light olive brown, very firm silty clay loam

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils and the moderately well drained Vanmeter soils that have shale residuum in the lower part of the subsoil and in the substratum; in landscape positions similar to those of the McGary soil

Similar inclusions:
• Soils that are eroded and have a thinner surface layer
• Soils that have a surface layer of silty clay loam

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour

farming, and a crop rotation that includes 1 or more years of forage crops help to control erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• 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 reduce the hazard of erosion.

Woodland

Suitability: Poorly suited
Management measures:
• Placing logging roads and skid trails on or near 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.
• Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

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 foundations helps to reduce 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 are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4W
Windbreak suitability group: 4L

178—Ruark fine sandy loam

Composition

Ruark and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Ponding duration: Brief
Size of areas: 4 to 195 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Glacial outwash
Runoff: 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: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

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

Subsurface layer:
8 to 16 inches—light brownish gray, mottled, friable fine sandy loam

Subsoil:
16 to 21 inches—light brownish gray, mottled, friable sandy clay loam
21 to 34 inches—light gray, mottled, friable loam

Substratum:
34 to 60 inches—light gray, mottled, friable fine sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Roby soils on foot slopes above the Ruark soil
• The very poorly drained Westland soils on the lower parts of the terrace tread

Similar inclusions:
• Soils that have less sand and more clay in the subsoil
• Soils that have more gravel in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface ditches or subsurface drains reduce the wetness.
• Leaving crop residue on the surface and establishing windbreaks help to control erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4W
Windbreak suitability group: 2

184A—Roby fine sandy loam, 0 to 2 percent slopes

Composition

Roby and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Foot slopes and terrace treads
Size of areas: 3 to 180 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

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

Subsurface layer:
9 to 15 inches—yellowish brown, very friable loamy fine sand

Subsoil:
15 to 23 inches—yellowish brown, mottled, very friable sandy loam
23 to 46 inches—yellowish brown, mottled, very friable loamy sand

Substratum:
46 to 60 inches—light brownish gray, mottled, loose sand

Inclusions

Contrasting inclusions:
• The poorly drained Ruark and very poorly drained Westland soils on the lower parts of the terrace tread
• The well drained Camden and Alvin soils on the higher parts of the terrace tread

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface ditches or subsurface drains reduce the wetness.
• Leaving crop residue on the surface and establishing windbreaks help to control soil blowing.
• Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop

residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains helps to lower the seasonal high water table.

Interpretive Groups

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

214B—Hosmer silt loam, 1 to 5 percent slopes

Composition

Hosmer and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Narrow interfluves
Size of areas: 3 to 2,130 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part; very slow in the fragipan
Parent material: Loess
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 1.5 to 3.0 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark brown, friable silt loam
Subsurface layer:
8 to 10 inches—brown, friable silt loam
Subsoil:
10 to 15 inches—yellowish brown, firm silt loam and silty clay loam
15 to 24 inches—yellowish brown, friable silty clay loam
24 to 53 inches—yellowish brown, mottled, firm and brittle silty clay loam
Substratum:
53 to 60 inches—yellowish brown, firm silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Stoy soils on the broader interfluves
• The somewhat poorly drained Atlas soils, which formed in loess and glacial till; on moderately sloping side slopes
Similar inclusions:
• Soils that have more sand in the lower part of the subsoil
• Soils that are eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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: Moderately suited
Management measures:
• In openings where timber has been harvested,

competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.
• 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: Poorly suited
Management measures:
• A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.
• Sewage lagoons function satisfactorily if the site is leveled.

Interpretive Groups

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

214C2—Hosmer silt loam, 5 to 10 percent slopes, eroded

Composition

Hosmer and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 130 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part; very slow in the fragipan
Parent material: Loess
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 1.5 to 3.0 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
6 to 10 inches—yellowish brown, friable silty clay loam
10 to 24 inches—brownish yellow and yellowish brown, firm silty clay loam
24 to 48 inches—brownish yellow, very firm and brittle silty clay loam
48 to 60 inches—dark brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Stoy soils on the broader interfluves
• The somewhat poorly drained Atlas soils, which formed in loess and glacial till; in landscape positions similar to those of the Hosmer soil
• The well drained Hickory soils, which formed in glacial till; on moderately steep side slopes

Similar inclusions:
• Soils that have more sand in the lower part of the subsoil
• Soils that are less eroded and have a thicker surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops help to control further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet

reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Moderately suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.
• 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: Poorly suited
Management measures:
• Installing subsurface interceptor drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces wetness.
• Installing specially designed systems that include sand filters helps to overcome the restricted permeability.

Interpretive Groups

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

218—Newberry silt loam

Composition

Newberry and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Slight depressions
Size of areas: 4 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Loess and silty or loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: At the surface to 2 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 gray, friable silt loam

Subsurface layer:
8 to 18 inches—gray, mottled, friable silt loam

Subsoil:
18 to 22 inches—gray, mottled, friable silty clay loam
22 to 50 inches—gray and grayish brown, mottled, firm silty clay loam

Substratum:
50 to 60 inches—mottled gray, dark gray, and yellowish brown, firm silty clay loam

Inclusions

Contrasting inclusions:
• Shiloh and Cisne soils, which have more clay in the subsoil than the Newberry soil and are in landscape positions similar to those of the Newberry soil

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile drains, and surface inlet tile function satisfactorily if suitable outlets are available.
• Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

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 are installed.
• Sewage lagoons function well on this soil.

Interpretive Groups

Land capability classification: IIw
Windbreak suitability group: 2

286A—Carmi sandy loam, 0 to 2 percent slopes

Composition

Carmi and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 8 to 2,245 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the gravelly material
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 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 7 inches—very dark brown, friable sandy loam
Subsurface layer:
7 to 23 inches—very dark brown and very dark grayish brown, friable sandy loam
Subsoil:
23 to 27 inches—dark brown, friable sandy loam
27 to 36 inches—dark brown, firm and friable gravelly sandy clay loam and gravelly sandy loam
36 to 60 inches—dark brown, very friable loamy sand, gravelly loamy sand, and coarse sand

Inclusions

Contrasting inclusions:
• The very poorly drained Westland and somewhat poorly drained Roby soils on the lower parts of the terrace tread
Similar inclusions:
• Soils that have more gravel 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, or contour farming helps to control erosion, improves tilth, and conserves soil moisture.
• Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• This soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field.

Interpretive Groups

Land capability classification: IIs
Windbreak suitability group: 6G

286B—Carmi loam, 2 to 5 percent slopes

Composition

Carmi and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Size of areas: 4 to 90 acres
Major uses: Cropland, pasture and hay

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderately rapid in the upper part and rapid in the gravelly material
Parent material: Glacial outwash
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: 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 brown, friable loam

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

Subsoil:
15 to 23 inches—dark brown, friable sandy loam
23 to 30 inches—dark brown, friable gravelly sandy clay loam
30 to 54 inches—dark brown, very friable and friable loamy sand and gravelly loamy sand

Substratum:
54 to 60 inches—brown, loose gravelly sand

Inclusions

Contrasting inclusions:
• The very poorly drained Westland and somewhat poorly drained Roby soils on the lower parts of the terrace tread

Similar inclusions:
• Soils that have more gravel in the subsoil
• Soils that are eroded and have a thinner 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, or contour farming helps to control erosion, improves tilth, and conserves soil moisture.
• Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• This soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field.

Interpretive Groups

Land capability classification: IIe
Windbreak suitability group: 6G

300—Westland silty clay loam

Composition

Westland and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Terrace treads
Ponding duration: Long
Size of areas: 3 to 825 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Very poorly drained
Permeability: Moderate in the upper part and very rapid in the lower part
Parent material: Glacial outwash
Runoff: Very slow or ponded (fig. 6)
Available water capacity: Moderate
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 11 inches—black, firm silty clay loam

Figure 6.—Ponding in an area of Westland silty clay loam.

Subsoil:
11 to 30 inches—very dark gray and very dark grayish brown, mottled, firm clay loam
30 to 48 inches—dark grayish brown, mottled, friable, stratified gravelly clay loam and loamy sand

Substratum:
48 to 60 inches—dark brown, friable, stratified very gravelly sand and sand

Inclusions

Contrasting inclusions:
• The well drained Carmi and Camden soils on the higher, more sloping parts of the terrace tread
• The somewhat poorly drained Roby soils on foot slopes above the Westland soil

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

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
• Land grading helps to control the ponding.
• 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 increase the rate of water infiltration.

• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

308B—Alford silt loam, 1 to 5 percent slopes

Composition

Alford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Narrow interfluves
Size of areas: 3 to 395 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
10 to 40 inches—yellowish brown, firm silty clay loam
40 to 50 inches—yellowish brown, friable silty clay loam
50 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Muren soils on the broader parts of the interfluve
• Hickory soils, which formed in glacial till; on moderately sloping side slopes

Similar inclusions:
• Soils that have more sand in the lower part of the subsoil
• Soils that are eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Well suited

Interpretive Groups

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

308C2—Alford silt loam, 5 to 10 percent slopes, eroded

Composition

Alford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 160 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 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 7 inches—dark yellowish brown, friable silt loam
Subsoil:
7 to 17 inches—yellowish brown, firm silty clay loam
17 to 48 inches—yellowish brown, friable silty clay loam
48 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils in landscape positions similar to those of the Alford soil
• Hickory soils, which formed in glacial till; on moderately steep side slopes
Similar inclusions:
• Soils that have a surface layer of silty clay loam
• Soils that have more sand in the lower part of the subsoil
• Soils that have a seasonal high water table between depths of 2 and 6 feet

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• A system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops help to control further erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Well suited

Interpretive Groups

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

308D2—Alford silt loam, 10 to 15 percent slopes, eroded

Composition

Alford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 6 to 60 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 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 8 inches—dark yellowish brown, friable silt loam

Subsurface layer:
8 to 13 inches—dark yellowish brown and yellowish brown, friable silty clay loam

Subsoil:
13 to 49 inches—yellowish brown, firm silty clay loam
49 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:
- Hickory soils, which formed in glacial till; in landscape positions similar to those of the Alford soil or on the steeper side slopes
- The moderately well drained Muren and Hosmer soils on narrow interfluves above the Alford soil

Similar inclusions:
- Soils that have a surface layer of silty clay loam
- Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
- Further erosion can be controlled by using a cropping system that is dominated by forage crops.
- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
- Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
- A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management measures:
- In openings where timber has been harvested, competition from undesirable vegetation 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.

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 foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management measures:
• Installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

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

308E—Alford silt loam, 15 to 30 percent slopes

Composition

Alford and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 65 acres
Major uses: Pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: 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 6 inches—dark brown, friable silt loam
Subsurface layer:
6 to 12 inches—dark brown, friable silt loam
Subsoil:
12 to 60 inches—yellowish brown, firm silty clay loam

Inclusions

Contrasting inclusions:
• Hickory soils, which formed in glacial till; in landscape positions similar to those of the Alford soil
• The moderately well drained Muren and Hosmer soils on narrow interfluves above the Alford soil
• Soils that have shale residuum in the lower part of the subsoil; in landscape positions similar to those of the Alford soil

Similar inclusions:
• Soils that have more sand in the lower part of the subsoil
• Soils that are eroded and have a thinner surface layer

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Moderately suited
Management measures:
• Bromegrass, orchardgrass, tall fescue, Korean lespedeza, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• In areas where the pasture is established, seeding legumes on the contour with a no-till seeder improves the forage quality.
• The plants should not be grazed or clipped until they are sufficiently established.
• A permanent cover of pasture plants helps to control erosion and maintains tilth.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management measures:
• The slope increases the hazard of erosion and limits the use of equipment.
• Placing logging roads and skid trails on or near 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.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: VIe

Woodland ordination symbol: 5R
Windbreak suitability group: 3

453A—Muren silt loam, 0 to 2 percent slopes

Composition

Muren and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 4 to 70 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 2 to 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—dark brown, friable silt loam

Subsurface layer:
10 to 19 inches—yellowish brown and light yellowish brown, friable silt loam

Subsoil:
19 to 28 inches—yellowish brown, firm silty clay loam
28 to 55 inches—yellowish brown, mottled, firm and friable silty clay loam
55 to 60 inches—pale brown, mottled, firm silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Iva soils on the broader interfluves

Similar inclusions:
• Well drained soils on the narrower or higher parts of the interfluve
• Soils that have more sand in the lower part of the subsoil
• Soils that have free carbonates in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Returning crop residue to the soil and regularly adding other organic material improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Poorly suited
Management measures:
• Installing subsurface tile drains helps to lower the seasonal high water table.

Interpretive Groups

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

453B2—Muren silt loam, 2 to 5 percent slopes, eroded

Composition

Muren and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 4 to 256 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess
Runoff: Medium
Available water capacity: Very high
Depth to the seasonal high water table: 2 to 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 8 inches—dark yellowish brown, friable silt loam mixed with common pockets of yellowish brown subsoil material

Subsoil:
8 to 35 inches—yellowish brown, mottled, firm silty clay loam

Substratum:
35 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Iva soils on interfluves above the Muren soil

Similar inclusions:
• Well drained soils in the more sloping areas
• Soils that have more sand in the lower part of the subsoil
• Soils that have free carbonates in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Further erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces.
• Maintaining surface ditches helps to remove excess surface water.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Maintaining a cover of grasses and legumes improves tilth and helps to control erosion.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• 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:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Moderately suited
Management measures:
• 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: Poorly suited
Management measures:
• Installing subsurface tile drains helps to lower the seasonal high water table.

Interpretive Groups

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

454A—Iva silt loam, 0 to 2 percent slopes

Composition

Iva and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 5 to 380 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess
Runoff: Slow

Available water capacity: Very high
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsurface layer:
9 to 16 inches—pale brown, mottled, friable silt loam

Subsoil:
16 to 35 inches—mottled yellowish brown and dark grayish brown, friable and firm silty clay loam
35 to 45 inches—mottled yellowish brown and dark grayish brown, firm silt loam
45 to 59 inches—strong brown and brown, mottled, friable silt loam

Substratum:
59 to 60 inches—brownish yellow and strong brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The moderately well drained Muren soils on the higher or narrower parts of the interfluve
• The poorly drained Virden soils on the broader interfluves

Similar inclusions:
• Soils that have more sand in the lower part of the subsoil
• Soils that have free carbonates in the lower part of the subsoil and in the substratum
• Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Surface ditches or subsurface drains help to lower the seasonal high water table.
• In areas where slopes are very long, erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting.
• Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

Septic tank absorption fields

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains helps to lower the seasonal high water table.

Interpretive Groups

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

615C2—Vanmeter silty clay loam, 5 to 12 percent slopes, eroded

Composition

Vanmeter and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 3 to 50 acres
Major uses: Cropland, pasture and hay, woodland
Special feature: Erosion has thinned the surface layer.

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Moderately well drained
Permeability: Very slow
Parent material: Calcareous shale residuum
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silty clay loam

Subsurface layer:
9 to 14 inches—brownish yellow, mottled, friable silty clay loam

Subsoil:
14 to 21 inches—yellowish brown, mottled, firm silty clay

21 to 27 inches—light brownish gray, mottled, firm silty clay

Substratum:

27 to 60 inches—olive gray, very firm and extremely firm silty clay shale

Inclusions

Contrasting inclusions:

• Soils that formed in residuum derived from sandstone or acid shale; in landscape positions similar to those of the Vanmeter soil

• Soils that formed in calcareous lacustrine deposits; in landscape positions similar to or less sloping than those of the Vanmeter soil

Similar inclusions:

• Soils that have a surface layer of silt loam or loam

Use and Management

Cropland

Suitability: Poorly suited

Management measures:

• Further erosion can be controlled by using a cropping system that is dominated by forage crops.

• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.

• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Poorly suited

Management measures:

• Establishing grasses and legumes on this soil helps to control erosion and improves tilth.

• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.

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

Woodland

Suitability: Poorly suited

Management measures:

• Placing logging roads and skid trails on or near 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.

• Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.

• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Poorly suited

Management measures:

• 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 because of the moderate depth to bedrock

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 2C
Windbreak suitability group: 8

615E2—Vanmeter silty clay loam, 12 to 30 percent slopes, eroded

Composition

Vanmeter and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Side slopes
Size of areas: 4 to 90 acres
Major uses: Pasture and hay, woodland
Special feature: Erosion has thinned the surface layer and mixed it with the upper part of the subsoil.

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Moderately well drained
Permeability: Very slow

Parent material: Calcareous shale residuum
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

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

Subsoil:
6 to 28 inches—olive and pale olive, firm silty clay loam

Substratum:
28 to 44 inches—pale olive, firm silty clay loam
44 to 60 inches—olive, very firm silty clay loam

Inclusions

Contrasting inclusions:
• Soils that formed in residuum derived from sandstone or acid shale; in landscape positions similar to those of the Vanmeter soil
• The well drained Hickory soils, which formed in glacial till; in landscape positions similar to those of the Vanmeter soil

Similar inclusions:
• Soils that have a surface layer of silt loam or loam

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management measures:
• Bromegrass, orchardgrass, tall fescue, Korean lespedeza, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.
• In areas where the pasture is established, seeding legumes on the contour with a no-till seeder improves the forage quality.
• The plants should not be grazed or clipped until they are sufficiently established.
• A permanent cover of grasses and legumes helps to control erosion and improves tilth.
• Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

Woodland

Suitability: Poorly suited
Management measures:
• Placing logging roads and skid trails on or near 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.
• Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the moderate depth to bedrock and the slope

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: 2R
Windbreak suitability group: 8

620A—Darmstadt silt loam, 0 to 2 percent slopes

Composition

Darmstadt and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Uplands
Landform: Till plains
Landform position: Interfluves
Size of areas: 3 to 90 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and loamy sediments
Runoff: Medium
Available water capacity: Moderate

Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsurface layer:
6 to 9 inches—light brownish gray, friable silt loam

Subsoil:
9 to 16 inches— brown, mottled, firm silty clay loam
16 to 35 inches—grayish brown, mottled, firm silty clay loam
35 to 60 inches—mottled light grayish brown and yellowish brown, firm silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Cisne soils on the broader interfluves
• Bluford and Hoyleton soils, which do not have a high concentration of sodium in the subsoil; in landscape positions similar to those of the Darmstadt soil

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

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Measures that maintain the drainage system are needed in some areas. Additional drainage is needed in some areas. Drainage can be improved by diversions and surface ditches.
• Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Minimizing tillage and returning crop residue to the soil increase the rate of water infiltration and improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Dwellings

Suitability: Poorly suited
Management measures:
• Installing subsurface tile drains near the foundations helps to overcome the seasonal high water table.

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 are installed.
• Sewage lagoons or mounds are alternative methods of waste disposal.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4T
Windbreak suitability group: 9

3070—Beaucoup silty clay loam, frequently flooded

Composition

Beaucoup and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Backswamps
Flooding frequency: Frequent
Flooding duration: Long
Ponding duration: Long
Size of areas: 3 to 260 acres
Major uses: Cropland, woodland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff: 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 7 inches—very dark grayish brown, firm silty clay loam

Subsurface layer:
7 to 12 inches—very dark grayish brown, firm silty clay loam

Subsoil:
12 to 23 inches—dark grayish brown, mottled, firm silty clay loam
23 to 60 inches—very dark gray and dark gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The well drained Armiesburg and Stonelick soils in the higher positions on the flood plain and on natural levees
• The somewhat poorly drained Tice soils in the slightly higher positions on the flood plain

Similar inclusions:
• Soils that have a thinner, lighter colored surface layer and subsurface layer
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Shallow surface drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Levees reduce the damage caused by flooding.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Woodland

Suitability: Poorly 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.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IVw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3284—Tice silty clay loam, frequently flooded

Composition

Tice and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts
Flooding frequency: Frequent
Flooding duration: Long
Size of areas: 3 to 100 acres
Major uses: Cropland, woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1.5 to 3.0 feet
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 silty clay loam

Subsurface layer:
8 to 15 inches—very dark grayish brown, firm silty clay loam

Subsoil:
15 to 58 inches—dark grayish brown, mottled, firm silty clay loam
58 to 60 inches—very dark gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The well drained Armiesburg and Stonelick soils in the higher positions on the flood plain and on natural levees
• The poorly drained Beaucoup soils in the lower positions on the flood plain

Similar inclusions:
• Soils that have more sand and gravel in the subsoil
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Subsurface tile drains help to overcome the seasonal high water table.
• Levees reduce the extent of crop damage caused by flooding.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IVw
Woodland ordination symbol: 5A
Windbreak suitability group: 1

3288—Petrolia silty clay loam, frequently flooded

Composition

Petrolia and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts
Flooding frequency: Frequent
Flooding duration: Long
Ponding duration: Long
Size of areas: 3 to 1,100 acres
Major uses: Cropland, woodland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 3.0 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 9 inches—dark grayish brown, friable silty clay loam

Substratum:
9 to 27 inches—light gray, mottled, firm silty clay loam
27 to 43 inches—dark gray, mottled, firm silty clay
43 to 60 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The well drained Haymond soils in the higher positions on the flood plain and on natural levees

Similar inclusions:
• Soils that have a darker surface layer
• Soils that have more sand or more clay in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches or subsurface drains.
• Levees reduce the extent of crop damage caused by flooding.
• A good seedbed is difficult to prepare on this soil because of surface crusting and cloddiness.
• Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural

chemicals reduce the risk of contamination of ground water and surface water.

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.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3331—Haymond silt loam, frequently flooded

Composition

Haymond and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts and natural levees
Flooding frequency: Frequent
Flooding duration: Brief
Size of areas: 5 to 340 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Very slow
Available water capacity: Very high
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—dark brown, friable silt loam
Subsoil:
7 to 41 inches—dark brown, friable silt loam
Substratum:
41 to 60 inches—dark brown, friable silt loam and very friable fine sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Wakeland and poorly drained Birds soils in the lower positions
Similar inclusions:
• Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Avoiding fall cultivation and establishing grass strips in critical areas help to control scouring and erosion during floods.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Levees reduce the extent of damage caused by flooding in some years.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested,

competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 8A
Windbreak suitability group: 1

3333—Wakeland silt loam, frequently flooded

Composition

Wakeland and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts
Flooding frequency: Frequent
Flooding duration: Brief
Size of areas: 4 to 2,500 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Very slow
Available water capacity: Very high
Depth to the seasonal high water table: 1 to 3 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

Surface layer:
0 to 12 inches—dark brown, friable silt loam
Substratum:
12 to 23 inches—dark grayish brown, mottled, firm, stratified silt loam
23 to 40 inches—grayish brown, mottled, firm and friable silt loam
40 to 60 inches—light brownish gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:
• The well drained Haymond soils in the higher positions
• The poorly drained Birds soils in the lower positions
Similar inclusions:
• Soils that have more sand in the substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Subsurface tile drains help to overcome the seasonal high water table.
• Levees reduce the extent of crop damage caused by flooding.
• Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Levees reduce the extent of damage caused by flooding in some years.
• Subsurface tile drains help to lower the water table.
• The flooding delays harvesting of hay in some years.
• 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.
• Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Windbreak suitability group: 1

3334—Birds silt loam, frequently flooded

Composition

Birds and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts
Flooding frequency: Frequent
Flooding duration: Brief
Ponding duration: Brief
Size of areas: 4 to 1,450 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Alluvium
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

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

Subsurface layer:
6 to 16 inches—dark gray, mottled, friable silt loam

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

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Wakeland soils in the higher positions

Similar inclusions:
- Soils that have more clay in the substratum
- Soils that have more sand in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches or subsurface drains.
- Levees reduce the extent of 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 improve tilth and increase the rate of water infiltration.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
- Levees reduce the extent of damage caused by flooding in some years.
- Subsurface tile drains help to lower the water table.
- The flooding delays harvesting of hay in some years.
- 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.
- Reed canarygrass, tall fescue, ladino, and alsike clover are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

Woodland

Suitability: Poorly 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.
- Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
- In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 5W
Windbreak suitability group: 2

3404—Titus silty clay loam, frequently flooded

Composition

Titus and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Backswamps
Flooding frequency: Frequent
Flooding duration: Long
Ponding duration: Long
Size of areas: 4 to 2,000 acres
Major uses: Cropland, woodland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Alluvium
Runoff: 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: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown, firm silty clay loam

Subsurface layer:
4 to 10 inches—very dark gray, firm silty clay

Subsoil:
10 to 54 inches—dark gray, mottled, firm silty clay
54 to 60 inches—gray, mottled, firm silty clay

Inclusions

Contrasting inclusions:
• The very poorly drained Westland soils on terraces above the Titus soil

Similar inclusions:
• Soils that have more gravel in the subsoil
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management measures:
• Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Tile drains do not function well because of the restricted permeability, but shallow surface drains and surface inlet tile function satisfactorily if suitable outlets are available.
• Levees reduce the extent of crop damage caused by flooding.
• Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Woodland

Suitability: Poorly 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.
• Using harvesting methods that do not leave the remaining trees isolated or widely spaced and removing high-value trees only from a strip about 50 feet wide along the western and southern edges of the woodland reduce the hazard of windthrow.
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IVw
Woodland ordination symbol: 2W
Windbreak suitability group: 2

3424—Shoals silt loam, frequently flooded

Composition

Shoals and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts
Flooding frequency: Frequent
Flooding duration: Brief
Size of areas: 5 to 310 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Very slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 1.5 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: High

Typical Profile

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

Subsurface layer:
7 to 11 inches—dark brown, mottled, friable silt loam

Substratum:
11 to 15 inches—brown, mottled, friable, stratified silt loam and sandy loam
15 to 60 inches—light brownish gray, mottled, friable, stratified loam and silt loam

Inclusions

Contrasting inclusions:
- The poorly drained Birds soils in the lower positions
- The well drained Haymond soils in the higher positions

Similar inclusions:
- Soils that have less sand in the substratum
- Soils that have less clay in the substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
- Subsurface tile drains help to overcome the seasonal high water table.
- Levees reduce the extent of crop damage caused by flooding.
- Keeping tillage to a minimum and leaving crop residue on the surface after planting improve tilth.
- Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
- Levees reduce the extent of damage caused by flooding in some years.
- Subsurface tile drains help to lower the water table.
- The flooding delays harvesting of hay in some years.
- 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.
- Bromegrass, orchardgrass, tall fescue, and ladino are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

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.
- In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5W
Windbreak suitability group: 1

3597—Armiesburg silty clay loam, frequently flooded

Composition

Armiesburg and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Natural levees and meander belts
Flooding frequency: Frequent
Flooding duration: Brief
Size of areas: 3 to 320 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsurface layer:
6 to 14 inches—very dark grayish brown, firm silty clay loam

Subsoil:
14 to 40 inches—dark brown, firm silty clay loam

Substratum:
40 to 60 inches—yellowish brown, friable silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Beaucoup and somewhat poorly drained Tice soils in the lower positions

Similar inclusions:
• Soils that have more sand in the substratum
• Soils that are more acid in the subsoil and substratum

Use and Management

Cropland

Suitability: Well suited
Management measures:
• Avoiding fall cultivation and establishing grass strips in critical areas help to control scouring and erosion during floods.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Well suited
Management measures:
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Levees reduce the extent of damage caused by flooding in some years.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 8A
Windbreak suitability group: 1

3665—Stonelick loam, frequently flooded

Composition

Stonelick and similar soils: 80 to 90 percent
Contrasting inclusions: 10 to 20 percent

Setting

Landscape: Flood plains
Landform: Low positions on the flood plains (first bottom)
Landform position: Meander belts and natural levees
Flooding frequency: Frequent
Flooding duration: Very brief
Size of areas: 3 to 550 acres
Major uses: Cropland, pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Alluvium
Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 14 inches—dark grayish brown, very friable loam

Substratum:
14 to 33 inches—dark grayish brown and dark brown, friable loam and very friable fine sandy loam
33 to 47 inches—yellowish brown, loose loamy fine sand
47 to 60 inches—dark yellowish brown and dark brown, very friable fine sandy loam and friable silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Beaucoup and somewhat poorly drained Tice soils in the lower positions

Similar inclusions:
• Soils that have a surface layer of fine sandy loam
• Soils that contain less sand in the substratum
• Soils that contain more clay in the substratum
• Soils that do not have carbonates in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management measures:
• Avoiding fall cultivation and establishing grass strips in critical areas help to control scouring and erosion during floods.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil improve tilth and increase the rate of water infiltration.
• Carefully controlled applications of agricultural chemicals reduce the risk of contamination of ground water and surface water.

Pasture and hay

Suitability: Moderately suited
Management measures:
• Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing during wet periods help to keep the pasture in good condition.
• Levees reduce the extent of damage caused by flooding in some years.
• Bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and little bluestem.

Woodland

Suitability: Well suited
Management measures:
• In openings where timber has been harvested, competition from undesirable vegetation 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.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

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

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S.

Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

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

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

About 207,000 acres in Crawford County, or nearly 70 percent of the total acreage, meets the soil requirements for prime farmland. These areas are scattered throughout the county.

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

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

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

J.R. Pearse, district conservationist, Natural Resources Conservation Service, prepared this section.

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

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

The soils in Crawford County have good potential for continued crop production, particularly if the latest technology is applied. The chief management needs in the county are measures that control erosion and soil blowing, maintain or improve tilth and fertility, maintain drainage systems, and increase the rate of water infiltration. A cropping system that keeps plant cover and crop residue on the surface for extended periods helps to control erosion and maintains the productive capacity of the soils. Including grasses and legumes in the crop rotation helps to prevent surface crusting, improves tilth, and increases the supply of nitrogen.

Erosion is the major management concern on about 20 percent of the cropland and pastureland in Crawford County. Erosion is a hazard on some soils that have slopes of more than 2 percent. It is more severe on the longer or steeper slopes.

Erosion reduces the content of organic matter and the natural fertility level and results in a deterioration of tilth as the surface layer is thinned and subsoil material is incorporated into the plow layer. Consequently, the rate of water infiltration is reduced, the surface layer is subject to crusting after heavy rainfalls, and the runoff rate increases. Erosion also results in the sedimentation of streams, rivers, ponds, and ditches. Removing this sediment is expensive. Controlling erosion helps to prevent this pollution and improves the quality of water for rural and municipal uses, for recreational uses, for livestock, and for fish and wildlife.

Terraces, contour farming, conservation tillage, and diversions help to control erosion and reduce the runoff

Figure 7.—A grassed waterway in an area of Hosmer soils.

rate. These practices are most effective on soils that have uniform and regular slopes. In areas where slopes are short and irregular, a crop rotation that provides adequate plant cover is needed to reduce the hazard of erosion.

A conservation tillage system, such as chisel plowing, no-till farming, or ridge planting, helps to prevent excessive soil loss, reduces the runoff rate, and increases the rate of water infiltration. Chisel plowing is suitable on most of the tillable soils in the county. No-till farming is more successful on well drained to somewhat poorly drained soils, such as Alford or Iva soils, than on poorly drained soils, such as Cisne soils. Leaving crop residue on the surface can delay warming and drying of the surface layer. In poorly drained soils, using such a system could delay planting or hinder seed germination. Ridge planting is suitable on most nearly level soils.

Grassed waterways help to carry excess rainwater downslope to the nearest watercourse (fig. 7). When established in natural drainageways, they remove the water at a nonerosive velocity. They generally are used in combination with other conservation practices, such as terraces, diversions, conservation tillage, and contour farming. These conservation practices help to manage rainfall effectively and help to prevent excessive soil loss.

Crop rotations that include small grain and legumes help to control erosion in the sloping areas. These crops also increase the content of organic matter and nitrogen in the soil, increase the available water capacity, and improve tilth.

Soil blowing is a hazard on some soils, such as Alvin and Roby soils. Establishing field windbreaks, using a tillage system that leaves the surface rough, leaving crop residue on the surface after planting, and maintaining an adequate plant cover help to prevent excessive soil loss and crop damage caused by windblown soil particles.

Soil drainage benefits crop production in areas of somewhat poorly drained to very poorly drained soils. A drainage system is needed if these soils are used for the crops commonly grown in the area. In Crawford County, drainage systems have already been installed in most areas of these soils. Maintenance of the existing drainage systems is needed.

The design of surface and subsurface drainage systems varies with the kind of soil. Tile drains alone are inadequate on many soils. A combination of open

drainage ditches and surface inlet tile functions satisfactorily in some areas if suitable outlets are available. Tile drains may not be effective in areas of slowly or very slowly permeable soils, such as Weir, Cisne, and Newberry soils. Surface drains and open drainage ditches can be used in areas of these soils.

Further information about erosion-control measures and drainage systems can be obtained from the local offices of the Natural Resources Conservation Service and the Cooperative Extension Service.

Droughtiness limits the productivity of some soils used for crops and pasture in the county. The physical composition of some soils limits the amount of available water during dry periods. Carmi and Stockland soils are examples. Droughtiness can be minimized by increasing the rate of water infiltration, reducing the runoff rate, and planting crops that are tolerant of droughty conditions. No-till farming and crop residue management increase the rate of water infiltration and reduce the runoff rate.

Flooding is a hazard in some areas of the county. Soils on flood plains are flooded by stream overflow almost every year. Levees can protect the adjacent soils. Crop varieties that require a relatively short growing season should be selected for planting in areas of soils that are susceptible to flooding. Also, the less intensive land uses are practical on these soils.

Natural fertility in the soils in Crawford County ranges from low to high. It is low in Sylvan soils and high in Virden soils. Crops on most of the soils in the county respond well to additions of nitrogen, phosphorus, and potassium fertilizers and to certain micronutrients. In most of the soils, applications of agricultural limestone raise the pH level sufficiently for optimum plant growth. Some soils, such as Stonelick and Armiesburg soils, have naturally high pH levels and generally do not need applications of lime. The kind and amount of lime or fertilizer to be applied should be based on the results of soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help in determining the kind and amounts of lime or fertilizer needed.

Soil tilth is an important factor affecting the germination of seeds, the amount of runoff, and the rate of water infiltration. Generally, soils with good tilth are granular and porous.

Some soils have a lower content of organic matter than others. A crust may form on the surface of these soils during periods of intensive rainfall. Surface crusting reduces the infiltration rate and increases the runoff rate. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth, increase the content of organic matter, and improve fertility levels.

Poor tilth is also a concern in soils that have a moderately fine textured surface layer, such as Petrolia, Shiloh, Titus, and Virden soils. The surface layer of these soils becomes compact and cloddy if tilled when wet. As a result of the cloddiness, preparing a good seedbed is difficult. The opportunity for primary tillage commonly is limited because these soils often stay wet until late in the spring. If these soils are tilled in the fall, leaving crop residue on the surface helps to control erosion.

Measures that reduce the hazard of erosion, improve fertility, and prevent overgrazing are needed in areas used for pasture. Applications of lime and fertilizer should be based on the results of soil tests. When used appropriately, applications of fertilizer help to keep pastures productive and maintain dense stands of grasses and legumes.

Pastures should not be grazed when the soils are wet. Rotation grazing and measures that prevent overgrazing help to keep the pasture in good condition. Seeding and maintaining legumes, such as alfalfa, red clover, or birdsfoot trefoil, in the stand of grasses improve the quality and productivity of the pasture and provide nitrogen for the grasses.

The latest information about the suitability of the soils for crops and pasture can be obtained from the local offices of the Natural Resources Conservation Service and the Cooperative Extension Service.

Yields per Acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(5)*. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

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

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(10)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

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

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

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

Woodland Management and Productivity

Bill Keyth, district forester, Illinois Department of Conservation, helped prepare this section.

Much of Crawford County was originally covered by hardwood forests. Most of this original forest land has been cleared, especially in areas that are suitable for cultivation. Important trees in upland areas included white ash, American beech, black oak, white oak, red oak, shagbark hickory, black walnut, and sugar maple. Silver maple, cottonwood, pin oak, and sycamore were important trees on flood plains. The woodland areas today are areas that are either too steep or too wet for use as cropland or are inaccessible. The soils in these areas range from poorly suited to well suited to high-quality trees and wood crops (fig. 8).

About 18 percent of the total land area in Crawford County, or about 50,000 acres, is used as woodland. Most of the woodland is used for noncommercial production and provides valuable watershed protection, wildlife habitat, and recreational areas. A small part of the acreage is managed as commercial woodland. Christmas trees are grown in a few areas. The largest areas of woodland are in associations 1, 2, 3, and 6, which are described under the heading "General Soil Map Units."

Many of the woodland areas can be improved by thinning or harvesting mature trees, removing undesirable species, preventing fires, excluding livestock from the woodland, and controlling disease

Figure 8.—A stand of young hardwood trees. Hickory silt loam, 10 to 15 percent slopes, eroded, is on the left, and Wakeland silt loam, frequently flooded, is on the right.

and insects. More information regarding woodland management is provided in the section "Detailed Soil Map Units."

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

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an

indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; 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, 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 are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

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

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

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

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

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

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

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

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several

rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

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

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

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens.

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 local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

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

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

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

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

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

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

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject

to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Crawford County has large and varied populations of wildlife. The types of habitat also vary considerably. They include woodland, cropland, pastureland, swampy areas, and abandoned gravel pits. Deer, squirrels, rabbits, quail, songbirds, ducks, and geese are common in these areas. Turkey, fox, beaver, groundhogs, skunks, hawks, and snakes also thrive in these areas.

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

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

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

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

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

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, wildrice, cordgrass, rushes, sedges, and reeds.

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

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes,

and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

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

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

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, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock 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, 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, a high water table, flooding (fig. 9), 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, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

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

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

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. 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, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

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

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

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

Figure 9.—A flooded road in an area of Shoals silt loam, frequently flooded.

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 and bedrock 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. In an area landfill, 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.

Area landfills must be able to bear heavy vehicular traffic. Also, they involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect area landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. 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 or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

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

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

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

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

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

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

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

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

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

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

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

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20

to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

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

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock 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, 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 sodium. 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. The performance of a system is affected by the depth of the root zone, the amount of 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 affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as 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. These results are reported in table 18.

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

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

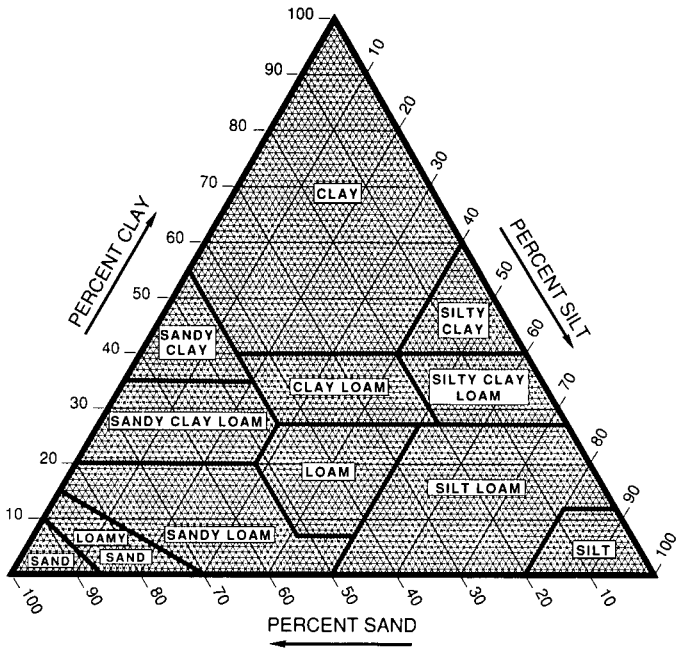

Figure 10.—Percentages of sand, silt, and clay in the basic USDA soil textural classes.

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 *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

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

highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

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

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

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

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

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

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

Physical and Chemical Properties

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

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

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

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

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

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

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory

analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

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

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

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

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

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

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

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

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

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

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

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

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

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

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

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

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

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

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

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

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

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

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

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

Engineering Index Test Data

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

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(11)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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

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

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

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. 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" *(12)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(11)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Alford Series

Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands

Parent material: Loess
Slope range: 1 to 30 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Alford silt loam, 5 to 10 percent slopes, eroded, about 690 feet south and 3,260 feet east of the northwest corner of sec. 7, T. 5 N., R. 10 W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; mixed with common pockets of yellowish brown (10YR 5/6) subsoil material; moderate fine granular structure; friable; many very fine and common fine roots; few fine rounded accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

Bt1—7 to 17 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; many very fine and common fine roots; many distinct strong brown (7.5YR 4/6) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt2—17 to 32 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common very fine and few fine roots; common distinct strong brown (7.5YR 4/6) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; medium acid; gradual smooth boundary.

Bt3—32 to 48 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; few very fine roots; few faint dark yellowish brown (10YR 4/6) clay films; common fine irregular accumulations of iron and manganese oxides; medium acid; gradual smooth boundary.

Bt4—48 to 60 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/8) mottles; weak fine prismatic structure; friable; few very fine roots; few fine irregular accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Thickness of the solum: More than 60 inches

Ap horizon:
Chroma—3 or 4

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6

Alvin Series

Drainage class: Well drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Landscape: Terraces and uplands
Parent material: Eolian sands
Slope range: 0 to 30 percent

Taxonomic class: Coarse-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Alvin fine sandy loam, 5 to 10 percent slopes, eroded, about 625 feet north and 1,220 feet east of the southwest corner of sec. 14, T. 8 N., R. 14 W.

Ap—0 to 10 inches; dark brown (10YR 4/3) and strong brown (7.5YR 4/6) fine sandy loam; moderate fine subangular blocky structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

Bt1—10 to 20 inches; strong brown (7.5YR 4/6) fine sandy loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 30 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 42 inches; strong brown (7.5YR 4/6) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; common faint dark brown (7.5YR 4/4) clay bridges between sand grains; medium acid; clear smooth boundary.

E/Bt—42 to 50 inches; brownish yellow (10YR 6/6) (E) and strong brown (7.5YR 5/6) (Bt) loamy fine sand; single grain; loose; few very fine roots; common distinct dark yellowish brown (10YR 4/6) clay bridges between sand grains; medium acid; clear smooth boundary.

C—50 to 60 inches; brownish yellow (10YR 6/6) fine sand; single grain; loose; medium acid.

Range in Characteristics

Thickness of the solum: 36 to more than 60 inches

Ap horizon:
Chroma—2 or 3
Texture—fine sandy loam or loamy fine sand

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Texture—fine sandy loam, loamy fine sand, fine sand, very fine sandy loam, or sandy clay loam

C horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—fine sand, fine sandy loam, or sandy loam

Armiesburg Series

Drainage class: Well drained
Permeability: Moderate
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Fluventic Hapludolls

Typical Pedon

Armiesburg silty clay loam, frequently flooded, about 1,700 feet north and 2,475 feet east of the southwest corner of sec. 17, T. 5 N., R. 10 W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; many very fine and common fine roots; mildly alkaline; abrupt smooth boundary.

A—6 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate medium angular blocky structure parting to moderate fine subangular blocky; firm; common very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

Bw1—14 to 28 inches; dark brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak fine angular blocky; firm; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

Bw2—28 to 40 inches; dark brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak fine subangular blocky; firm; few very fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

C—40 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; massive; friable; few very fine roots; mildly alkaline.

Range in Characteristics

Thickness of the solum: 24 to 50 inches
Other features: The content of organic carbon decreases irregularly with increasing depth.

C horizon:
Value—3 to 5
Chroma—3 or 4

Atlas Series

Drainage class: Somewhat poorly drained
Permeability: Very slow
Landscape: Uplands
Parent material: Loess and glacial till
Slope range: 5 to 15 percent

Taxonomic class: Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs

Typical Pedon

Atlas silt loam, 5 to 10 percent slopes, eroded, about 300 feet north and 1,700 feet east of the southwest corner of sec. 4, T. 7 N., R. 13 W.

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few fine and many very fine roots; few fine irregular accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

Bt—4 to 9 inches; yellowish brown (10YR 5/4) and dark brown (10YR 4/3) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; few fine and many very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

2Btg1—9 to 23 inches; gray (5Y 5/1) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; common fine and very fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; about 1 percent pebbles; strongly acid; gradual smooth boundary.

2Btg2—23 to 34 inches; gray (5Y 5/1) clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; very firm; few very fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; about 3 percent pebbles; neutral; gradual smooth boundary.

2Btg3—34 to 52 inches; light gray (5Y 6/1) clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; very firm; few very fine roots; common prominent dark

grayish brown (2.5Y 4/2) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; about 2 percent pebbles; neutral; gradual smooth boundary.

2Btg4—52 to 60 inches; light gray (5Y 6/1) clay loam; many coarse prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; firm; common prominent dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine irregular accumulations of iron and manganese oxides; about 2 percent pebbles; neutral.

Range in Characteristics

Thickness of the solum: 42 to more than 60 inches
Thickness of the loess: 20 inches or less

Ap horizon:
Value—4 or 5
Chroma—2 to 4
Texture—silt loam or silty clay loam

Bt or 2Bt horizon:
Texture—silty clay loam, clay loam, clay, or silty clay

Ava Series

Drainage class: Moderately well drained
Permeability: Moderate in the upper part, moderately slow in the next part, very slow in the fragipan
Landscape: Uplands
Parent material: Loess and silty or loamy sediments
Slope range: 1 to 10 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Fragiudalfs

Typical Pedon

Ava silt loam, 1 to 5 percent slopes, about 80 feet south and 1,250 feet east of the northwest corner of sec. 33, T. 6 N., R. 12 W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) and yellow (10YR 7/6) dry; moderate medium granular structure; friable; common very fine roots; few fine irregular accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

E—7 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium platy structure parting to weak fine granular; friable; common very fine roots; common fine rounded accumulations of iron and manganese oxides; medium acid; abrupt smooth boundary.

Bt—11 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; many faint yellowish brown (10YR 5/6) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

B/E—24 to 27 inches; yellowish brown (10YR 5/6) silty clay loam (B) and light yellowish brown (10YR 6/4) silt (E), white (10YR 8/2) dry; the E material occurring as common distinct silt coatings on faces of peds and as fillings in spaces between peds; moderate very fine and fine subangular blocky structure; firm; few very fine roots; many faint yellowish brown (10YR 5/4) clay films on faces of peds; common fine irregular accumulations of iron and manganese oxides; very strongly acid; abrupt smooth boundary.

B't—27 to 33 inches; brownish yellow (10YR 6/6) silty clay loam; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; few distinct dark brown (10YR 4/3) and common prominent dark yellowish brown (10YR 4/4) clay films on faces of peds; very few distinct white (10YR 8/2) silt coatings on faces of peds; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

2Btx1—33 to 42 inches; brownish yellow (10YR 6/6) silty clay loam; moderate coarse and very coarse prismatic structure; very firm; brittle; few distinct yellowish brown (10YR 5/4) clay films and few distinct white (10YR 8/1) silt coatings on faces of peds; common fine irregular and rounded accumulations of iron and manganese oxides; about 1 percent pebbles; strongly acid; clear smooth boundary.

2Btx2—42 to 50 inches; yellowish brown (10YR 5/6) clay loam; many medium prominent light gray (10YR 6/1) mottles; moderate medium prismatic structure; very firm; brittle; few faint yellowish brown (10YR 5/4) clay films on faces of peds and few prominent dark brown (7.5YR 3/4) clay films in root channels; common distinct white (10YR 8/1) silt coatings on faces of peds; few fine irregular accumulations of iron and manganese oxides; about 1 percent pebbles; strongly acid; clear smooth boundary.

2BC—50 to 60 inches; brownish yellow (10YR 6/6) clay loam; many medium distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; few very fine and fine roots; very few distinct dark yellowish brown (10YR 4/4) clay films on vertical faces of peds; few fine irregular accumulations of iron and manganese oxides; about 2 percent pebbles; strongly acid.

Range in Characteristics

Depth to the fragipan: 25 to 40 inches
Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 30 to 55 inches

Ap horizon:
Chroma—2 to 4

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—3 to 6
Texture—silt loam or silty clay loam

Btx horizon:
Hue—10YR or 7.5YR
Chroma—3 to 6

Beaucoup Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Fluvaquentic Haplaquolls

Typical Pedon

Beaucoup silty clay loam, frequently flooded, about 2,400 feet north and 390 feet west of the southeast corner of sec. 17, T. 6 N., R. 10 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine granular structure; firm; common very fine and few fine roots; few fine irregular accumulations of iron and manganese oxides; about 1 percent pebbles; neutral; abrupt smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine angular blocky structure; firm; common very fine and few fine roots; common fine irregular accumulations of iron and manganese oxides; about 1 percent pebbles; neutral; clear smooth boundary.

Bg1—12 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine and fine roots; many distinct dark olive gray (5Y 3/2) pressure faces on faces of peds; common fine and few medium irregular accumulations of iron and manganese oxides; about 1 percent pebbles; neutral; gradual smooth boundary.

Bg2—23 to 41 inches; very dark gray (2.5Y 3/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak fine angular blocky; firm; common faint very dark gray (2.5Y 3/1) pressure faces on faces of peds; common fine and few medium irregular accumulations of iron and manganese oxides; about 1 percent pebbles; neutral; gradual smooth boundary.

BCg—41 to 60 inches; dark gray (5Y 4/1) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few faint very dark gray (5Y 3/1) pressure faces on faces of peds; common medium irregular accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Thickness of the solum: 35 to more than 60 inches
Thickness of the mollic epipedon: 10 to 24 inches
Other features: The content of organic carbon decreases irregularly with increasing depth.

Bg horizon:
Value—3 to 5

Birds Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, nonacid, mesic Typic Fluvaquents

Typical Pedon

Birds silt loam, frequently flooded, about 800 feet south and 1,400 feet west of the center of sec. 9, T. 6 N., R. 13 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine roots; few medium rounded concretions and accumulations of iron and manganese oxides; neutral; clear smooth boundary.

ACg—6 to 16 inches; dark gray (10YR 4/1) silt loam; common fine distinct grayish brown (2.5Y 5/2), many medium faint dark grayish brown (10YR 4/2), and few fine prominent strong brown (7.5YR 4/6) mottles; weak medium granular structure; friable; few very fine roots; few fine rounded concretions and accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg1—16 to 42 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) mottles; massive; friable; few very fine roots; common fine irregular concretions and accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Cg2—42 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/4) and few medium prominent strong brown (7.5YR 4/6) mottles; massive; friable; common fine irregular concretions and accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Special features: The content of organic carbon decreases irregularly with increasing depth.

Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 or 2

Bluford Series

Drainage class: Somewhat poorly drained
Permeability: Moderately slow in the upper part and slow in the lower part
Landscape: Uplands
Parent material: Loess and loamy sediments
Slope range: 0 to 5 percent

Taxonomic class: Fine, montmorillonitic, mesic Aeric Ochraqualfs

Typical Pedon

Bluford silt loam, 0 to 2 percent slopes, about 1,585 feet south and 925 feet west of the northeast corner of sec. 16, T. 8 N., R. 13 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; few very fine roots; few fine rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

E1—7 to 15 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/4) and few medium faint brown (10YR 5/3) mottles; moderate medium platy structure; very friable; few very fine roots; common fine rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

E2—15 to 20 inches; pale brown (10YR 6/3) silt loam; common medium faint grayish brown (10YR 5/2) mottles; moderate medium platy structure parting to moderate fine subangular blocky; very friable; few very fine roots; common prominent white (10YR 8/1) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Btg—20 to 35 inches; grayish brown (10YR 5/2) silty clay; common medium distinct dark yellowish brown (10YR 4/4), common medium faint gray (10YR 5/1), and many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds and common prominent strong brown (7.5YR 5/6) stains on faces of peds and in pores; few fine rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btgx—35 to 42 inches; grayish brown (10YR 5/2) silty clay loam; few fine faint light gray (10YR 6/1) and common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate coarse prismatic structure; firm; brittle; few faint grayish brown (10YR 5/2) clay films and common prominent white (10YR 8/1) silt coatings on faces of peds; common prominent strong brown (7.5YR 5/6) stains of iron and manganese oxides on faces of peds and in pores; few fine rounded accumulations of iron and manganese oxides; very strongly acid; gradual smooth boundary.

2Btg—42 to 60 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; very firm; few faint dark gray (10YR 4/1) clay films in root channels; common fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; very strongly acid.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 30 to 45 inches
Thickness of horizon with fragipan characteristics: 7 to 25 inches

Ap horizon:
Chroma—2 or 3

Btg horizon:
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silty clay

Btx horizon:
Value—4 to 6
Chroma—2 to 4

Camden Series

Drainage class: Well drained
Permeability: Moderate
Landscape: Terraces
Parent material: Loess and glacial outwash
Slope range: 0 to 10 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Camden silt loam, 0 to 2 percent slopes, about 120 feet south and 420 feet west of the northeast corner of sec. 31, T. 7 N., R. 11 W.

Ap—0 to 12 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine and fine granular structure; friable; common fine and medium roots; neutral; clear smooth boundary.

BE—12 to 17 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silt loam, light yellowish brown (10YR 6/4) dry; weak very fine and fine granular structure; friable; few fine and medium roots; neutral; abrupt smooth boundary.

Bt1—17 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; common very fine and few fine roots; many prominent dark brown (7.5YR 4/4) clay films on faces of peds; few distinct black (10YR 2/1) stains of iron and manganese oxides on faces of peds; medium acid; clear smooth boundary.

Bt2—26 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; common very fine and fine roots; many prominent dark brown (7.5YR 4/4) clay films and few distinct black (10YR 2/1) stains of iron and manganese oxides on faces of peds; strongly acid; clear smooth boundary.

2Bt3—37 to 54 inches; yellowish brown (10YR 5/6) clay loam; moderate medium and coarse subangular blocky structure; firm; many prominent dark brown (7.5YR 4/4) clay films and very few distinct black (10YR 2/1) stains of iron and manganese oxides on faces of peds; strongly acid; abrupt smooth boundary.

2C—54 to 60 inches; yellowish brown (10YR 5/6), stratified fine sandy loam, loam, loamy sand, and sand; massive and single grain; friable and loose; medium acid.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess or silty material: 24 to 40 inches

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—loam, clay loam, or sandy loam

Carmi Series

Drainage class: Well drained
Permeability: Moderately rapid in the upper part and rapid in the gravelly material
Landscape: Terraces
Parent material: Glacial outwash
Slope range: 0 to 5 percent

Taxonomic class: Coarse-loamy, mixed, mesic Typic Hapludolls

Typical Pedon

Carmi sandy loam, 0 to 2 percent slopes, about 1,325 feet south and 60 feet east of the northwest corner of sec. 33, T. 9 N., R. 11 W.

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

A1—7 to 18 inches; very dark brown (10YR 2/2) sandy loam, dark grayish brown (10YR 4/2) dry; weak very coarse granular structure; friable; common very fine roots; medium acid; gradual smooth boundary.

A2—18 to 23 inches; very dark grayish brown (10YR 3/2) sandy loam; weak very coarse granular structure; friable; common very fine roots; medium acid; clear smooth boundary.

BA—23 to 27 inches; dark brown (10YR 3/3) sandy loam; weak medium and coarse subangular blocky structure; friable; common very fine roots; common distinct coatings on sand grains and pebbles; about 4 percent pebbles; strongly acid; clear smooth boundary.

2Bw1—27 to 31 inches; dark brown (10YR 3/3) gravelly sandy clay loam; weak medium subangular blocky structure; firm; common very fine roots; common distinct coatings on sand grains and pebbles; about 36 percent pebbles; strongly acid; clear smooth boundary.

2Bw2—31 to 36 inches; dark brown (10YR 3/3) gravelly sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct coatings on sand grains and pebbles; about

26 percent pebbles; strongly acid; clear smooth boundary.

2Bw3—36 to 43 inches; dark brown (7.5YR 3/2) loamy sand; weak medium and coarse subangular blocky structure; very friable; few very fine roots; few distinct coatings on sand grains and pebbles; about 10 percent pebbles; strongly acid; abrupt smooth boundary.

2Bw4—43 to 46 inches; dark brown (7.5YR 3/2) gravelly loamy sand; weak coarse subangular blocky structure; very friable; few very fine roots; few distinct coatings on sand grains and pebbles; about 20 percent pebbles; strongly acid; abrupt smooth boundary.

2Bw5—46 to 60 inches; dark brown (7.5YR 3/2) coarse sand; very weak coarse subangular blocky structure; very friable; few very fine roots; about 8 percent pebbles; strongly acid.

Range in Characteristics

Depth to materials containing more than 15 percent gravel: 20 to 40 inches

Thickness of the solum: 30 to more than 60 inches

Ap horizon:
Chroma—1 or 2

Cisne Series

Drainage class: Poorly drained
Permeability: Very slow
Landscape: Uplands
Parent material: Loess and loamy and silty sediments
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Mollic Albaqualfs

Typical Pedon

Cisne silt loam, about 270 feet south and 165 feet west of the center of sec. 5, T. 7 N., R. 13 W.

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

Eg—7 to 17 inches; grayish brown (10YR 5/2) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium platy structure; friable; few very fine roots; few fine rounded accumulations of iron and manganese oxides; strongly acid; abrupt smooth boundary.

B/E—17 to 20 inches; grayish brown (10YR 5/2) silty clay loam (B) and white (10YR 8/2 dry) silt (E); many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; friable; common distinct grayish brown (10YR 5/2) clay films on faces of peds and in pores; few very fine roots; few medium rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg1—20 to 27 inches; light brownish gray (10YR 6/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; many faint grayish brown (10YR 5/2) clay films and common distinct white (10YR 8/2) silt coatings on faces of peds and in pores; few very fine roots; few medium rounded accumulations of iron and manganese oxides; strongly acid; gradual smooth boundary.

Btg2—27 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds and in pores; few very fine roots; common medium irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

2Btg3—38 to 49 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate fine prismatic structure; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds and in pores; common coarse rounded accumulations of iron and manganese oxides; about 1 percent pebbles; medium acid; gradual smooth boundary.

2BCg—49 to 60 inches; light gray (10YR 6/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; firm; few faint gray (10YR 5/1) clay films on faces of peds and in pores; few medium rounded accumulations of iron and manganese oxides; about 2 percent pebbles; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 30 to 55 inches

Ap horizon:
Chroma—2 or 3

E horizon:
Value—5 to 7

Bt horizon:
Texture—silty clay loam or silty clay

2Bt or 2BC horizon:
Texture—silty clay loam, clay loam, or loam

Cowden Series

Drainage class: Poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Mollic Albaqualfs

Typical Pedon

Cowden silt loam, about 925 feet north and 2,375 feet west of the southeast corner of sec. 22, T. 8 N., R. 12 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common very fine roots; few fine rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Eg—9 to 15 inches; gray (10YR 5/1) silt loam; few fine prominent yellowish brown (10YR 5/8) and common fine prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; very friable; slightly acid; abrupt smooth boundary.

Btg1—15 to 23 inches; gray (10YR 5/1) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common very fine and fine roots between peds; many faint dark gray (10YR 4/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg2—23 to 34 inches; gray (10YR 5/1) silty clay; many coarse prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; common very fine roots in cracks; many faint dark gray (10YR 4/1) clay films and common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; gradual smooth boundary.

Btg3—34 to 47 inches; gray (10YR 5/1) silty clay; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots in cracks; common faint dark gray (10YR 4/1) clay films and few faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Btg4—47 to 60 inches; gray (10YR 5/1) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few faint dark gray (10YR 4/1) clay films on faces of peds; neutral.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 55 to more than 60 inches

E horizon:
Value—4 to 6
Chroma—1 or 2

Bt horizon:
Value—4 to 6
Chroma—1 or 2

Darmstadt Series

Drainage class: Somewhat poorly drained
Permeability: Very slow
Landscape: Uplands
Parent material: Loess and loamy and silty sediments
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Albic Natraqualfs

Typical Pedon

Darmstadt silt loam, 0 to 2 percent slopes, about 395 feet north and 1,450 feet east of the southwest corner of sec. 11, T. 8 N., R. 13 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E—6 to 9 inches; light brownish gray (10YR 6/2) silt loam, light gray (10YR 7/2) dry; weak thin platy structure; friable; few fine roots; few prominent dark grayish brown (10YR 4/2) organic coatings on vertical and horizontal faces of peds; common medium rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Bt1—9 to 16 inches; brown (10YR 5/3) silty clay loam; common medium faint yellowish brown (10YR 5/4) mottles; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; mildly alkaline; clear smooth boundary.

Bt2—16 to 21 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint dark gray (10YR 4/2) clay films on faces of peds; common fine rounded and irregular accumulations

of iron and manganese oxides; moderately alkaline; gradual smooth boundary.

Bt3—21 to 35 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium irregular accumulations of iron and manganese oxides; moderately alkaline; gradual smooth boundary.

2Bt4—35 to 60 inches; mottled light grayish brown (10YR 6/2) and yellowish brown (10YR 5/6) silt loam; few fine prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium rounded accumulations of iron and manganese oxides; about 5 percent pebbles; mildly alkaline.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Thickness of the loess: 30 to 55 inches

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Texture—silty clay loam or silty clay

Elco Series

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landscape: Uplands
Parent material: Loess and glacial till
Slope range: 5 to 15 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Elco silt loam, 5 to 10 percent slopes, eroded, about 80 feet north and 2,120 feet east of the southwest corner of sec. 27, T. 8 N., R. 12 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many very fine and common fine roots; few fine rounded accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

BE—7 to 12 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; many very fine and few fine roots; few distinct dark brown (10YR 4/3) clay films in worm channels; few fine rounded accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; common very fine and few fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; firm; common very fine and few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt3—26 to 32 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light yellowish brown (10YR 6/4) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm; common very fine and few fine roots; few distinct dark yellowish brown (10YR 4/4) clay films and many prominent white (10YR 8/2 dry) silt coatings on faces of peds; common fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt4—32 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light yellowish brown (10YR 6/4) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure; firm; common very fine and few fine roots; few distinct dark yellowish brown (10YR 4/4) clay films and few distinct white (10YR 8/2 dry) silt coatings on faces of peds; common fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

2Btg1—37 to 51 inches; light brownish gray (2.5Y 6/2) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate fine prismatic structure; firm; common very fine roots between peds; common distinct dark grayish brown (10YR 4/2) clay films on vertical faces of peds and few distinct white (10YR 8/2 dry) silt coatings on faces of peds; common medium irregular and rounded accumulations of iron and manganese oxides; about 1 percent pebbles; medium acid; gradual smooth boundary.

2Btg2—51 to 60 inches; light brownish gray (2.5Y 6/2) clay loam; common medium prominent strong brown (7.5YR 5/6) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium

prismatic structure; firm; few very fine roots; few prominent dark brown (10YR 4/3) clay films on vertical faces of peds; few fine irregular accumulations of iron and manganese oxides; about 2 percent pebbles; slightly acid.

Range in Characteristics

Thickness of the solum: 48 to more than 60 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Chroma—2 to 4

Bt horizon:
Value—4 or 5
Chroma—2 to 6

2Btg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—2 to 4
Texture—silty clay loam or clay loam

Fishhook Series

Drainage class: Somewhat poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess and glacial till
Slope range: 2 to 5 percent

Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Fishhook silt loam, 2 to 5 percent slopes, eroded, about 700 feet north and 1,450 feet west of the southeast corner of sec. 19, T. 6 N., R. 11 W.

Ap—0 to 5 inches; yellowish brown (10YR 5/4) silt loam, very pale brown (10YR 7/4) dry; moderate very fine subangular blocky structure; friable; many very fine and fine roots; few fine rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Bt1—5 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct strong brown (7.5YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; strong fine and medium angular blocky structure; firm; many very fine and few fine roots; many prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—12 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and many medium prominent strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure; firm; common very fine and few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Btg1—22 to 31 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to weak fine subangular blocky; firm; common very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; abrupt smooth boundary.

2Btg2—31 to 47 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent olive brown (2.5Y 4/4) mottles; moderate fine prismatic structure; firm; many faint dark gray (10YR 4/1) clay films on faces of peds; common fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; mildly alkaline; clear smooth boundary.

2BCg—47 to 58 inches; gray (10YR 5/1) clay loam; common medium prominent olive brown (2.5Y 4/4) mottles; weak fine prismatic structure; firm; common faint gray (10YR 5/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; mildly alkaline; clear smooth boundary.

2Cg—58 to 60 inches; gray (10YR 5/1) clay loam; many coarse prominent yellowish brown (10YR 5/8) and common fine prominent olive brown (2.5Y 4/4) mottles; massive; firm; few fine rounded accumulations of iron and manganese oxides; about 3 percent pebbles; mildly alkaline.

Range in Characteristics

Thickness of the solum: 50 to more than 60 inches
Thickness of the loess: 20 to 40 inches

Ap horizon:
Value—3 to 5
Chroma—2 to 4

Bt horizon:
Hue—10YR or 2.5Y

2Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam or clay loam

Haymond Series

Drainage class: Well drained
Permeability: Moderate

Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Coarse-silty, mixed, nonacid, mesic Typic Udifluvents

Typical Pedon

Haymond silt loam, frequently flooded, about 750 feet south and 2,500 feet west of the northeast corner of sec. 6, T. 5 N., R. 10 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable; common very fine roots; mildly alkaline; clear smooth boundary.

Bw1—7 to 19 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

Bw2—19 to 29 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bw3—29 to 41 inches; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; friable; few very fine roots; neutral; abrupt smooth boundary.

C1—41 to 57 inches; dark brown (10YR 4/3) silt loam; massive; friable; few very fine roots; neutral; clear smooth boundary.

C2—57 to 60 inches; dark brown (10YR 4/3) fine sandy loam; few fine and medium prominent strong brown (7.5YR 5/6) mottles; massive; very friable; few very fine roots; neutral.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Other features: The content of organic carbon decreases irregularly with increasing depth.

Ap horizon:
Chroma—2 or 3

Hickory Series

Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands
Parent material: Glacial till
Slope range: 10 to 50 percent

Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Hickory loam, 20 to 50 percent slopes, about 1,000 feet north and 900 feet west of the southeast corner of sec. 21, T. 6 N., R. 13 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine and few fine roots; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

E—4 to 10 inches; yellowish brown (10YR 5/4) loam; weak thick platy structure parting to weak fine granular; friable; common very fine and few fine roots; few fine rounded accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/6) clay loam; moderate fine subangular blocky structure; firm; few very fine and fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; medium acid; clear smooth boundary.

Bt2—18 to 35 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; very firm; few very fine and fine roots; many prominent dark brown (7.5YR 4/4) clay films on faces of peds; common medium rounded accumulations of iron and manganese oxides; about 2 percent pebbles; medium acid; clear smooth boundary.

Bt3—35 to 53 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to weak medium angular blocky; firm; few very fine and fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds; common medium rounded accumulations of iron and manganese oxides; about 3 percent pebbles; medium acid; clear smooth boundary.

BC—53 to 60 inches; yellowish brown (10YR 5/4) gravelly clay loam; weak medium prismatic structure; firm; few very fine and fine roots; common prominent dark brown (10YR 3/3) clay films on vertical faces of peds; few fine irregular accumulations of iron and manganese oxides; about 5 percent pebbles; neutral.

Range in Characteristics

Depth to carbonates: 40 to more than 60 inches
Thickness of the solum: 40 to more than 60 inches

Ap horizon:
Value—3 to 5
Chroma—2 to 4
Texture—silt loam or loam

Bt horizon:
Hue—10YR or 7.5YR

Value—4 to 6
Chroma—3 to 6
Texture—clay loam, silty clay loam, or gravelly clay loam

Hosmer Series

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and very slow in the fragipan
Landscape: Uplands
Parent material: Loess
Slope range: 1 to 10 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Fragiudalfs

Typical Pedon

Hosmer silt loam, 1 to 5 percent slopes, about 2,250 feet south and 1,350 feet east of the northwest corner of sec. 9, T. 5 N., R. 11 W.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate fine and medium granular structure parting to moderate very fine granular; friable; many very fine roots; neutral; clear smooth boundary.

E—8 to 10 inches; brown (10YR 5/3) silt loam; moderate thin and medium platy structure; friable; many very fine and few fine roots; medium acid; clear smooth boundary.

BE—10 to 15 inches; yellowish brown (10YR 5/6) silt loam and silty clay loam; few fine faint brownish yellow (10YR 6/6) and common fine and medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium platy structure parting to weak fine subangular blocky; firm; common very fine and few fine roots; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt—15 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; common faint yellowish brown (10YR 5/4) clay films and common prominent white (10YR 8/1) silt coatings on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Btx1—24 to 32 inches; yellowish brown (10YR 5/6 and 5/4) silty clay loam; common fine distinct brownish yellow (10YR 6/8) and few fine prominent yellowish red (5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; brittle; common very fine and few fine roots; many prominent white (10YR 8/1) silt coatings, few distinct brown (10YR 5/3) clay films, and few prominent black (2.5YR 2/0) stains of iron and manganese oxides on faces of peds; medium acid; clear smooth boundary.

Btx2—32 to 53 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/8) and few fine and medium distinct light yellowish brown (10YR 6/4) mottles; weak medium and coarse subangular blocky structure; firm; brittle; few distinct pale brown (10YR 6/3) clay films and many prominent white (10YR 8/1) silt coatings on faces of peds; few distinct grayish brown (10YR 5/2) clay films in root channels; few fine irregular soft masses of iron and manganese oxides; strongly acid; abrupt smooth boundary.

C—53 to 60 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium prominent yellowish red (5YR 5/8) mottles; massive; firm; few fine roots; common prominent white (10YR 8/1) silt coatings in pores; medium acid.

Range in Characteristics

Depth to the fragipan: 20 to 40 inches
Thickness of the solum: 50 to more than 60 inches
Thickness of the loess: 50 to more than 60 inches

Ap horizon:
Value—4 or 5
Chroma—2 to 4

Bt horizon:
Value—5 or 6
Chroma—3 to 6

Btx horizon:
Value—5 or 6
Chroma—4 to 8

Hoyleton Series

Drainage class: Somewhat poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess and silty or loamy sediments
Slope range: 0 to 5 percent

Taxonomic class: Fine, montmorillonitic, mesic Aquollic Hapludalfs

Typical Pedon

Hoyleton silt loam, 0 to 2 percent slopes, about 120 feet south and 1,925 feet west of the northeast corner of sec. 26, T. 6 N., R. 13 W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; many very fine and few

fine roots; mildly alkaline; abrupt smooth boundary.
E—6 to 10 inches; yellowish brown (10YR 5/4) silt loam; few fine prominent red (2.5YR 4/6) and few fine distinct yellowish brown (10YR 5/8) mottles; weak very thin platy structure; friable; many very fine roots; common fine rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.
Bt1—10 to 14 inches; brown (10YR 5/3) silty clay loam; common medium prominent red (2.5YR 4/6) and few medium prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; firm; common very fine roots; common faint dark grayish brown (10YR 4/2) clay films and common distinct light gray (10YR 7/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.
Bt2—14 to 18 inches; pale brown (10YR 6/3) silty clay loam; few medium faint grayish brown (10YR 5/2) and many medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common very fine roots between peds; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt3—18 to 27 inches; light yellowish brown (10YR 6/4) silty clay loam; many coarse distinct yellowish brown (10YR 5/8), few medium distinct light brownish gray (10YR 6/2), and few fine prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots between peds; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt4—27 to 37 inches; light yellowish brown (10YR 6/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.
2Btg—37 to 47 inches; light brownish gray (10YR 6/2) loam; many coarse distinct dark yellowish brown (10YR 4/6) and few medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few faint grayish brown (10YR 5/2) clay films in pores; many fine rounded accumulations of iron and manganese oxides; about 2 percent pebbles; slightly acid; clear smooth boundary.
2Cg—47 to 60 inches; light brownish gray (10YR 6/2) loam; few medium prominent yellowish brown (10YR 5/8) and common medium faint light gray (10YR 6/1) mottles; massive; firm; many fine rounded accumulations of iron and manganese oxides; about 5 percent pebbles; neutral.

Range in Characteristics

Thickness of the solum: 36 to more than 60 inches
Thickness of the loess: 30 to 50 inches

Ap horizon:
Chroma—2 or 3

Bt horizon:
Hue—10YR or 7.5YR
Chroma—2 to 4
Texture—silty clay loam or silty clay

2Cg horizon:
Value—5 or 6
Chroma—2 to 4
Texture—loam or silty clay loam

Iva Series

Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Aeric Ochraqualfs

Typical Pedon

Iva silt loam, 0 to 2 percent slopes, about 2,000 feet south and 1,200 feet west of the northeast corner of sec. 23, T. 7 N., R. 12 W.

Ap—0 to 9 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate fine granular structure; friable; common fine roots; few fine rounded accumulations of iron and manganese oxides; very strongly acid; abrupt smooth boundary.
E—9 to 16 inches; pale brown (10YR 6/3) silt loam, white (10YR 8/2) dry; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; common faint light brownish gray (10YR 6/2) silt coatings on faces of peds; common fine rounded accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.
Bt1—16 to 25 inches; mottled yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) silty clay loam; strong fine and medium angular blocky structure; friable; common fine roots; many distinct grayish brown (10YR 5/2) clay films and common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded accumulations of

iron and manganese oxides; very strongly acid; gradual smooth boundary.

Bt2—25 to 35 inches; mottled yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) silty clay loam; common fine distinct brown (10YR 5/3) mottles; strong medium angular blocky structure; firm; common fine roots; many distinct grayish brown (10YR 5/2) clay films and common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; common fine and few medium rounded accumulations of iron and manganese oxides; very strongly acid; gradual smooth boundary.

Bt3—35 to 45 inches; mottled yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) silt loam; common fine distinct brown (10YR 5/3) and common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; firm; few fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded and few medium rounded accumulations of iron and manganese oxides; very strongly acid; gradual smooth boundary.

Bt4—45 to 59 inches; strong brown (7.5YR 5/6) and brown (10YR 5/3) silt loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few distinct grayish brown (10YR 5/2) clay films in pores; few fine rounded accumulations of iron and manganese oxides; strongly acid; gradual smooth boundary.

C—59 to 60 inches; brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) silt loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; massive; friable; few fine rounded accumulations of iron and manganese oxides; medium acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Thickness of the loess: 60 inches or more

Ap horizon:
Value—4 or 5
Chroma—2 or 3

E horizon:
Value—5 or 6
Chroma—2 or 3

McGary Series

Drainage class: Somewhat poorly drained
Permeability: Slow
Landscape: Terraces
Parent material: Lacustrine deposits
Slope range: 2 to 5 percent

Taxonomic class: Fine, mixed, mesic Aeric Ochraqualfs

Typical Pedon

McGary silt loam, 2 to 5 percent slopes, about 210 feet north and 960 feet west of the southeast corner of sec. 31, T. 8 N., R. 11 W.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots between peds; few fine irregular accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Bt1—6 to 12 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent dark brown (7.5YR 4/4) and few fine distinct grayish brown (2.5Y 5/2) mottles; moderate fine subangular blocky structure; firm; common very fine roots between peds; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—12 to 20 inches; olive brown (2.5Y 4/4) silty clay; common fine distinct grayish brown (2.5Y 5/2) mottles; moderate very fine subangular blocky structure; firm; common very fine roots between peds; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt3—20 to 26 inches; olive brown (2.5Y 4/4) silty clay loam; many medium prominent gray (5Y 5/1) mottles; moderate fine angular blocky structure; firm; common very fine roots between peds; common distinct dark grayish brown (10YR 4/2) and dark gray (10YR 4/1) clay films on faces of peds; common fine irregular accumulations of iron and manganese oxides; slight effervescence; neutral; abrupt smooth boundary.

Cg—26 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; massive; very firm; common distinct olive gray (5Y 5/2) pressure faces; many medium accumulations of calcium carbonate and few fine irregular accumulations of iron and manganese oxides; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 55 inches
Thickness of the solum: 24 to 40 inches

Ap horizon:
Value—4 or 5

Bt horizon:
Value—4 to 6
Chroma—2 to 6

Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silty clay

Muren Series

Drainage class: Moderately well drained
Permeability: Moderate
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 5 percent

Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludalfs

Taxadjunct feature: The Muren soils in this survey area do not have mottles with chroma of 2 in the upper part of the Bt horizon. As a result, these soils are classified as fine-silty, mixed, mesic Typic Hapludalfs.

Typical Pedon

Muren silt loam, 2 to 5 percent slopes, eroded, about 2,245 feet north and 1,650 feet east of the southwest corner of sec. 6, T. 6 N., R. 11 W.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; mixed with common pockets of yellowish brown (10YR 5/6) subsoil material; moderate medium granular structure; friable; common very fine roots; few fine irregular accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

Bt1—8 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; few very fine irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—18 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; common very fine roots; very few faint grayish brown (10YR 5/2) clay films on faces of peds and common prominent light gray (10YR 7/2) silt coatings on faces of peds and in pores; common fine irregular accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt3—23 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm; common very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt4—30 to 35 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent strong brown (7.5YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

C—35 to 60 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2), common medium distinct yellowish brown (10YR 5/6), and few fine faint dark yellowish brown (10YR 4/4) mottles; massive; friable; few fine irregular accumulations of iron and manganese oxides; medium acid.

Range in Characteristics

Thickness of the solum: 35 to 60 inches

Ap horizon:
Chroma—2 to 4

Bt horizon:
Value—5 or 6
Chroma—4 to 6

C horizon:
Chroma—3 to 6

Newberry Series

Drainage class: Poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess and silty or loamy sediments
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Mollic Ochraqualfs

Typical Pedon

Newberry silt loam, about 150 feet south and 50 feet west of the northeast corner of sec. 3, T. 9 N., R. 14 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam with small pockets of dark gray (10YR 4/1);

moderate fine granular structure; friable; neutral; clear smooth boundary.

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

Btg1—18 to 22 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; moderate fine subangular blocky structure; friable; common faint dark gray (10YR 4/1) clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—22 to 29 inches; gray (10YR 5/1) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; common faint dark gray (10YR 4/1) clay films on faces of peds; common distinct very dark gray (10YR 3/1) clay films in root channels; medium acid; clear smooth boundary.

Btg3—29 to 34 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4 and 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; common distinct gray (10YR 5/1) and few distinct dark gray (10YR 4/1) clay films on faces of peds; medium acid; clear smooth boundary.

Btg4—34 to 44 inches; gray (10YR 5/1) silty clay loam; common fine and medium prominent yellowish brown (10YR 5/6 and 5/8) and few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; firm; few faint gray (10YR 5/1) clay films on faces of peds and dark gray (10YR 4/1) clay films in root channels; krotovina filled with dark gray (10YR 4/1) silty clay loam; medium acid; gradual smooth boundary.

2Btg5—44 to 50 inches; gray (10YR 5/1) silty clay loam; many fine and medium distinct yellowish brown (10YR 5/4 and 5/8) and few fine distinct grayish brown (2.5Y 5/2) mottles; weak coarse subangular blocky structure; firm; few faint gray (10YR 5/1) clay films on faces of peds; common black (N 2/0) stains and few fine rounded accumulations of iron and manganese oxides; some sand grains; slightly acid; gradual wavy boundary.

2Cg—50 to 60 inches; mottled gray (10YR 5/1), dark gray (10YR 4/1), and yellowish brown (10YR 5/6 and 5/8) silty clay loam; massive; firm; noticeable amounts of sand; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches

Thickness of the loess: 30 to 55 inches

Ap horizon:
Chroma—1 or 2

Btg horizon:
Value—4 to 6

2C horizon:
Hue—10YR or 2.5Y
Texture—silty clay loam or clay loam

Oconee Series

Drainage class: Somewhat poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Udollic Ochraqualfs

Typical Pedon

Oconee silt loam, 0 to 2 percent slopes, about 1,050 feet north and 2,580 feet east of the southwest corner of sec. 13, T. 8 N., R. 12 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; few fine rounded accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

E—8 to 13 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure; friable; common very fine roots; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt1—13 to 22 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to strong fine subangular blocky; firm; many distinct dark grayish brown (10YR 4/2) clay films and many distinct light gray (10YR 7/2) silt coatings on faces of peds and in pores; common very fine roots; few fine irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt2—22 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; many fine distinct yellowish brown (10YR 5/6), few fine prominent strong brown (7.5YR 5/8), and common fine distinct grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; many prominent very dark gray (10YR 3/1) and many distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common very fine roots between peds; common fine and few medium

irregular accumulations of iron and manganese oxides; medium acid; gradual smooth boundary.

Bt3—31 to 53 inches; olive brown (2.5Y 4/4) silty clay loam; common medium distinct grayish brown (2.5Y 5/2) and few fine prominent strong brown (7.5YR 5/6) mottles; weak fine prismatic structure; firm; common prominent very dark grayish brown (10YR 3/2) clay films on faces of peds and in pores; few very fine roots; common fine and few medium irregular accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

C—53 to 60 inches; olive brown (2.5Y 4/4) loam; few fine distinct grayish brown (2.5Y 5/2) and few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine irregular accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 55 to more than 60 inches

E horizon:
Value—4 to 6
Chroma—1 or 2

Bt horizon:
Value—4 to 6
Texture—silty clay loam or silty clay

Patton Series

Drainage class: Poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landscape: Terraces
Parent material: Lacustrine deposits
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Haplaquolls

Typical Pedon

Patton silty clay loam, about 700 feet north and 500 feet west of the southeast corner of sec. 22, T. 5 N., R. 13 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; common very fine and few fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; clear smooth boundary.

A—8 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; common very fine and few fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Btg1—12 to 21 inches; dark gray (10YR 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine and few fine roots; many distinct black (10YR 2/1) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

Btg2—21 to 31 inches; dark gray (10YR 4/1) silty clay loam; common fine prominent brownish yellow (10YR 6/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots between peds; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular accumulations of iron and manganese oxides; mildly alkaline; clear smooth boundary.

BCg—31 to 40 inches; olive gray (5Y 5/2) silty clay loam; common fine and medium prominent brownish yellow (10YR 6/8) mottles; weak fine prismatic structure; firm; few very fine roots between peds; common faint gray (10YR 5/1) clay films on vertical faces of peds; few fine irregular accumulations of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

Cg—40 to 60 inches; light olive gray (5Y 6/2) silty clay loam; many fine and medium prominent strong brown (7.5YR 5/8) mottles; massive; firm; common fine irregular accumulations of iron and manganese oxides; mildly alkaline.

Range in Characteristics

Thickness of the solum: 24 to 48 inches
Depth to carbonates: 40 to more than 60 inches

Ap horizon:
Value—2 or 3
Chroma—1 or 2

Bg horizon:
Value—3 to 5

Cg horizon:
Chroma—1 or 2

Petrolia Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, nonacid, mesic Typic Fluvaquents

Typical Pedon

Petrolia silty clay loam, frequently flooded, about 2,425 feet north and 525 feet east of the southwest corner of sec. 23, T. 7 N., R. 14 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; few fine and many very fine roots; few fine rounded accumulations of iron and manganese oxides; slightly acid; abrupt smooth boundary.

Cg1—9 to 16 inches; light gray (10YR 6/1) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; few very fine roots; few fine rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Cg2—16 to 27 inches; light gray (10YR 6/1) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure; firm; common very fine roots; common distinct gray (10YR 5/1) pressure faces on faces of peds; common fine rounded accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg3—27 to 43 inches; dark gray (10YR 4/1) silty clay; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; few very fine roots; many faint dark gray (10YR 4/1) pressure faces on faces of peds; common fine rounded accumulations of iron and manganese oxides; neutral; gradual smooth boundary.

Cg4—43 to 60 inches; gray (10YR 5/1) silty clay loam; many fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; many faint dark gray (10YR 4/1) pressure faces on faces of peds; few medium rounded accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Special features: The content of organic carbon decreases irregularly with increasing depth.

Cg horizon:
Chroma—1 or 2

Roby Series

Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately rapid in the lower part
Landscape: Terraces
Parent material: Glacial outwash
Slope range: 0 to 2 percent

Taxonomic class: Coarse-loamy, mixed, mesic Aquic Hapludalfs

Typical Pedon

Roby fine sandy loam, 0 to 2 percent slopes, about 130 feet south and 65 feet east of the northwest corner of sec. 22, T. 6 N., R. 14 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine granular structure; very friable; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt—15 to 23 inches; yellowish brown (10YR 5/4) sandy loam; few fine faint brown (10YR 5/3) and few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few faint clay bridges between sand grains; few faint yellowish red (5YR 5/6) stains of iron and manganese oxides on faces of peds; slightly acid; clear smooth boundary.

BC—23 to 46 inches; yellowish brown (10YR 5/4) loamy sand; few fine distinct yellowish brown (10YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; very friable; few faint clay bridges between sand grains; common faint yellowish red (5YR 5/6) stains of iron and manganese oxides on faces of peds; neutral; clear smooth boundary.

C—46 to 60 inches; light brownish gray (10YR 6/2) sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grain; loose; neutral.

Range in Characteristics

Thickness of the solum: 30 to 60 inches

Ap horizon:
Value—4 or 5
Chroma—2 or 3

E horizon:
Value—4 to 6
Chroma—3 or 4

Bt horizon:
Value—4 or 5
Chroma—2 to 6
Texture—dominantly fine sandy loam, sandy loam, or loam, but some pedons have subhorizons of clay loam or sandy clay loam

BC horizon (if it occurs):
Texture—fine sandy loam, sandy loam, or loamy sand

C horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—2 to 8

Ruark Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Terraces
Parent material: Glacial outwash
Slope range: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, mesic Typic Ochraqualfs

Typical Pedon

Ruark fine sandy loam, about 130 feet north and 1,190 feet east of the southwest corner of sec. 14, T. 8 N., R. 14 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam, pale brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; many very fine roots; common fine and medium rounded accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Eg—8 to 16 inches; light brownish gray (10YR 6/2) fine sandy loam; many medium faint brown (10YR 5/3), few fine distinct yellowish brown (10YR 5/6), and few fine faint grayish brown (10YR 5/2) mottles; weak thin and medium platy structure; friable; few very fine roots; common fine and medium rounded accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Btg1—16 to 21 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium faint brown (10YR 5/3) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium rounded accumulations of iron and manganese oxides; very strongly acid; abrupt smooth boundary.

Btg2—21 to 34 inches; light gray (10YR 6/1) loam; common medium prominent dark yellowish brown (10YR 4/6) and few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine and few fine roots; common faint gray (10YR 5/1) clay films on faces of peds; common fine and medium rounded accumulations of iron and manganese oxides; very strongly acid; gradual smooth boundary.

Cg—34 to 60 inches; light gray (10YR 6/1) fine sandy loam; common medium prominent dark yellowish brown (10YR 4/6) and many medium faint grayish brown (10YR 5/2) mottles; massive; friable; common very fine roots; common fine and medium and few coarse rounded accumulations of iron and manganese oxides; slightly acid.

Range in Characteristics

Thickness of the solum: 30 to 50 inches

Ap horizon:
Value—4 or 5
Chroma—1 or 2

E horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 or 2

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—loam, sandy clay loam, or clay loam

Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—sandy loam, fine sandy loam, sandy clay loam, loam, loamy sand, clay loam, or silt loam

Shiloh Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Cumulic Haplaquolls

Typical Pedon

Shiloh silty clay loam, about 1,260 feet south and 725 feet east of the northwest corner of sec. 23, T. 8 N., R. 14 W.

Ap—0 to 5 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium granular structure; friable; many very fine and few fine roots; neutral; abrupt smooth boundary.

A—5 to 14 inches; very dark gray (10YR 3/1) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate fine and medium

angular blocky structure; very firm; few very fine roots; neutral; clear smooth boundary.

Bg1—14 to 27 inches; very dark gray (10YR 3/1) silty clay; few fine prominent dark yellowish brown (10YR 4/6) and few fine distinct gray (10YR 5/1) mottles; moderate medium prismatic structure; very firm; few very fine roots; neutral; gradual smooth boundary.

Bg2—27 to 44 inches; dark gray (10YR 4/1) silty clay; common fine prominent dark yellowish brown (10YR 4/6) and common medium distinct gray (10YR 5/1) mottles; moderate medium prismatic structure; very firm; few very fine roots; common faint very dark gray (10YR 3/1) pressure faces on vertical faces of peds; few fine rounded accumulations of iron and manganese oxides; neutral; gradual smooth boundary.

BCg—44 to 60 inches; dark gray (10YR 4/1) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; very firm; few faint very dark gray (10YR 3/1) pressure faces on vertical faces of peds; common fine rounded accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 30 inches
Thickness of the solum: 36 to more than 60 inches

Ap and A horizons:
Hue—10YR or neutral
Chroma—0 or 1

Bg horizon:
Hue—10YR or neutral
Chroma—0 to 2
Texture—silty clay loam or silty clay

Shoals Series

Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Shoals silt loam, frequently flooded, about 2,010 feet north and 310 feet west of the southeast corner of sec. 16, T. 8 N., R. 14 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common very fine roots; few fine accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

A—7 to 11 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; few medium faint light brownish gray (10YR 6/2) and few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; friable; common very fine roots; few fine accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

C—11 to 15 inches; brown (10YR 5/3), stratified silt loam and sandy loam; common medium faint light brownish gray (10YR 6/2), common medium distinct dark yellowish brown (10YR 4/6), and few fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; common very fine roots; common fine and medium accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg1—15 to 26 inches; light brownish gray (10YR 6/2), stratified loam and silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium concretions and common medium and coarse accumulations of iron and manganese oxides; slightly acid; gradual smooth boundary.

Cg2—26 to 60 inches; light brownish gray (10YR 6/2), stratified loam and silt loam; common fine distinct yellowish brown (10YR 5/4) mottles; massive; friable; common fine and medium accumulations and concretions of iron and manganese oxides; about 3 percent pebbles; slightly acid.

Range in Characteristics

Special features: The content of organic carbon decreases irregularly with increasing depth.

Ap and A horizons:
Chroma—2 or 3

Cg horizon:
Value—4 to 6

Stockland Series

Drainage class: Well drained
Permeability: Moderately rapid
Landscape: Terraces
Parent material: Glacial outwash
Slope range: 0 to 10 percent

Taxonomic class: Loamy-skeletal, mixed, mesic Typic Hapludolls

Typical Pedon

Stockland loam, 0 to 2 percent slopes, about 1,400 feet

south and 2,260 feet west of the northeast corner of sec. 8, T. 8 N., R. 11 W.

Ap—0 to 12 inches; very dark brown (10YR 2/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine and common fine roots; about 2 percent pebbles; medium acid; abrupt wavy boundary.

Bw1—12 to 20 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak fine subangular blocky structure; friable; many very fine and common fine roots; few prominent very dark grayish brown (10YR 3/2) clay films in root channels and reddish brown (5YR 4/4) clay films on sand grains and pebbles; about 20 percent pebbles; neutral; clear smooth boundary.

Bw2—20 to 36 inches; dark brown (7.5YR 4/4) very gravelly sandy loam; weak medium subangular blocky structure; friable; many very fine and common fine roots; common prominent reddish brown (5YR 4/4) clay films on sand grains and pebbles; about 50 percent pebbles; neutral; clear wavy boundary.

BC—36 to 50 inches; dark brown (7.5YR 4/4) gravelly loamy coarse sand; weak coarse subangular blocky structure; very friable; few very fine and few fine roots; common distinct reddish brown (5YR 4/4) clay films on sand grains and pebbles; about 15 percent pebbles; neutral; gradual wavy boundary.

C—50 to 60 inches; yellowish brown (10YR 4/6) and brown (10YR 5/3) coarse sand; single grain; loose; few very fine and fine roots; about 5 percent pebbles; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to more than 60 inches
Thickness of the solum: 30 to more than 60 inches

Ap horizon:
Value—2 or 3
Chroma—1 or 2
Texture—loam or sandy loam

Bw horizon:
Hue—10YR or 7.5YR
Value—3 or 4
Chroma—2 to 4
Texture—sandy loam, gravelly sandy loam, very gravelly sandy loam, gravelly loamy coarse sand, gravelly sandy clay loam, gravelly clay loam, sandy clay loam, very gravelly clay loam, very gravelly loamy sand, and extremely gravelly coarse sandy loam

Stonelick Series

Drainage class: Well drained
Permeability: Moderately rapid
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Coarse-loamy, mixed (calcareous), mesic Typic Udifluvents

Typical Pedon

Stonelick loam, frequently flooded, 255 feet south and 300 feet west of the northeast corner of sec. 13, T. 7 N., R. 11 W.

Ap—0 to 14 inches; dark grayish brown (10YR 4/2) loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

C1—14 to 25 inches; dark grayish brown (10YR 4/2) loam; moderate fine subangular blocky structure; friable; many very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

C2—25 to 33 inches; dark brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots; slight effervescence; mildly alkaline; gradual smooth boundary.

C3—33 to 47 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; common very fine roots; slight effervescence; mildly alkaline; gradual smooth boundary.

C4—47 to 55 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

C5—55 to 60 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; common very fine roots; slight effervescence; mildly alkaline.

Range in Characteristics

Special features: The content of organic carbon decreases irregularly with increasing depth.

Ap horizon:
Value—3 or 4
Chroma—2 or 3

Stoy Series

Drainage class: Somewhat poorly drained
Permeability: Slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 5 percent

Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Stoy silt loam, 0 to 2 percent slopes, about 50 feet south and 420 feet west of the northeast corner of sec. 23, T. 9 N., R. 12 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

E—8 to 16 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct grayish brown (10YR 5/2) mottles; weak medium platy structure; friable; strongly acid; clear smooth boundary.

BE—16 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure parting to strong very fine subangular blocky; firm; many distinct pale brown (10YR 6/3) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—19 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct grayish brown (10YR 5/2) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate and strong fine and medium subangular blocky structure; firm; common distinct dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—24 to 35 inches; grayish brown (10YR 5/2) silty clay loam; many coarse distinct yellowish brown (10YR 5/4 and 5/6) and few fine prominent dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; common faint dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bx—35 to 47 inches; pale brown (10YR 6/3) silty clay loam; many coarse faint grayish brown (10YR 5/2) and many fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; very firm; brittle; common distinct dark brown (10YR 3/3) stains of iron and manganese oxides on faces of peds; grayish brown mottles arranged in a polygon network of streaks; very strongly acid; gradual smooth boundary.

C—47 to 60 inches; yellowish brown (10YR 5/4 and 5/8) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; friable; few distinct black (N 2/0) stains of iron and manganese oxides in root channels; medium acid.

Range in Characteristics

Depth to horizon with fragipan characteristics: 25 to 45 inches

Thickness of the solum: 38 to more than 60 inches

Ap or A horizon:
Value—3 or 4
Chroma—2 or 3

Bt or Bx horizon:
Texture—silty clay loam or silt loam

Sylvan Series

Drainage class: Well drained
Permeability: Moderate
Landscape: Uplands
Parent material: Loess
Slope range: 10 to 15 percent

Taxonomic class: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded, about 700 feet north and 900 feet west of the southeast corner of sec. 10, T. 5 N., R. 10 W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; strong very fine and fine subangular blocky structure; firm; common very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—7 to 14 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—14 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct strong brown (7.5YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

BC—22 to 31 inches; yellowish brown (10YR 5/4) silt loam; few medium prominent strong brown (7.5YR 5/6) and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay

films on vertical faces of peds; few fine rounded accumulations of iron and manganese oxides; mildly alkaline; clear smooth boundary.

C1—31 to 45 inches; pale brown (10YR 6/3) silt loam; common medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; common fine and medium rounded accumulations of iron and manganese oxides; slight effervescence; mildly alkaline; clear smooth boundary.

C2—45 to 55 inches; light brownish gray (10YR 6/2) silt loam; few fine prominent strong brown (7.5YR 5/8) mottles; massive; friable; few fine rounded accumulations of iron and manganese oxides; slight effervescence; moderately alkaline; clear smooth boundary.

C3—55 to 60 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles; massive; friable; few fine rounded accumulations of iron and manganese oxides; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 22 to 40 inches
Thickness of the solum: 22 to 40 inches

Ap horizon:
Chroma—3 or 4

Bt horizon:
Value—4 or 5
Chroma—3 to 6

Tice Series

Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine-silty, mixed, mesic Fluvaquentic Hapludolls

Typical Pedon

Tice silty clay loam, frequently flooded, about 1,020 feet north and 30 feet east of the southwest corner of sec. 24, T. 9 N., R. 11 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak and moderate fine granular structure; friable; mildly alkaline; abrupt smooth boundary.

A—8 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; firm; mildly alkaline; gradual smooth boundary.

BA—15 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; common coarse faint very dark grayish brown (10YR 3/2) and common fine faint dark brown (10YR 4/3) mottles; moderate fine granular structure; firm; neutral; gradual smooth boundary.

Bw1—25 to 42 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint dark brown (10YR 4/3) and few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure parting to moderate fine granular; firm; neutral; gradual smooth boundary.

Bw2—42 to 58 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) and common fine faint dark brown (10YR 4/3) mottles; moderate and strong fine subangular blocky structure; firm; few faint dark gray (10YR 4/1) coatings on faces of peds; neutral; gradual smooth boundary.

Bw3—58 to 60 inches; very dark gray (10YR 3/1) silty clay loam; common fine distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; moderate fine and medium subangular blocky structure; firm; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the solum: 30 to more than 60 inches
Other features: The content of organic carbon decreases irregularly with increasing depth.

Bw horizon:
Chroma—1 to 3

Titus Series

Drainage class: Poorly drained
Permeability: Slow
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls

Typical Pedon

Titus silty clay loam, frequently flooded, about 240 feet south and 1,260 feet east of the northwest corner of sec. 16, T. 5 N., R. 13 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; firm; many very fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

A2—4 to 10 inches; very dark gray (5Y 3/1) silty clay,

gray (5Y 5/1) dry; moderate medium angular blocky structure; firm; common very fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Bg1—10 to 26 inches; dark gray (5Y 4/1) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; firm; common very fine roots; many faint very dark gray (5Y 3/1) slickensides on vertical and horizontal faces of peds; common fine irregular accumulations of iron and manganese oxides; neutral; gradual smooth boundary.

Bg2—26 to 54 inches; dark gray (5Y 4/1) silty clay; common fine prominent light olive brown (2.5Y 5/6) mottles; weak fine and medium angular blocky structure; firm; few very fine roots; many faint very dark gray (5Y 3/1) slickensides on vertical and horizontal faces of peds; common fine irregular and few medium rounded accumulations of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

BCg—54 to 60 inches; gray (5Y 5/1) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; firm; few very fine roots; common faint dark gray (5Y 4/1) slickensides on vertical and horizontal faces of peds; common fine and few medium irregular accumulations of iron and manganese oxides; mildly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the solum: 35 to 60 inches
Other features: The content of organic carbon decreases irregularly with increasing depth.

A horizon:
Value—2 or 3

Bg horizon:
Hue—10YR, 2.5Y, or 5Y

Vanmeter Series

Depth class: Moderately deep
Drainage class: Moderately well drained
Permeability: Very slow
Landscape: Uplands
Parent material: Calcareous shale residuum
Slope range: 5 to 30 percent

Taxonomic class: Fine, illitic, mesic Typic Eutrochrepts

Typical Pedon

Vanmeter silty clay loam, 5 to 12 percent slopes, eroded, about 550 feet north and 1,200 feet east of the southwest corner of sec. 20, T. 5 N., R. 10 W.

Ap—0 to 9 inches; brown (10YR 5/3) silty clay loam, very pale brown (10YR 7/3) dry; weak very fine granular structure; friable; many very fine and few fine roots; common fine rounded accumulations of iron and manganese oxides; about 2 percent pebbles; slightly acid; abrupt smooth boundary.

E—9 to 14 inches; brownish yellow (10YR 6/6) silty clay loam; common fine distinct pale brown (10YR 6/3) and common fine prominent strong brown (7.5YR 5/8) mottles; weak medium platy structure; friable; common very fine roots; common fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; slightly acid; clear smooth boundary.

Bw1—14 to 21 inches; yellowish brown (10YR 5/6) silty clay; many fine prominent strong brown (7.5YR 5/8) and many fine distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; firm; common very fine roots; few distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; slightly acid; gradual smooth boundary.

Bw2—21 to 27 inches; light brownish gray (10YR 6/2) silty clay; few fine prominent strong brown (7.5YR 5/8) and common fine faint light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; firm; few very fine roots between peds and few fine roots throughout; few distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; about 1 percent pebbles; mildly alkaline; abrupt smooth boundary.

Cr1—27 to 41 inches; olive gray (5Y 5/2) silty clay shale; massive; very firm; few very fine roots between soil fragments; few fine rounded accumulations of iron and manganese oxides and common fine irregular accumulations of calcium carbonate; about 1 percent pebbles; strong effervescence; mildly alkaline; clear smooth boundary.

Cr2—41 to 60 inches; olive gray (5Y 4/2) silty clay shale; massive; extremely firm; many coarse horizontal accumulations of calcium carbonate; about 2 percent channers; violent effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Thickness of the solum: 20 to 40 inches
Thickness of the loess: 20 inches or less

Ap horizon:
Value—4 or 5

Bw horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Texture—silty clay loam or silty clay

Cr horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silty clay

Virden Series

Drainage class: Poorly drained
Permeability: Moderately slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Typic Argiaquolls

Typical Pedon

Virden silty clay loam, about 1,220 feet north and 75 feet west of the center of sec. 14, T. 8 N., R. 12 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate coarse cloddy soil aggregates; very firm; common very fine roots; slightly acid; abrupt smooth boundary.

A—9 to 15 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; moderate coarse angular blocky structure parting to moderate fine angular blocky; very firm; few very fine roots between peds; slightly acid; clear smooth boundary.

Btg1—15 to 25 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm; few very fine roots between peds; many prominent very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; gradual smooth boundary.

Btg2—25 to 36 inches; silty clay loam, dark grayish brown (2.5Y 4/2) on exterior and olive brown (2.5Y 4/4) crushed; common medium prominent yellowish brown (10YR 5/6) mottles; moderate coarse angular blocky structure; firm; few very fine roots between peds; common distinct dark gray (10YR 4/1) clay films on faces of peds; neutral; gradual smooth boundary.

BC—36 to 46 inches; silty clay loam, light olive brown (2.5Y 5/4) on exterior and grayish brown (2.5Y 5/2) crushed; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse angular blocky structure; firm; few fine roots between peds; few prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

Cg—46 to 60 inches; grayish brown (2.5Y 5/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; firm; few very fine roots; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 12 to 24 inches
Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: More than 60 inches

Ap or A horizon:
Value—2 or 3
Chroma—1 or 2

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5

Cg horizon:
Hue—10YR, 2.5Y, or neutral
Chroma—0 to 2
Texture—silt loam or silty clay loam

Wakeland Series

Drainage class: Somewhat poorly drained
Permeability: Moderate
Landscape: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent

Taxonomic class: Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Wakeland silt loam, frequently flooded, about 235 feet south and 80 feet west of the northeast corner of sec. 26, T. 8 N., R. 12 W.

A—0 to 12 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure parting to weak fine and medium granular; friable; few very fine and fine roots; few fine irregular accumulations of iron and manganese oxides; about 1 percent pebbles; neutral; abrupt smooth boundary.

Cg1—12 to 23 inches; dark grayish brown (10YR 4/2), stratified silt loam; many fine and medium faint dark brown (10YR 4/3) mottles; massive; firm; few very fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg2—23 to 35 inches; grayish brown (10YR 5/2) silt

loam; many medium faint brown (10YR 5/3) mottles; massive; firm; very few faint grayish brown (10YR 5/2) and brown (10YR 5/3) clay films in pores; few fine irregular accumulations of iron and manganese oxides; neutral; clear smooth boundary.

Cg3—35 to 40 inches; grayish brown (10YR 5/2) silt loam; common fine and medium prominent dark brown (7.5YR 3/4) and common fine faint pale brown (10YR 6/3) mottles; massive; friable; few very fine roots; few fine irregular accumulations of iron and manganese oxides; neutral; abrupt smooth boundary.

Cg4—40 to 60 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/4), many medium and coarse faint dark brown (10YR 4/3), and few fine prominent dark brown (7.5YR 3/4) mottles; massive; friable; common very fine roots; many fine rounded accumulations of iron and manganese oxides; neutral.

Range in Characteristics

Special features: The content of organic carbon decreases irregularly with increasing depth.

A or Ap horizon:
Chroma—2 or 3

Cg horizon:
Chroma—1 or 2

Weir Series

Drainage class: Poorly drained
Permeability: Very slow
Landscape: Uplands
Parent material: Loess
Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Typic Ochraqualfs

Typical Pedon

Weir silt loam, about 595 feet south and 1,585 feet east of the northwest corner of sec. 35, T. 8 N., R. 12 W.

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

E—9 to 16 inches; grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) and common fine distinct yellowish brown (10YR 5/4) mottles; weak thick platy structure parting to weak medium subangular blocky; friable; common very fine roots; many fine and medium rounded accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg1—16 to 24 inches; grayish brown (10YR 5/2) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; many faint grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

Btg2—24 to 35 inches; grayish brown (10YR 5/2) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) and few medium distinct yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; very firm; many very fine and fine roots; common faint gray (10YR 5/1) clay films on faces of peds; few fine rounded accumulations of iron and manganese oxides; medium acid; clear smooth boundary.

BC—35 to 50 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct black (10YR 2/1) stains of iron and manganese oxides on faces of peds and in pores; medium acid; clear smooth boundary.

Cg—50 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; few distinct black (10YR 2/1) stains of iron and manganese oxides in pores; neutral.

Range in Characteristics

Thickness of the solum: 42 to more than 60 inches

Btg horizon:
Value—5 or 6
Texture—silty clay loam or silty clay

Westland Series

Drainage class: Very poorly drained
Permeability: Moderate in the upper part and very rapid in the lower part
Landscape: Terraces
Parent material: Glacial outwash
Slope range: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, mesic Typic Argiaquolls

Typical Pedon

Westland silty clay loam, about 1,700 feet north and 200 feet east of the southwest corner of sec. 14, T. 7 N., R. 11 W.

Ap—0 to 11 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; firm; many very fine and few fine roots; about 1 percent pebbles; neutral; clear smooth boundary.

Btg1—11 to 20 inches; very dark gray (10YR 3/1) clay loam, very dark gray (10YR 3/1) dry; few fine prominent strong brown (7.5YR 4/6) mottles; moderate fine subangular blocky structure; firm; many faint black (10YR 2/1) clay films on faces of peds and in pores; common very fine roots; few medium irregular accumulations of iron and manganese oxides; about 2 percent pebbles; neutral; clear smooth boundary.

Btg2—20 to 30 inches; very dark grayish brown (10YR 3/2) clay loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common faint black (10YR 2/1) clay films on faces of peds and in pores; few very fine roots; common medium irregular accumulations of iron and manganese oxides; about 4 percent pebbles; neutral; abrupt smooth boundary.

2Btg3—30 to 48 inches; dark grayish brown (2.5Y 4/2), stratified gravelly clay loam and loamy sand; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on sand grains and pebbles; few medium irregular accumulations of iron and manganese oxides; about 26 percent pebbles; neutral; abrupt smooth boundary.

2Cg—48 to 60 inches; dark brown (10YR 4/3), stratified very gravelly sand and sand; massive; friable; about 45 percent medium and coarse gravel; mildly alkaline.

Range in Characteristics

Depth to materials containing more than 15 percent gravel: 25 to 55 inches

Thickness of the mollic epipedon: More than 10 inches

Thickness of the solum: 40 to 60 inches

Btg horizon:

Value—3 to 5

Texture—clay loam, sandy clay loam, or silty clay loam

Wynoose Series

Drainage class: Poorly drained

Permeability: Very slow

Landscape: Uplands

Parent material: Loess and loamy sediments

Slope range: 0 to 2 percent

Taxonomic class: Fine, montmorillonitic, mesic Typic Albaqualfs

Typical Pedon

Wynoose silt loam, about 270 feet south and 2,300 feet east of the northwest corner of sec. 17, T. 7 N., R. 12 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; moderate fine and medium granular structure; friable; many very fine roots; common fine irregular accumulations of iron and manganese oxides; slightly acid; clear smooth boundary.

Eg1—9 to 14 inches; grayish brown (10YR 5/2) silt loam; many medium faint dark brown (10YR 4/3) mottles; weak medium platy and moderate fine and medium subangular blocky structure parting to moderate medium granular; friable; common very fine roots; common fine irregular accumulations of iron and manganese oxides; medium acid; abrupt smooth boundary.

Eg2—14 to 22 inches; light brownish gray (10YR 6/2) silt loam; many fine faint pale brown (10YR 6/3) mottles; weak medium platy and weak fine and medium subangular blocky structure; friable; few very fine and fine roots; common fine irregular accumulations of iron and manganese oxides; very strongly acid; abrupt smooth boundary.

Btg1—22 to 28 inches; gray (10YR 5/1) silty clay loam; many fine prominent strong brown (7.5YR 5/8) mottles; strong fine and medium angular blocky structure; firm; few very fine roots between peds; many faint dark gray (10YR 4/1) clay films and many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine irregular accumulations of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg2—28 to 34 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine distinct light gray (10YR 6/1) and many fine prominent yellowish red (5YR 5/8) mottles; strong medium and coarse angular blocky structure; very firm; few very fine roots between peds; many prominent dark gray (10YR 4/1) clay films and common faint light brownish gray (2.5Y 6/2) silt coatings on faces of peds; few fine to coarse irregular accumulations of iron and manganese oxides; strongly acid; clear smooth boundary.

Btg3—34 to 45 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium prismatic structure parting to strong medium and coarse subangular blocky; firm; few very fine roots between peds; many distinct dark gray (10YR 4/1)

clay films on faces of peds and in root channels; common medium irregular accumulations of iron and manganese oxides; medium acid; gradual smooth boundary.

2Btg4—45 to 57 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine distinct light brownish gray (10YR 6/2), many fine prominent light yellowish brown (10YR 6/4), and many fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; firm; few very fine roots between peds; few distinct dark grayish brown (10YR 4/2) and few distinct very dark gray (10YR 3/1) clay films on faces of peds and in root channels; common medium irregular accumulations of iron and manganese oxides; about 15 percent fine sand; medium acid; abrupt smooth boundary.

2Btg5—57 to 60 inches; light brownish gray (2.5Y 6/2) clay loam; common fine distinct light gray (10YR 6/1), many medium prominent light yellowish brown (10YR 6/4), and many fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; common medium irregular accumulations of iron and manganese oxides; about 1 percent pebbles; medium acid.

Range in Characteristics

Thickness of the solum: 40 to more than 60 inches
Thickness of the loess: 30 to 55 inches

Ap horizon:
Value—4 or 5

Btg horizon:
Texture—silty clay loam or silty clay

2Btg horizon:
Texture—silty clay loam or clay loam

Formation of the Soils

Soil-forming processes act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material accumulated and has existed since accumulation; the plant and animal life on and in the soil; relief, or lay of the land; and the length of time the forces of soil formation have acted on the material *(7)*.

Climate and plant and animal life are active forces of soil formation. As they act on the parent material, they slowly change the material into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms. Finally, time is needed for changing parent material into a soil. Usually, a long time is needed for the formation of distinct horizons. The importance of each factor differs from place to place, and each modifies the effects of the other four. In some areas, one factor dominates the formation of a soil. Human activities, such as clearing forests, cultivating, and applying fertilizer, also affect soil formation.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. The parent materials of the soils of Crawford County were deposited by wind, water, glaciers, or by meltwater from the glaciers. Some of these materials were reworked and redeposited by subsequent actions of water or wind. Parent material determines the chemical and mineralogical composition of the soil. Although some parent materials are of common glacial origin, their properties vary greatly. The dominant parent materials in the county were deposited as loess, sediments, glacial till, glacial outwash, lacustrine deposits, and alluvium. In a few areas the parent material was derived from weathered, calcareous shale.

Loess covers most of the county. These windblown deposits range from less than 2 feet to more than 10 feet in thickness *(4)*. Loess was deposited at various times associated with glacial activity in the Midwest. Locally, loess from the Wabash River resulted in thick deposits near the stream valley. Peoria Loess is the dominant loess in Crawford County. This loess was formed during the last glacial advance, the Woodfordian Substage of the Wisconsinan Stage, about 25,000 to 12,500 years ago *(15)*. In places, Roxanna Silts are below the Peoria Loess. Alford soils are examples of soils that formed in loess.

Sediments consist of a mixture of Roxanna Silt and glacial till that contains a paleosol. The Roxanna Silt is a loess that formed during the Altonian Substage, about 75,000 to 28,000 years ago *(6)*. The paleosol developed during the Sangamonian Substage, about 125,000 to 75,000 years ago. The paleosol is named the Sangamon paleosol. It formed in glacial till that had been deposited over 125,000 years ago by the Illinoian glacier. The properties of sediments are variable and include both silty and loamy textures. Wynoose and Cisne soils are examples of soils that formed in loess and in the underlying sediments.

Glacial till is material deposited directly by glaciers with minimal water action. It consists of particles of different sizes that are mixed together. The small pebbles in glacial till have sharp corners, indicating that they have not been worn down by water. In Crawford County, the till underlies most of the soils in the uplands. It is exposed on the moderately steep to very steep side slopes. This material was transported by the Illinoian glacier and is part of the Vandalia Till Member of the Glasford Formation *(6)*. Examples of soils that formed in glacial till are Hickory and Atlas soils.

Glacial outwash was laid down by running water melting from the glaciers. The size of the particles varies according to the speed of the streams of water that carried them. When water slows down, the coarser particles are deposited first. Finer particles, such as very fine sand, silt, and clay, are carried downstream by the more slowly moving water. The gravel and sand deposits of the Wabash River valley indicate that a rapidly moving stream deposited these materials. Carmi and Stockland soils are examples of soils that formed in glacial outwash. Some outwash deposits were later

reworked by wind action. Alvin soils formed in wind-deposited materials.

Lacustrine deposits were laid down in glacial lakes formed by blockage of the drainage outlets. These deposits are medium textured and fine textured. Commonly, they were later covered by loess deposits. Patton soils formed in lacustrine deposits.

Alluvium is deposited by floodwaters of active streams. Their texture is determined by the velocity of the flowing water. Most of the soils on flood plains in Crawford County formed in silty alluvium. Examples of soils that formed in alluvium are Haymond, Petrolia, and Shoals soils.

Calcareous shale residuum is predominantly buried by loess, glacial till, glacial outwash, and alluvium in Crawford County. Some of the soils on side slopes in the eastern part of the county, such as Vanmeter soils, formed in calcareous shale residuum.

Climate

Climate is an important factor in the formation of soils. It influences the kind of plant and animal life on and in the soil. Precipitation affects the weathering of minerals and the transporting of soil material. Temperature determines the rate of chemical reactions that occur in the soil. The general climate has had an important overall influence on the characteristics of the soils, but it does not cause major differences among soils in relatively small areas. The influence of climate, however, is sometimes modified locally by relief.

The climate of Crawford County is temperate and humid. It is probably similar to the climate under which the soils formed. More detailed information about the climate of the county is provided in the section "General Nature of the County."

Plant and Animal Life

Plants are the principal living organisms affecting the soils of Crawford County. Bacteria, fungi, earthworms, and human activity, however, have also affected soil formation. The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material on and in the soil depends on the kind of plants that grew on the soil. The remains of these plants accumulate in the surface layer, decay, and eventually become organic matter. The roots of the plants provide channels for the downward movement of water through the soil and add organic matter as they decay. Bacteria in the soil help to break down the organic matter and thus provide plant nutrients.

The native vegetation in the county was deciduous hardwood trees and prairie grasses. Various species of oak, hickory, maple, elm, and ash were dominant in the wooded areas. Atlas and Wynoose soils are examples of soils that formed under forest vegetation. They have a thin, relatively light-colored surface layer. Decomposed leaf litter is the main source of organic matter in these soils. Carmi, Virden, and other soils that formed under prairie grasses have a thick, dark surface layer. The many fine, fibrous grass roots in the upper part of these soils add large amounts of organic matter when they die and decompose. Cisne, Hoyleton, and other soils that formed under grasses and widely spaced trees have a thinner dark surface layer than soils that formed under prairie grasses only.

Human activities can also affect soil formation. Farming can reduce the content of organic matter in the surface layer and increase runoff and erosion. Building levees can reduce the frequency of flooding and prevent deposition of soil materials. Borrowing soil material for construction sites and cutting and filling for roadways, dams, and levees have altered some of the soils. Storing oil-waste products in pits and drilling for oil may release salts or chemicals, which are toxic to plants and animals. Clearing the land of trees also changes the conditions under which the soils form.

Relief

Relief, or lay of the land, has a marked influence on the soils through its effect on natural drainage, runoff, erosion, and deposition. In Crawford County, the slopes range from 0 to 50 percent. Natural soil drainage ranges from well drained on some steep side slopes to very poorly drained in depressions.

Soils that formed in different kinds of parent materials but that occur in areas of similar relief have similar characteristics. Hosmer and Ava soils are examples. The effects of relief on natural drainage account for differences among soils that formed in the same kinds of parent materials, such as Wynoose and Ava soils. Through its influence on the aeration of soils, natural drainage generally determines the color of soils. Soils that occur in nearly level areas or in slight depressions have a seasonal high water table that is close to the surface in most years. The soil pores contain much water, which restricts the circulation of air. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. As a result, the soils develop grayish colors and are mottled. Wynoose soils are examples. In the more sloping or higher landform positions, the water table is not as close to the surface. The soil pores contain less water and more air. As a result, the soils have brownish colors or have mottled brownish and grayish colors. Ava soils are examples.

To a large extent, relief determines how much water runs off the surface and how much water infiltrates the soil. Runoff is most rapid and the infiltration rate is slowest on the steeper slopes. The hazard of erosion becomes more severe as the slope gradient and the runoff rate increase. Low areas are temporarily ponded by runoff from the adjacent slopes. Slope wash may accumulate in these low areas or on foot slopes.

Time

Time is needed for the interaction of the other soil-forming factors. Soil profiles normally become more strongly expressed with increased exposure to weathering processes. The influence of time, however, can be modified by deposition, erosion, and relief. Soils on flood plains, such as Wakeland and Birds soils, receive surface deposits each time they are flooded. The processes of soil formation are interrupted with each flooding event. Consequently, these soils do not have distinct horizons that typically develop over time.

Because slope affects the amount of water that enters the soil, the extent of profile development generally decreases as the slope increases. In addition, if the rate of erosion exceeds the rate of soil formation, the soil profile will be thinner and morphologically less distinct.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

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.

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.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface

of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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

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

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

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

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

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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.

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.

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 periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most

mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material

deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). 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 and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 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 (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the

acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration 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

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.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

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 (geology). 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. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5

millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of 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:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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 substratum. 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.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single 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. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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 (geology). 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.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded

glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Effingham, Illinois)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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	36.1	18.2	27.2	65	-12	4	2.02	1.09	2.84	5	6.1
February	41.2	22.1	31.7	68	-6	5	2.18	1.14	3.10	4	4.2
March	51.7	31.5	41.6	78	6	45	3.65	1.95	5.14	7	3.9
April	66.2	42.9	54.5	86	24	185	3.66	2.10	5.04	7	.2
May	76.0	51.7	63.8	92	32	405	3.79	2.26	5.16	7	.0
June	85.1	61.2	73.1	99	44	675	4.53	2.11	6.61	6	.0
July	88.5	65.0	76.8	100	50	809	4.19	2.61	5.61	6	.0
August	86.8	62.9	74.8	99	47	762	2.60	1.36	3.70	4	.0
September	81.0	55.3	68.2	98	36	521	3.17	1.35	4.71	4	.0
October	68.8	43.6	56.2	89	23	226	2.42	1.21	3.48	4	.0
November	53.2	33.4	43.3	77	9	51	3.08	1.50	4.46	5	1.7
December	41.1	24.3	32.7	67	-4	6	2.96	1.14	4.48	5	3.8
Yearly:											
Average	64.6	42.7	53.7	---	---	---	---	---	---	---	---
Extreme	111	-24	---	102	-13	---	---	---	---	---	---
Total	---	---	---	---	---	3,693	38.25	31.25	43.08	64	19.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Effingham, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 6	Apr. 14	May 4
2 years in 10 later than--	Apr. 2	Apr. 10	Apr. 29
5 years in 10 later than--	Mar. 23	Apr. 1	Apr. 19
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 22	Oct. 11	Oct. 3
2 years in 10 earlier than--	Oct. 28	Oct. 16	Oct. 8
5 years in 10 earlier than--	Nov. 7	Oct. 26	Oct. 16

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Effingham, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	194	183	156
8 years in 10	201	189	164
5 years in 10	216	202	178
2 years in 10	231	215	192
1 year in 10	238	221	200

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Cisne silt loam	31,480	10.9
3A	Hoyleton silt loam, 0 to 2 percent slopes	7,380	2.6
3B	Hoyleton silt loam, 2 to 5 percent slopes	1,250	0.4
6B2	Fishhook silt loam, 2 to 5 percent slopes, eroded	2,450	0.9
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	5,500	1.9
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded	800	0.3
7D2	Atlas silt loam, 10 to 15 percent slopes, eroded	1,950	0.7
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded	4,720	1.7
8E2	Hickory silt loam, 15 to 20 percent slopes, eroded	5,090	1.8
8F	Hickory loam, 20 to 50 percent slopes	6,630	2.3
12	Wynoose silt loam	19,920	6.9
13A	Bluford silt loam, 0 to 2 percent slopes	28,900	10.0
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	6,800	2.4
14B	Ava silt loam, 1 to 5 percent slopes	15,080	5.2
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	4,390	1.5
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	210	0.1
50	Virden silty clay loam	3,470	1.2
112	Cowden silt loam	2,480	0.9
113A	Oconee silt loam, 0 to 2 percent slopes	1,070	0.4
119C2	Elco silt loam, 5 to 10 percent slopes, eroded	4,030	1.4
119D2	Elco silt loam, 10 to 15 percent slopes, eroded	1,300	0.5
131A	Alvin fine sandy loam, 0 to 2 percent slopes	1,610	0.6
131B	Alvin loamy fine sand, 2 to 5 percent slopes	1,720	0.6
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded	930	0.3
131D2	Alvin loamy fine sand, 10 to 18 percent slopes, eroded	340	0.1
131E	Alvin loamy fine sand, 18 to 30 percent slopes	340	0.1
134A	Camden silt loam, 0 to 2 percent slopes	1,450	0.5
134B	Camden silt loam, 2 to 5 percent slopes	580	0.2
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	600	0.2
138	Shiloh silty clay loam	470	0.2
142	Patton silty clay loam	1,540	0.5
155A	Stockland loam, 0 to 2 percent slopes	1,060	0.4
155B	Stockland sandy loam, 2 to 5 percent slopes	1,060	0.4
155C	Stockland loam, 5 to 10 percent slopes	730	0.3
164A	Stoy silt loam, 0 to 2 percent slopes	8,960	3.1
164B	Stoy silt loam, 2 to 5 percent slopes	1,420	0.5
165	Weir silt loam	3,360	1.2
173B	McGary silt loam, 2 to 5 percent slopes	800	0.3
178	Ruark fine sandy loam	2,470	0.9
184A	Roby fine sandy loam, 0 to 2 percent slopes	1,450	0.5
214B	Hosmer silt loam, 1 to 5 percent slopes	7,550	2.6
214C2	Hosmer silt loam, 5 to 10 percent slopes, eroded	2,110	0.7
218	Newberry silt loam	1,000	0.4
286A	Carmi sandy loam, 0 to 2 percent slopes	8,870	3.1
286B	Carmi loam, 2 to 5 percent slopes	1,090	0.4
300	Westland silty clay loam	3,950	1.4
308B	Alford silt loam, 1 to 5 percent slopes	4,980	1.7
308C2	Alford silt loam, 5 to 10 percent slopes, eroded	3,350	1.2
308D2	Alford silt loam, 10 to 15 percent slopes, eroded	560	0.2
308E	Alford silt loam, 15 to 30 percent slopes	870	0.3
453A	Muren silt loam, 0 to 2 percent slopes	6,440	2.3
453B2	Muren silt loam, 2 to 5 percent slopes, eroded	3,160	1.1
454A	Iva silt loam, 0 to 2 percent slopes	4,815	1.7
615C2	Vanmeter silty clay loam, 5 to 12 percent slopes, eroded	260	0.1
615E2	Vanmeter silty clay loam, 12 to 30 percent slopes, eroded	530	0.2
620A	Darmstadt silt loam, 0 to 2 percent slopes	1,150	0.4
3070	Beaucoup silty clay loam, frequently flooded	1,000	0.4
3284	Tice silty clay loam, frequently flooded	490	0.2
3288	Petrolia silty clay loam, frequently flooded	4,340	1.5
3331	Haymond silt loam, frequently flooded	5,605	2.0
3333	Wakeland silt loam, frequently flooded	17,000	6.0
3334	Birds silt loam, frequently flooded	5,050	1.8
3404	Titus silty clay loam, frequently flooded	6,180	2.2
3424	Shoals silt loam, frequently flooded	2,970	1.0
3597	Armiesburg silty clay loam, frequently flooded	2,440	0.9

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
3665	Stonelick loam, frequently flooded	2,080	0.7
	Water	1,690	0.6
	Total	285,320	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
2	Cisne silt loam (where drained)
3A	Hoyleton silt loam, 0 to 2 percent slopes
3B	Hoyleton silt loam, 2 to 5 percent slopes
13A	Bluford silt loam, 0 to 2 percent slopes (where drained)
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14B	Ava silt loam, 1 to 5 percent slopes
50	Virden silty clay loam (where drained)
112	Cowden silt loam (where drained)
113A	Oconee silt loam, 0 to 2 percent slopes (where drained)
131A	Alvin fine sandy loam, 0 to 2 percent slopes
131B	Alvin loamy fine sand, 2 to 5 percent slopes
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded
134A	Camden silt loam, 0 to 2 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
138	Shiloh silty clay loam (where drained)
142	Patton silty clay loam (where drained)
155A	Stockland loam, 0 to 2 percent slopes
155B	Stockland sandy loam, 2 to 5 percent slopes
155C	Stockland loam, 5 to 10 percent slopes
164A	Stoy silt loam, 0 to 2 percent slopes
164B	Stoy silt loam, 2 to 5 percent slopes
173B	McGary silt loam, 2 to 5 percent slopes
178	Ruark fine sandy loam (where drained)
184A	Roby fine sandy loam, 0 to 2 percent slopes
214B	Hosmer silt loam, 1 to 5 percent slopes
218	Newberry silt loam (where drained)
286A	Carmi sandy loam, 0 to 2 percent slopes
286B	Carmi loam, 2 to 5 percent slopes
300	Westland silty clay loam (where drained)
308B	Alford silt loam, 1 to 5 percent slopes
453A	Muren silt loam, 0 to 2 percent slopes
453B2	Muren silt loam, 2 to 5 percent slopes, eroded
454A	Iva silt loam, 0 to 2 percent slopes (where drained)
3070	Beaucoup silty clay loam, frequently flooded (where drained and either 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)
3288	Petrolia silty clay loam, frequently flooded (where drained and either 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 either protected from flooding or not frequently flooded during the growing season)
3334	Birds silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3404	Titus silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3424	Shoals silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3597	Armiesburg silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3665	Stonelick loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
2---------- Cisne	IIIw	115	35	52	4.5	7.5
3A---------- Hoyleton	IIw	116	34	53	4.7	7.5
3B---------- Hoyleton	IIe	115	34	52	4.7	7.4
6B2---------- Fishhook	IIe	71	21	23	2.4	4.0
7C2---------- Atlas	IIIe	52	---	19	2.2	4.0
7C3---------- Atlas	IVe	---	---	16	1.8	3.0
7D2---------- Atlas	IVe	---	---	18	2.1	3.4
8D2---------- Hickory	IIIe	72	23	26	2.7	4.5
8E2---------- Hickory	IVe	67	---	---	2.5	4.2
8F---------- Hickory	VIIe	---	---	---	---	3.0
12---------- Wynoose	IIIw	96	33	46	---	---
13A---------- Bluford	IIw	103	33	49	4.1	6.8
13B2---------- Bluford	IIe	99	32	47	3.9	6.6
14B---------- Ava	IIe	97	33	48	4.3	7.1
14C2---------- Ava	IIIe	89	30	44	3.9	6.5
19D3---------- Sylvan	IVe	93	29	44	---	6.9
50---------- Virden	IIw	138	46	57	---	---
112---------- Cowden	IIw	120	37	53	4.8	8.0
113A---------- Oconee	IIw	120	36	54	5.0	8.3

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
119C2--Elco	IIIe	105	35	44	4.1	6.6
119D2--Elco	IIIe	101	33	42	4.0	6.6
131A--Alvin	IIs	98	33	48	4.3	7.2
131B--Alvin	IIe	97	33	48	4.3	7.1
131C2, 131D2--Alvin	IIIe	90	30	44	4.0	6.6
131E--Alvin	VIe	---	---	---	3.1	5.3
134A--Camden	I	125	39	55	5.0	8.3
134B--Camden	IIe	124	39	54	5.0	8.2
134C2--Camden	IIIe	117	37	52	4.7	7.8
138--Shiloh	IIw	139	46	56	5.0	---
142--Patton	IIw	148	48	56	5.6	---
155A, 155B--Stockland	IIIs	82	28	43	3.7	6.1
155C--Stockland	IIIe	80	27	41	3.6	6.0
164A--Stoy	IIw	112	35	52	4.5	7.5
164B--Stoy	IIe	111	35	51	4.5	7.4
165--Weir	IIIw	103	34	45	---	---
173B--McGary	IIIe	100	35	45	3.3	5.9
178--Ruark	IIIw	100	35	44	3.5	---
184A--Roby	IIs	98	36	45	4.0	6.7
214B--Hosmer	IIe	105	37	47	4.3	7.6

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
214C2---------- Hosmer	IIIe	85	30	38	2.8	6.9
218---------- Newberry	IIw	118	37	53	4.5	---
286A---------- Carmi	IIs	103	33	53	4.3	7.2
286B---------- Carmi	IIe	102	33	52	4.3	7.1
300---------- Westland	IIw	140	49	56	4.8	---
308B---------- Alford	IIe	125	44	50	5.1	8.6
308C2---------- Alford	IIIe	110	38	44	4.9	8.1
308D2---------- Alford	IVe	95	33	38	4.7	7.8
308E---------- Alford	VIe	---	---	---	4.5	7.5
453A---------- Muren	I	125	44	50	5.2	8.7
453B2---------- Muren	IIe	120	42	48	4.9	8.3
454A---------- Iva	IIw	135	47	54	5.2	8.8
615C2---------- Vanmeter	IVe	35	9	---	---	1.9
615E2---------- Vanmeter	VIIe	---	---	---	---	---
620A---------- Darmstadt	IIIw	69	26	36	3.0	5.0
3070---------- Beaucoup	IVw	104	35	---	4.5	---
3284---------- Tice	IVw	92	28	---	2.4	4.0
3288---------- Petrolia	IIIw	110	35	40	4.0	---
3331---------- Haymond	IIw	110	39	42	3.7	---
3333---------- Wakeland	IIw	125	44	50	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
3334---------- Birds	IIIw	111	38	47	---	---
3404---------- Titus	IVw	75	25	31	---	---
3424---------- Shoals	IIw	120	42	48	4.0	---
3597---------- Armiesburg	IIw	110	42	47	3.8	---
3665---------- Stonelick	IIIw	80	28	---	3.5	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
2---------- Cisne	4W	Slight	Severe	Moderate	Moderate	Pin oak----------	70	4	Pin oak, green ash, water tupelo, red maple.
						White oak----------	---	---	
						Black oak----------	---	---	
						Bitternut hickory---	---	---	
3A, 3B---------- Hoyleton	4A	Slight	Slight	Slight	Slight	White oak----------	70	4	Shortleaf pine, white oak, eastern white pine, eastern cottonwood, northern red oak, green ash.
						Northern red oak----	70	4	
						Green ash----------	---	---	
						Bur oak----------	---	---	
6B2---------- Fishhook	4C	Slight	Slight	Slight	Moderate	White oak----------	70	4	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak----	70	4	
						Green ash----------	---	---	
						Bur oak----------	---	---	
7C2, 7C3, 7D2--- Atlas	4C	Slight	Slight	Moderate	Moderate	White oak----------	70	4	Green ash, pin oak, red maple, Austrian pine.
						Northern red oak----	70	4	
						Bur oak----------	70	4	
						Green ash----------	---	---	
8D2---------- Hickory	5A	Slight	Slight	Slight	Slight	White oak----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8E2---------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8F---------- Hickory	5R	Severe	Severe	Slight	Slight	White oak----------	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	5	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
12---------- Wynoose	4W	Slight	Severe	Moderate	Moderate	Pin oak----------	70	4	Pin oak, red maple.
						White oak----------	---	---	
						Black oak----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
13A, 13B2---------- Bluford	4A	Slight	Slight	Slight	Slight	White oak----------	70	4	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak----	70	4	
						Southern red oak----	70	4	
						Green ash----------	---	---	
						Bur oak----------	---	---	
14B, 14C2---------- Ava	4A	Slight	Slight	Slight	Slight	White oak----------	75	4	Black walnut, eastern cottonwood, sweetgum, yellow-poplar, white oak, American sycamore.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
19D3---------- Sylvan	6A	Slight	Slight	Slight	Slight	Yellow-poplar-------	90	6	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak----------	80	4	
						Northern red oak----	80	4	
						Black walnut--------	---	---	
119C2, 119D2---- Elco	4A	Slight	Slight	Slight	Slight	White oak----------	80	4	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
						Northern red oak----	---	---	
						Black walnut--------	---	---	
131A, 131B, 131C2, 131D2--- Alvin	4A	Slight	Slight	Slight	Slight	White oak----------	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak----	80	4	
						Black walnut--------	---	---	
						Yellow-poplar-------	90	6	
131E---------- Alvin	4R	Moderate	Moderate	Slight	Slight	White oak----------	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak----	80	4	
						Black walnut--------	---	---	
						Yellow-poplar-------	90	6	
134A, 134B, 134C2---------- Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	7	Yellow-poplar, white oak, green ash, black walnut, eastern white pine, red pine, black locust, white ash.
						White oak----------	85	5	
						Northern red oak----	85	5	
						Sweetgum-----------	80	6	
						Green ash----------	76	5	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
142---------- Patton	5W	Slight	Severe	Moderate	Moderate	Pin oak----------	85	5	Pin oak, sweetgum, eastern white pine, baldcypress, Norway spruce, red maple, white ash.
						White oak----------	75	4	
						Sweetgum----------	80	6	
						Northern red oak----	75	4	
164A, 164B------ Stoy	4A	Slight	Slight	Slight	Slight	White oak----------	70	4	Shortleaf pine, loblolly pine, eastern white pine, Scotch pine, eastern redcedar.
						Southern red oak----	70	4	
						White ash----------	---	---	
						Bur oak----------	---	---	
165---------- Weir	4W	Slight	Moderate	Moderate	Slight	Pin oak----------	70	4	Baldcypress, pin oak, water tupelo, red maple.
						White oak----------	---	---	
						Black oak----------	---	---	
						Pignut hickory------	---	---	
173B---------- McGary	4W	Slight	Moderate	Severe	Severe	White oak----------	70	4	Eastern white pine, baldcypress, white ash, red maple, yellow-poplar, American sycamore, eastern cottonwood, green ash.
						Pin oak----------	85	5	
						Yellow-poplar-------	85	6	
						Sweetgum----------	80	6	
178---------- Ruark	4W	Slight	Moderate	Moderate	Slight	Pin oak----------	80	4	Baldcypress, pin oak, green ash, water tupelo, red maple.
						White oak----------	---	---	
						Green ash----------	---	---	
						Yellow-poplar-------	80	5	
184A---------- Roby	4A	Slight	Slight	Slight	Slight	White oak----------	80	4	Black walnut, eastern cottonwood, American sycamore, yellow-poplar, white oak, eastern white pine.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
214B, 214C2----- Hosmer	4A	Slight	Slight	Slight	Slight	White oak----------	75	4	Eastern white pine, shortleaf pine, red pine, yellow-poplar, white ash.
						Yellow-poplar-------	90	6	
						Virginia pine-------	75	8	
						Sugar maple---------	75	3	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
300---------- Westland	5W	Slight	Severe	Severe	Severe	Pin oak----------	85	5	Sweetgum, eastern white pine, baldcypress, red maple, white ash.
						Sweetgum----------	90	7	
						White oak----------	75	4	
308B, 308C2, 308D2---------- Alford	5A	Slight	Slight	Slight	Slight	White oak----------	90	5	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	7	
						Sweetgum----------	76	5	
308E---------- Alford	5R	Moderate	Moderate	Slight	Slight	White oak----------	90	5	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	7	
						Sweetgum----------	76	5	
453A, 453B2----- Muren	5A	Slight	Slight	Slight	Slight	White oak----------	90	5	Eastern white pine, red pine, black walnut, black locust, yellow-poplar, white ash.
						Yellow-poplar-------	98	7	
						Sweetgum----------	76	5	
454A---------- Iva	4W	Slight	Moderate	Slight	Slight	White oak----------	75	4	Eastern white pine, baldcypress, white ash, red maple, yellow-poplar, American sycamore.
						Pin oak----------	85	5	
						Yellow-poplar-------	85	6	
						Sweetgum----------	80	6	
615C2----------	2C	Moderate	Moderate	Severe	Severe	White oak----------	45	2	Eastern white pine, red pine.
615E2---------- Vanmeter	2R	Severe	Severe	Severe	Severe	White oak----------	45	2	Eastern white pine, red pine.
620A---------- Darmstadt	4T	Slight	Slight	Moderate	Slight	White oak----------	70	4	Eastern white pine, white oak, green ash, eastern redcedar, Osage-orange.
						Black oak----------	70	4	
						Pignut hickory------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
3070---------- Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak----------	90	5	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	9	
						Sweetgum----------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3284---------- Tice	5A	Slight	Slight	Slight	Slight	Pin oak----------	96	5	Yellow-poplar, eastern cottonwood, American sycamore, green ash, red maple, cherrybark oak.
						Sweetgum----------	86	7	
						Yellow-poplar-------	90	6	
						Virginia pine-------	90	9	
						Eastern cottonwood--	---	---	
						White ash----------	---	---	
3288---------- Petrolia	5W	Slight	Moderate	Moderate	Slight	Pin oak----------	90	5	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
						Eastern cottonwood--	100	9	
						Sweetgum----------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3331---------- Haymond	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	100	8	Eastern white pine, black walnut, yellow-poplar, black locust.
						White oak----------	90	5	
						Black walnut--------	70	---	
3333---------- Wakeland	5A	Slight	Slight	Slight	Slight	Pin oak----------	90	5	Eastern white pine, baldcypress, American sycamore, red maple, white ash.
						Sweetgum----------	88	7	
						Yellow-poplar-------	90	6	
						Virginia pine-------	85	9	
3334---------- Birds	5W	Slight	Severe	Moderate	Moderate	Pin oak----------	90	5	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
						Eastern cottonwood--	100	9	
						Sweetgum----------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3404---------- Titus	2W	Slight	Severe	Severe	Moderate	Silver maple--------	80	2	Silver maple, eastern cottonwood, pin oak, swamp white oak, green ash, water tupelo, American sycamore, hackberry, red maple.
						Eastern cottonwood--	99	9	
						White ash----------	51	2	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
3424---------- Shoals	5W	Slight	Moderate	Moderate	Slight	Pin oak----------	90	5	Pin oak,
						Sweetgum----------	86	7	sweetgum,
						Yellow-poplar-------	90	6	yellow-poplar,
						Virginia pine-------	90	9	red maple,
						Eastern cottonwood--	---	---	swamp chestnut
						White ash----------	---	---	oak.
3597---------- Armiesburg	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	100	8	Eastern white
						White oak----------	90	5	pine, black
						Black walnut--------	70	---	walnut,
									yellow-poplar,
									black locust.
3665---------- Stonelick	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	4	Eastern white
						Yellow-poplar-------	95	7	pine, black
						White oak----------	---	---	walnut,
						Black walnut--------	---	---	yellow-poplar,
						Black cherry--------	---	---	white ash, red
						Sugar maple---------	---	---	pine, white
						White ash----------	---	---	oak.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
2---------- Cisne	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
3A, 3B---------- Hoyleton	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
6B2---------- Fishhook	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
7C2, 7C3, 7D2----- Atlas	American cranberrybush, silky dogwood, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8D2, 8E2, 8F------ Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
12---------- Wynoose	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
13A, 13B2--------- Bluford	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
14B, 14C2--------- Ava	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
50---------- Virden	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
112---------- Cowden	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, blue spruce, Norway spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
113A---------- Oconee	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange, northern whitecedar.	Eastern white pine, pin oak.	---
119C2, 119D2------ Elco	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
131A, 131B, 131C2, 131D2, 131E------ Alvin	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
134A, 134B, 134C2- Camden	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
138---------- Shiloh	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
142---------- Patton	Amur privet, silky dogwood, American cranberrybush, Amur honeysuckle.	White fir, northern whitecedar, blue spruce, Austrian pine, Washington hawthorn, Norway spruce.	Eastern white pine----	Pin oak.
155A, 155B, 155C-- Stockland	Amur honeysuckle, lilac, silky dogwood, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
164A, 164B-------- Stoy	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, Amur honeysuckle, arrowwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
165--------------- Weir	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
173B-------------- McGary	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
178--------------- Ruark	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
184A-------------- Roby	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, Washington hawthorn, northern whitecedar.	Norway spruce---------	Eastern white pine, pin oak.
214B, 214C2------- Hosmer	Eastern redcedar, arrowwood, Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
218--------------- Newberry	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
286A, 286B-------- Carmi	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, silky dogwood.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
300--------------- Westland	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
308B, 308C2, 308D2, 308E---Alford	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
453A, 453B2---Muren	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
454A---Iva	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
615C2, 615E2---Vanmeter	Eastern redcedar, Osage-orange, Russian-olive, Washington hawthorn.	Northern catalpa, honeylocust, green ash.	---	---
620A---Darmstadt	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
3070---Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3284---Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3288---Petrolia	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, blue spruce, Washington hawthorn, Norway spruce, Austrian pine, northern whitecedar.	Eastern white pine	Pin oak.
3331---Haymond	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3333---Wakeland	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3334---Birds	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
3404---------- Titus	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
3424---------- Shoals	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3597---------- Armiesburg	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3665---------- Stonelick	Siberian peashrub-----	Green ash, eastern redcedar, Osage-orange, northern whitecedar, nannyberry viburnum, white spruce, Washington hawthorn.	Black willow----------	---

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 Cisne	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
3A, 3B Hoyleton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
6B2 Fishhook	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
7C2, 7C3 Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
7D2 Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty, slope.
8D2 Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8E2 Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8F Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
12 Wynoose	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
13A, 13B2 Bluford	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
14B Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
14C2 Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness.
19D3 Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
50 Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
112 Cowden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
113A Oconee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
119C2 Elco	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
119D2 Elco	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
131A Alvin	Slight	Slight	Slight	Slight	Slight.
131B Alvin	Slight	Slight	Moderate: slope.	Slight	Slight.
131C2 Alvin	Slight	Slight	Severe: slope.	Slight	Slight.
131D2 Alvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
131E Alvin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
134A Camden	Slight	Slight	Slight	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: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
142 Patton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
155A Stockland	Slight	Slight	Slight	Slight	Slight.
155B Stockland	Slight	Slight	Moderate: slope.	Slight	Slight.
155C Stockland	Slight	Slight	Severe: slope.	Slight	Slight.
164A, 164B Stoy	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
165 Weir	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
173B McGary	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
178 Ruark	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
184A Roby	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
214B Hosmer	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
214C2 Hosmer	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness.
218 Newberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
286A Carmi	Slight	Slight	Slight	Slight	Slight.
286B Carmi	Slight	Slight	Moderate: slope.	Slight	Slight.
300 Westland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
308B Alford	Slight	Slight	Moderate: slope.	Slight	Slight.
308C2 Alford	Slight	Slight	Severe: slope.	Slight	Slight.
308D2 Alford	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
308E Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
453A Muren	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: erodes easily.	Slight.
453B2 Muren	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Severe: erodes easily.	Slight.
454A Iva	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
615C2 Vanmeter	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope, depth to rock.
615E2 Vanmeter	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
620A Darmstadt	Severe: wetness, percs slowly, excess sodium.	Severe: excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Severe: excess sodium.
3070 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3284---------- Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
3288---------- Petrolia	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3331---------- Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3333---------- Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3334---------- Birds	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3404---------- Titus	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3424---------- Shoals	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3597---------- Armiesburg	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3665---------- Stonelick	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2---------- Cisne	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3A---------- Hoyleton	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3B---------- Hoyleton	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
6B2---------- Fishhook	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
7C2, 7C3, 7D2------ Atlas	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8D2---------- Hickory	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8E2---------- Hickory	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8F---------- Hickory	Very poor.	Poor	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
12---------- Wynoose	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
13A---------- Bluford	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
13B2---------- Bluford	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B, 14C2---------- Ava	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
19D3---------- Sylvan	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
50---------- Virden	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
112---------- Cowden	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
113A---------- Oconee	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
119C2, 119D2------- Elco	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
131A, 131B--------- Alvin	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
131C2, 131D2------- Alvin	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
131E---------- Alvin	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
134A, 134B--------- Camden	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2---------- Camden	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
138---------- Shiloh	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
142---------- Patton	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
155A, 155B--------- Stockland	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
155C---------- Stockland	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
164A---------- Stoy	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
164B---------- Stoy	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
165---------- Weir	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
173B---------- McGary	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
178---------- Ruark	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
184A---------- Roby	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
214B---------- Hosmer	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
214C2---------- Hosmer	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
218---------- Newberry	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
286A, 286B--------- Carmi	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
300---------- Westland	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
308B---------- Alford	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
308C2---------- Alford	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
308D2, 308E--------- Alford	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
453A, 453B2--------- Muren	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
454A---------- Iva	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
615C2, 615E2------- Vanmeter	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
620A---------- Darmstadt	Fair	Good	Poor	Good	Fair	Fair	Fair	Good	Fair.
3070---------- Beaucoup	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3284---------- Tice	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
3288---------- Petrolia	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3331---------- Haymond	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
3333---------- Wakeland	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
3334---------- Birds	Good	Fair	Good	Good	Good	Good	Good	Good	Good.
3404---------- Titus	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3424---------- Shoals	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
3597---------- Armiesburg	Poor	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
3665---------- Stonelick	Poor	Fair	Fair	Good	Poor	Very poor.	Fair	Good	Very poor.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2---- Cisne	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
3A, 3B---- Hoyleton	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
6B2---- Fishhook	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
7C2, 7C3---- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty.
7D2---- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty, slope.
8D2---- Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8E2, 8F---- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
12---- Wynoose	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
13A, 13B2---- Bluford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
14B---- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
14C2---- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
19D3---- Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
50---- Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
112---------- Cowden	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
113A---------- Oconee	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
119C2---------- Elco	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
119D2---------- Elco	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
131A, 131B-------- Alvin	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
131C2---------- Alvin	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
131D2---------- Alvin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
131E---------- Alvin	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
134A, 134B-------- Camden	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
134C2---------- Camden	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
138---------- Shiloh	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
142---------- Patton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
155A, 155B-------- Stockland	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
155C---------- Stockland	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
164A, 164B-------- Stoy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
165--Weir	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
173B--McGary	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
178--Ruark	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
184A--Roby	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness, droughty.
214B--Hosmer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Moderate: wetness.
214C2--Hosmer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action.	Moderate: wetness.
218--Newberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
286A, 286B--Carmi	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
300--Westland	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
308B--Alford	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
308C2--Alford	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
308D2--Alford	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
308E--Alford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
453A, 453B2--Muren	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
454A--Iva	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
615C2---------- Vanmeter	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Moderate: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope, depth to rock.
615E2---------- Vanmeter	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
620A---------- Darmstadt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Severe: excess sodium.
3070---------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3284---------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3288---------- Petrolia	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
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: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3404---------- Titus	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding.
3424---------- Shoals	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
3597---------- Armiesburg	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3665---------- Stonelick	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
2 Cisne	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: wetness.
3A Hoyleton	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
3B Hoyleton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
6B2 Fishhook	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Poor: too clayey, hard to pack.
7C2, 7C3, 7D2 Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2 Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Fair: too clayey, small stones, slope.
8E2, 8F Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
12 Wynoose	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: wetness.
13A Bluford	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: wetness.
13B2 Bluford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Poor: wetness.
14B Ava	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
14C2 Ava	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
19D3 Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope.
50 Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
112 Cowden	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
113A Oconee	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
119C2 Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
119D2 Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
131A, 131B Alvin	Slight	Severe: seepage.	Severe: seepage.	Poor: seepage.
131C2 Alvin	Slight	Severe: seepage, slope.	Severe: seepage.	Poor: seepage.
131D2 Alvin	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Poor: seepage.
131E Alvin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
134A Camden	Slight	Moderate: seepage.	Slight	Fair: too clayey.
134B Camden	Slight	Moderate: seepage, slope.	Slight	Fair: too clayey.
134C2 Camden	Slight	Severe: slope.	Slight	Fair: too clayey.
138 Shiloh	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
142 Patton	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
155A, 155B Stockland	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
155C---------- Stockland	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Poor: seepage, too sandy, small stones.
164A---------- Stoy	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Poor: wetness.
164B---------- Stoy	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Poor: wetness.
165---------- Weir	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
173B---------- McGary	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
178---------- Ruark	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
184A---------- Roby	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
214B---------- Hosmer	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Fair: too clayey, wetness.
214C2---------- Hosmer	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Fair: too clayey, wetness.
218---------- Newberry	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Poor: hard to pack, wetness.
286A, 286B---------- Carmi	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.
300---------- Westland	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
308B---------- Alford	Slight----------	Moderate: seepage, slope.	Slight----------	Fair: too clayey.
308C2---------- Alford	Slight----------	Severe: slope.	Slight----------	Fair: too clayey.
308D2---------- Alford	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: too clayey, slope.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
308E---------- Alford	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
453A, 453B2--------- Muren	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
454A---------- Iva	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
615C2---------- Vanmeter	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock.
615E2---------- Vanmeter	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
620A---------- Darmstadt	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Poor: wetness, excess sodium.
3070---------- Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3284---------- Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3288---------- Petrolia	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3331---------- Haymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
3333---------- Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3334---------- Birds	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3404---------- Titus	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3424---------- Shoals	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3597---------- Armiesburg	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: hard to pack.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
3665---------- Stonelick	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Poor: seepage.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2 Cisne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3A, 3B Hoyleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
6B2 Fishhook	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
7C2, 7C3, 7D2 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.
8E2 Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
8F Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
12 Wynoose	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
13A, 13B2 Bluford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B, 14C2 Ava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
19D3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
50 Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
112 Cowden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
113A Oconee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
119C2 Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
119D2 Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
131A, 131B, 131C2, 131D2---- Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
131E---- Alvin	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
134A, 134B, 134C2---- Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
138---- Shiloh	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
142---- Patton	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
155A, 155B, 155C---- Stockland	Good	Probable	Probable	Poor: small stones, area reclaim.
164A, 164B---- Stoy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
165---- Weir	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
173B---- McGary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
178---- Ruark	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
184A---- Roby	Fair: wetness.	Probable	Improbable: too sandy.	Poor: thin layer.
214B, 214C2---- Hosmer	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
218---- Newberry	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
286A, 286B---- Carmi	Good	Probable	Probable	Poor: small stones, area reclaim.
300---- Westland	Poor: wetness.	Probable	Probable	Poor: area reclaim, wetness.
308B, 308C2---- Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
308D2---- Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
308E Alford	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
453A, 453B2 Muren	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
454A Iva	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
615C2 Vanmeter	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
615E2 Vanmeter	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
620A Darmstadt	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium.
3070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3284 Tice	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3288 Petrolia	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
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.
3404 Titus	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3424 Shoals	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3597 Armiesburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3665 Stonelick	Good	Probable	Improbable: too sandy.	Fair: small stones.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2---- Cisne	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3A---- Hoyleton	Slight	Severe: thin layer, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3B---- Hoyleton	Moderate: slope.	Severe: thin layer, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
6B2---- Fishhook	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
7C2, 7C3---- Atlas	Moderate: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
7D2---- Atlas	Severe: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
8D2, 8E2, 8F---- Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
12---- Wynoose	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13A---- Bluford	Slight	Severe: piping.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13B2---- Bluford	Moderate: slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
14B, 14C2---- Ava	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
19D3---- Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
50---- Virden	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
112---- Cowden	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113A---- Oconee	Slight	Severe: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
119C2---------- Elco	Moderate: seepage, slope.	Moderate: piping, wetness.	Frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily.
119D2---------- Elco	Severe: slope.	Moderate: piping, wetness.	Frost action, slope.	Slope, wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily.
131A---------- Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
131B---------- Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, fast intake, soil blowing.	Soil blowing---	Favorable.
131C2---------- Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
131D2, 131E------- Alvin	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, fast intake, soil blowing.	Slope, soil blowing.	Slope.
134A---------- Camden	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
134B, 134C2------- Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
138---------- Shiloh	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
142---------- Patton	Moderate: seepage.	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding--------	Erodes easily, ponding.	Wetness, erodes easily.
155A---------- Stockland	Severe: seepage.	Severe: seepage.	Deep to water	Rooting depth	Too sandy------	Rooting depth.
155B---------- Stockland	Severe: seepage.	Severe: seepage.	Deep to water	Slope, soil blowing, rooting depth.	Too sandy, soil blowing.	Rooting depth.
155C---------- Stockland	Severe: seepage.	Severe: seepage.	Deep to water	Slope, rooting depth.	Too sandy------	Rooting depth.
164A---------- Stoy	Slight---------	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
164B---------- Stoy	Moderate: slope.	Moderate: wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
165---------- Weir	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
173B---------- McGary	Moderate: slope.	Severe: wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
178---------- Ruark	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding, soil blowing.	Ponding--------	Wetness.
184A---------- Roby	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty, rooting depth.
214B, 214C2------- Hosmer	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
218---------- Newberry	Slight---------	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
286A---------- Carmi	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing---	Too sandy, soil blowing.	Favorable.
286B---------- Carmi	Severe: seepage.	Severe: seepage.	Deep to water	Slope----------	Too sandy------	Favorable.
300---------- Westland	Severe: seepage.	Severe: thin layer, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
308B, 308C2------- Alford	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
308D2, 308E------- Alford	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
453A---------- Muren	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
453B2---------- Muren	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Frost action, slope.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
454A---------- Iva	Moderate: seepage.	Severe: thin layer, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
615C2, 615E2------ Vanmeter	Severe: slope.	Slight---------	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
620A---------- Darmstadt	Slight---------	Severe: excess sodium.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, excess sodium.
3070---------- Beaucoup	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
3284---------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness--------	Favorable.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
3288--- Petrolia	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
3331--- Haymond	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
3333--- Wakeland	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3334--- Birds	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3404--- Titus	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
3424--- Shoals	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3597--- Armiesburg	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Flooding	Favorable	Favorable.
3665--- Stonelick	Severe: seepage.	Severe: seepage, piping.	Deep to water	Flooding	Too sandy	Favorable.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
2---------- Cisne	0-7	Silt loam-----	CL, CL-ML, ML	A-4	0	0	100	100	90-100	90-100	25-35	5-10
	7-17	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	17-38	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	90-100	90-100	45-60	20-35
	38-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	100	90-100	70-95	50-90	30-50	15-30
3A, 3B--------- Hoyleton	0-6	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	5-15
	6-10	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	10-37	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	20-30
	37-60	Silt loam, loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	95-100	90-100	70-95	20-45	5-25
6B2---------- Fishhook	0-5	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-15
	5-31	Silty clay loam.	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	31-60	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
7C2---------- Atlas	0-4	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	75-95	25-35	5-15
	4-23	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	23-60	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
7C3---------- Atlas	0-2	Silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	75-100	40-60	25-40
	2-24	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	24-60	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
7D2---------- Atlas	0-7	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	75-95	25-35	5-15
	7-29	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	29-44	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	44-60	Clay loam, clay, loam.	CH, CL	A-6, A-7	0	0	95-100	90-100	90-100	65-95	35-55	20-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
8D2, 8E2------ Hickory	0-10	Silt loam-----	CL	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	10-45	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
	45-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8F---------- Hickory	0-10	Loam----------	CL, ML, CL-ML	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	10-53	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
	53-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
12---------- Wynoose	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-95	20-35	5-15
	9-22	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	85-95	15-30	2-15
	22-45	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	20-35
	45-60	Silt loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0	100	95-100	90-100	70-90	30-45	15-25
13A---------- Bluford	0-7	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	20-35	5-15
	7-20	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	95-100	95-100	90-100	20-30	NP-10
	20-35	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	35-60	Silt loam, clay loam, silty clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20
13B2---------- Bluford	0-6	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	20-35	5-15
	6-43	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	43-60	Silt loam, silty clay loam, clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
14B---------- Ava	0-11	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
	11-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	24-33	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	33-50	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	95-100	90-100	80-90	20-45	5-20
	50-60	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-90	25-40	5-20
14C2---------- Ava	0-10	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
	10-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	28-44	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	95-100	90-100	80-90	20-45	5-20
	44-60	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-90	25-40	5-20
19D3---------- Sylvan	0-7	Silty clay loam.	CL	A-7, A-6	0	0	100	100	100	95-100	35-50	20-30
	7-22	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
	22-60	Silt loam, silt.	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	95-100	20-40	5-20
50---------- Virden	0-15	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	30-45	10-25
	15-46	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
	46-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
112---------- Cowden	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	3-15
	9-15	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	15-60	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
113A---------- Oconee	0-8	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	8-13	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	13-31	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	31-53	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
	53-60	Silt loam-----	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
119C2--------- Elco	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	7-37	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	85-100	25-45	10-30
	37-60	Silty clay loam, clay loam, silt loam.	CL	A-7, A-6	0	0	100	90-100	85-95	75-95	25-45	10-30
119D2--------- Elco	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	7-28	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	85-100	25-45	10-30
	28-60	Silty clay loam, clay loam, silt loam.	CL	A-7, A-6	0	0	100	90-100	85-95	75-95	25-45	10-30
131A---------- Alvin	0-8	Fine sandy loam.	SM, ML	A-4, A-2	0	0	100	100	80-95	30-60	<25	NP-4
	8-28	Loamy fine sand, fine sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	28-60	Fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
131B---------- Alvin	0-13	Loamy fine sand.	SM	A-2	0	0	100	100	50-75	15-30	<25	NP-4
	13-41	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	41-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
131C2--------- Alvin	0-10	Fine sandy loam.	SM, ML	A-4, A-2	0	0	100	100	80-95	30-60	<25	NP-4
	10-30	Loamy fine sand, fine sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	30-60	Fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
131D2--------- Alvin	0-10	Loamy fine sand.	SM	A-2	0	0	100	100	50-75	15-30	<20	NP-4
	10-24	Fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	24-60	Fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
131E---------- Alvin	0-14	Loamy fine sand.	SM	A-2	0	0	100	100	50-75	15-30	<20	NP-4
	14-47	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	47-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
134A, 134B---- Camden	0-12	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	12-37	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	37-54	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	54-60	Stratified sandy loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10
134C2--------- Camden	0-9	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	9-28	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	28-60	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
138---------- Shiloh	0-14	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	15-25
	14-44	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	15-40
	44-60	Silty clay loam, silty clay, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-50	15-30
142---------- Patton	0-12	Silty clay loam.	CL	A-6	0	0	100	100	95-100	80-95	30-40	15-25
	12-31	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	80-100	40-55	15-25
	31-60	Stratified silt loam to silty clay loam.	CL	A-6	0	0	100	100	95-100	75-95	25-40	10-20
155A---------- Stockland	0-12	Loam----------	ML, CL	A-4, A-6	0-1	0-5	95-100	95-100	60-85	50-60	15-40	NP-15
	12-36	Gravelly sandy loam, gravelly sandy clay loam.	SC, SM, SC-SM	A-4, A-6, A-2	0-1	0-5	75-95	50-75	40-65	25-50	15-40	NP-15
	36-60	Gravelly sand, gravelly sandy loam.	SM, SP-SM, GP-GM, GM	A-1	0-3	0-15	35-60	25-50	20-40	5-25	<20	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
155B---------- Stockland	0-10	Sandy loam----	SC, SM, ML, CL	A-4, A-6, A-2	0-1	0-5	95-100	95-100	60-85	30-60	15-40	NP-15
	10-31	Sandy clay loam, very gravelly clay loam.	SC, SM, SC-SM	A-4, A-6, A-2	0-1	0-5	75-95	50-85	40-65	25-50	15-40	NP-15
	31-60	Very gravelly loamy sand, gravelly loam.	SM, SP-SM, GP-GM, GM	A-1	0-3	0-15	35-60	25-55	20-40	5-25	<20	NP-5
155C---------- Stockland	0-12	Loam----------	ML, CL	A-4, A-6	0-1	0-5	95-100	95-100	60-85	50-60	15-40	NP-15
	12-36	Gravelly sandy clay loam, very gravelly clay loam, very gravelly coarse sandy loam.	SC, SM, SC-SM	A-4, A-6, A-2	0-1	0-5	75-95	40-75	35-65	25-50	15-40	NP-15
	36-60	Gravelly sand, very gravelly sandy clay loam.	SM, SP-SM, GP-GM, GM	A-1	0-3	0-15	35-70	25-60	20-45	5-25	<20	NP-5
164A, 164B---- Stoy	0-16	Silt loam-----	ML, CL	A-6	0	0	100	100	95-100	90-100	30-40	10-15
	16-35	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	22-32
	35-47	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	47-60	Silt loam-----	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	13-25
165---------- Weir	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	5-17
	9-16	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	100	95-100	90-100	<25	3-10
	16-50	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-50	15-30
	50-60	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-30	9-16
173B---------- McGary	0-6	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-95	25-40	5-15
	6-26	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	90-100	45-60	25-35
	26-60	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-55	20-35
178---------- Ruark	0-16	Fine sandy loam.	SM, SC-SM, ML, CL-ML	A-4	0	0	100	100	90-100	40-60	<25	NP-7
	16-34	Loam, clay loam, sandy clay loam.	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	55-70	25-40	5-15
	34-60	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC-SM, ML, CL-ML	A-4	0	0	100	90-100	90-100	40-75	<25	NP-7

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
184A---------- Roby	0-9	Fine sandy loam.	SM, SC-SM	A-4	0	0	95-100	95-100	85-95	35-50	<25	NP-7
	9-15	Loamy fine sand, fine sand, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0	90-100	90-100	65-90	20-50	<20	NP-7
	15-23	Fine sandy loam, sandy loam, loam.	SM, ML	A-4, A-2	0	0	90-100	90-100	85-95	30-75	20-34	NP-7
	23-60	Stratified gravelly sand to loam.	SM, SC-SM, SP-SM, ML	A-4, A-2	0	0	80-100	75-90	50-90	10-65	<20	NP-7
214B---------- Hosmer	0-10	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	100	90-100	70-90	<25	3-10
	10-24	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	25-35	5-15
	24-60	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	20-30	5-15
214C2--------- Hosmer	0-6	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	100	90-100	70-90	<25	3-10
	6-24	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	25-35	5-15
	24-60	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	70-95	20-30	5-15
218---------- Newberry	0-8	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	30-40	10-20
	8-18	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	85-100	30-40	8-15
	18-44	Silty clay loam.	CL, CH	A-7, A-6	0	0	100	100	95-100	85-100	35-55	15-30
	44-60	Silty clay loam, clay loam, loam.	CL	A-7, A-6	---	0-5	95-100	90-100	75-100	50-90	30-45	15-25
286A---------- Carmi	0-27	Sandy loam----	SC-SM, SC	A-6, A-4	0	0-5	90-100	90-100	55-70	35-45	15-35	5-15
	27-36	Gravelly sandy clay loam, gravelly sandy loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0	0-5	65-95	60-90	50-65	20-40	15-35	5-15
	36-60	Stratified gravelly loamy sand to coarse sand.	SP-SM, GP-GM, SM, GM	A-1, A-2	0-1	0-15	40-90	35-80	20-60	5-35	<20	NP-5
286B---------- Carmi	0-15	Loam----------	CL-ML, CL	A-4, A-6	0	0-5	90-100	90-100	55-70	30-60	15-35	5-15
	15-30	Gravelly sandy clay loam, gravelly sandy clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0	0-5	65-95	60-90	50-65	20-40	15-35	5-15
	30-60	Stratified gravelly loamy sand to coarse sand.	SP-SM, GP-GM, SM, GM	A-1, A-2	0-1	0-15	40-90	35-80	20-60	5-35	<20	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
300---------- Westland	0-11	Silty clay loam.	CL	A-6	0	0	100	100	75-100	55-90	30-40	11-16
	11-30	Clay loam, loam, silty clay loam.	CL, SC	A-6, A-4	0	0	85-100	85-100	50-100	40-80	25-40	8-16
	30-48	Gravelly sandy clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6	0	0-3	70-95	70-95	50-70	40-70	<35	NP-15
	48-60	Very gravelly coarse sand, gravelly loamy coarse sand, sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	40-80	35-80	10-40	1-10	---	NP-3
308B, 308C2, 308D2, 308E-- Alford	0-7	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	20-30	5-15
	7-60	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
453A---------- Muren	0-19	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-30	5-15
	19-55	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	100	100	90-100	80-100	25-35	8-15
	55-60	Silt loam, silt.	CL, CL-ML, ML	A-4	0	0	100	100	90-100	70-90	<25	NP-10
453B2--------- Muren	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-30	5-15
	8-35	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	100	100	90-100	80-100	25-35	8-15
	35-60	Silt loam, silt.	CL, CL-ML, ML	A-4	0	0	100	100	90-100	70-90	<25	NP-10
454A---------- Iva	0-16	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	25-35	5-15
	16-35	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-100	35-50	15-30
	35-60	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
615C2, 615E2-- Vanmeter	0-14	Silty clay loam.	ML, MH	A-7	0	0-5	95-100	75-100	70-100	65-100	40-55	11-25
	14-27	Silty clay, clay.	CH, CL	A-7	0	0-5	95-100	75-100	70-100	65-100	40-65	24-40
	27-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
620A---------- Darmstadt	0-9	Silt loam-----	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	95-100	95-100	75-100	25-45	5-20
	9-16	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	16-35	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	35-60	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	0	95-100	95-100	90-100	75-100	20-50	7-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
3070---------- Beaucoup	0-12	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	12-60	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-30
3284---------- Tice	0-15	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	15-60	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	15-30
3288---------- Petrolia	0-9	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	90-100	80-100	30-45	10-20
	9-60	Silty clay loam, silty clay.	CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-45	15-25
3331---------- Haymond	0-7	Silt loam-----	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	4-10
	7-41	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	20-32	4-13
	41-60	Fine sandy loam, silt loam, loam.	SM, ML, CL, SC	A-4, A-6	0	0	95-100	90-100	80-100	35-90	15-35	NP-15
3333---------- Wakeland	0-12	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
	12-60	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
3334---------- Birds	0-6	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
	6-60	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
3404---------- Titus	0-10	Silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
	10-60	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-55	20-30
3424---------- Shoals	0-11	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	65-90	20-35	6-15
	11-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4	0	0-3	90-100	85-100	60-80	50-70	<30	3-10
3597---------- Armiesburg	0-14	Silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	35-55	20-35
	14-60	Silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	35-55	20-35
3665---------- Stonelick	0-14	Loam----------	ML, CL, SM, CL-ML	A-4	0	0	85-100	75-100	60-95	45-90	20-32	2-10
	14-60	Stratified loam to loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1-b	0	0	85-100	75-100	40-60	5-40	<15	NP

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2----------	0-7	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.8	Low----------	0.37	3	6	1-3
Cisne	7-17	15-27	1.25-1.45	0.06-0.6	0.18-0.20	4.5-6.0	Low----------	0.37			
	17-38	35-45	1.40-1.60	<0.06	0.09-0.15	4.5-6.0	High---------	0.37			
	38-60	25-37	1.50-1.70	<0.06	0.08-0.14	5.1-6.5	Moderate-----	0.37			
3A, 3B----------	0-6	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.8	Low----------	0.32	3	6	1-3
Hoyleton	6-10	15-27	1.35-1.60	0.2-0.6	0.16-0.18	4.5-6.5	Low----------	0.43			
	10-37	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High---------	0.43			
	37-60	15-33	1.35-1.70	0.06-0.2	0.17-0.22	5.1-7.3	Moderate-----	0.43			
6B2----------	0-5	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	4	6	1-3
Fishhook	5-31	27-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	31-60	35-45	1.55-1.75	0.06-0.2	0.09-0.16	4.5-7.8	High---------	0.37			
7C2----------	0-4	20-27	1.30-1.50	0.2-0.6	0.20-0.25	4.5-7.3	Moderate-----	0.43	3	6	1-3
Atlas	4-23	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High---------	0.32			
	23-60	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High---------	0.32			
7C3----------	0-2	30-40	1.35-1.55	0.06-0.2	0.14-0.19	4.5-7.3	High---------	0.43	2	7	.5-1
Atlas	2-24	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High---------	0.32			
	24-60	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High---------	0.32			
7D2----------	0-7	20-27	1.30-1.50	0.2-0.6	0.20-0.25	4.5-7.3	Moderate-----	0.43	3	6	1-3
Atlas	7-29	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High---------	0.32			
	29-44	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High---------	0.32			
	44-60	20-30	1.35-1.60	0.06-0.2	0.07-0.18	6.1-7.8	Moderate-----	0.32			
8D2, 8E2---------	0-10	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
Hickory	10-45	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.28			
	45-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.28			
8F----------	0-10	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
Hickory	10-53	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate-----	0.28			
	53-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.28			
12----------	0-9	15-25	1.25-1.45	0.6-2.0	0.22-0.24	4.5-7.8	Low----------	0.43	3	6	.5-2
Wynoose	9-22	12-18	1.30-1.50	0.06-0.2	0.18-0.20	3.6-7.3	Low----------	0.43			
	22-45	35-42	1.40-1.60	<0.06	0.09-0.13	3.6-6.0	High---------	0.43			
	45-60	25-37	1.50-1.70	0.06-0.2	0.11-0.15	3.6-6.0	Moderate-----	0.43			
13A----------	0-7	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	1-3
Bluford	7-20	15-25	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low----------	0.43			
	20-35	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate-----	0.43			
	35-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate-----	0.43			
13B2----------	0-6	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	1-3
Bluford	6-43	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate-----	0.43			
	43-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate-----	0.43			
14B----------	0-11	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.43	4	6	.5-2
Ava	11-24	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	24-33	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	33-50	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low----------	0.43			
	50-60	20-30	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low----------	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
14C2	0-10	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.43	4	6	.5-2
Ava	10-28	22-33	1.40-1.60	0.2-0.6	0.18-0.21	4.5-5.5	Moderate	0.43			
	28-44	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low	0.43			
	44-60	20-30	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low	0.43			
19D3	0-7	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate	0.37	4	7	<1
Sylvan	7-22	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.37			
	22-60	10-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low	0.37			
50	0-15	27-30	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.8	Moderate	0.28	5	7	4-6
Virden	15-46	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High	0.28			
	46-60	25-33	1.25-1.55	0.2-0.6	0.18-0.22	6.1-8.4	Moderate	0.28			
112	0-9	17-27	1.30-1.50	0.6-2.0	0.22-0.25	5.6-7.3	Low	0.37	3	6	2-3
Cowden	9-15	17-27	1.25-1.45	0.06-0.2	0.18-0.20	4.5-6.0	Low	0.37			
	15-60	35-42	1.35-1.60	0.06-0.2	0.12-0.20	4.5-7.3	High	0.37			
113A	0-8	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate	0.32	3	6	2-3
Oconee	8-13	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate	0.43			
	13-31	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High	0.43			
	31-53	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-6.5	Moderate	0.43			
	53-60	17-27	1.40-1.60	0.06-0.2	0.20-0.22	5.6-8.4	Moderate	0.43			
119C2	0-7	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	5	6	1-3
Elco	7-37	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.8	Moderate	0.37			
	37-60	23-35	1.40-1.60	0.2-0.6	0.16-0.20	5.1-7.8	Moderate	0.37			
119D2	0-7	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	5	6	1-3
Elco	7-28	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.8	Moderate	0.37			
	28-60	23-35	1.40-1.60	0.2-0.6	0.16-0.20	5.1-7.8	Moderate	0.37			
131A	0-8	10-15	1.45-1.65	2.0-6.0	0.14-0.17	4.5-7.3	Low	0.24	5	3	.5-1
Alvin	8-28	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low	0.24			
	28-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low	0.24			
131B	0-13	5-10	1.45-1.65	6.0-20	0.09-0.12	4.5-7.3	Low	0.17	5	2	.5-1
Alvin	13-41	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low	0.24			
	41-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low	0.24			
131C2	0-10	10-15	1.45-1.65	2.0-6.0	0.14-0.17	4.5-7.3	Low	0.24	5	3	.5-1
Alvin	10-30	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low	0.24			
	30-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low	0.24			
131D2	0-10	5-10	1.45-1.65	6.0-20	0.09-0.12	4.5-7.3	Low	0.17	5	2	.5-1
Alvin	10-24	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low	0.24			
	24-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low	0.24			
131E	0-14	5-10	1.45-1.65	6.0-20	0.09-0.12	4.5-7.3	Low	0.17	5	2	.5-1
Alvin	14-47	15-18	1.40-1.65	2.0-6.0	0.14-0.18	4.5-7.3	Low	0.24			
	47-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low	0.24			
134A, 134B	0-12	14-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low	0.37	5	6	1-2
Camden	12-37	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate	0.37			
	37-54	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low	0.32			
	54-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low	0.32			
134C2	0-9	14-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low	0.37	5	6	1-2
Camden	9-28	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate	0.37			
	28-60	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low	0.32			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
138	0-14	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.1-7.3	High	0.28	5	7	4-6
Shiloh	14-44	35-45	1.35-1.55	0.2-0.6	0.09-0.18	6.1-7.8	High	0.28			
	44-60	25-45	1.30-1.50	0.2-0.6	0.18-0.20	6.1-8.4	High	0.28			
142	0-12	27-35	1.15-1.35	0.6-2.0	0.21-0.23	6.6-7.3	Moderate	0.28	5	7	3-5
Patton	12-31	27-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-7.8	Moderate	0.43			
	31-60	22-35	1.30-1.50	0.2-0.6	0.18-0.22	7.4-8.4	Moderate	0.43			
155A	0-12	8-18	1.40-1.60	2.0-6.0	0.13-0.18	5.6-7.3	Low	0.28	4	5	1-3
Stockland	12-36	10-22	1.60-1.70	2.0-6.0	0.12-0.15	5.6-7.3	Low	0.15			
	36-60	2-8	1.80-2.00	6.0-20	0.02-0.10	6.6-8.4	Low	0.15			
155B	0-10	8-18	1.40-1.60	2.0-6.0	0.13-0.18	5.6-7.3	Low	0.20	4	3	1-3
Stockland	10-31	10-22	1.60-1.70	2.0-6.0	0.12-0.15	5.6-7.3	Low	0.15			
	31-60	2-8	1.80-2.00	6.0-20	0.02-0.10	6.6-8.4	Low	0.15			
155C	0-12	8-18	1.40-1.60	2.0-6.0	0.13-0.18	5.6-7.3	Low	0.28	4	5	1-3
Stockland	12-36	10-22	1.60-1.70	2.0-6.0	0.12-0.15	5.6-7.3	Low	0.15			
	36-60	2-8	1.80-2.00	6.0-20	0.02-0.10	6.6-8.4	Low	0.15			
164A, 164B	0-16	20-27	1.20-1.40	0.2-0.6	0.22-0.24	4.5-6.5	Low	0.43	5	6	1-2
Stoy	16-35	27-35	1.35-1.55	0.06-0.2	0.18-0.20	4.5-5.5	Moderate	0.43			
	35-47	27-35	1.55-1.75	0.06-0.2	0.09-0.12	4.5-5.5	Moderate	0.43			
	47-60	20-27	1.55-1.75	0.06-0.2	0.10-0.15	4.5-6.0	Low	0.43			
165	0-9	12-27	1.30-1.50	0.2-0.6	0.22-0.24	4.5-7.3	Low	0.43	3	6	1-3
Weir	9-16	12-20	1.40-1.55	0.06-0.2	0.17-0.20	4.5-7.3	Low	0.43			
	16-50	35-40	1.40-1.60	<0.06	0.18-0.20	4.5-5.5	High	0.43			
	50-60	20-27	1.45-1.65	0.06-0.2	0.20-0.22	4.5-6.5	Low	0.43			
173B	0-6	22-27	1.35-1.50	0.6-2.0	0.22-0.24	6.1-7.3	Low	0.43	3	6	1-4
McGary	6-26	35-50	1.60-1.70	0.06-0.2	0.11-0.13	5.6-7.8	High	0.32			
	26-60	35-50	1.55-1.65	0.06-0.2	0.14-0.16	7.9-8.4	High	0.32			
178	0-16	15-20	1.40-1.60	0.6-2.0	0.16-0.18	4.5-7.3	Low	0.24	5	3	.5-2
Ruark	16-34	20-35	1.40-1.60	0.2-0.6	0.15-0.19	4.5-6.0	Low	0.24			
	34-60	10-20	1.45-1.65	0.6-2.0	0.11-0.16	5.6-7.8	Low	0.24			
184A	0-9	5-15	1.20-1.40	0.6-2.0	0.12-0.15	4.5-6.5	Low	0.20	5	3	1-2
Roby	9-15	3-15	1.25-1.55	0.6-2.0	0.09-0.20	4.5-6.0	Low	0.28			
	15-23	10-18	1.40-1.70	0.6-2.0	0.12-0.19	5.6-7.8	Low	0.28			
	23-60	3-15	1.50-1.85	2.0-6.0	0.04-0.17	5.6-7.8	Low	0.10			
214B	0-10	10-17	1.20-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low	0.43	4	5	1-2
Hosmer	10-24	24-30	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Moderate	0.43			
	24-60	16-26	1.60-1.70	<0.06	0.06-0.08	4.5-6.0	Low	0.43			
214C2	0-6	10-17	1.20-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low	0.43	4	5	1-2
Hosmer	6-24	24-30	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Moderate	0.43			
	24-60	16-26	1.60-1.70	<0.06	0.06-0.08	4.5-6.0	Low	0.43			
218	0-8	20-27	1.25-1.50	0.2-0.6	0.22-0.24	5.6-7.3	Low	0.37	5	6	2-3
Newberry	8-18	18-25	1.30-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Low	0.37			
	18-44	27-35	1.30-1.55	0.06-0.2	0.18-0.20	4.5-6.0	Moderate	0.37			
	44-60	22-33	1.50-1.70	0.06-0.2	0.14-0.20	4.5-7.3	Moderate	0.37			
286A	0-27	10-20	1.45-1.60	2.0-6.0	0.14-0.15	5.1-7.8	Low	0.20	4	3	2-3
Carmi	27-36	15-22	1.45-1.65	2.0-6.0	0.09-0.12	4.5-6.0	Low	0.20			
	36-60	5-15	1.50-1.70	6.0-20	0.04-0.06	5.1-7.8	Low	0.15			
286B	0-15	10-20	1.40-1.55	0.6-2.0	0.15-0.18	5.1-7.8	Low	0.28	4	5	2-3
Carmi	15-30	15-22	1.45-1.65	2.0-6.0	0.09-0.12	4.5-6.0	Low	0.20			
	30-60	5-15	1.50-1.70	6.0-20	0.04-0.06	5.1-7.8	Low	0.15			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
300----------	0-11	27-29	1.45-1.55	0.6-2.0	0.17-0.23	6.1-7.3	Moderate-----	0.28	5	7	2-6
Westland	11-30	20-35	1.40-1.65	0.6-2.0	0.15-0.20	6.1-7.3	Moderate-----	0.28			
	30-48	5-30	1.55-1.70	0.6-2.0	0.04-0.13	6.6-7.8	Low----------	0.28			
	48-60	1-10	1.65-1.95	>20	0.01-0.04	7.4-8.4	Low----------	0.10			
308B, 308C2, 308D2, 308E-----	0-7	12-26	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	5	.5-2
Alford	7-60	22-32	1.35-1.50	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
453A----------	0-19	15-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	5	6	.5-2
Muren	19-55	22-30	1.35-1.50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	55-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.37			
453B2----------	0-8	15-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	5	6	.5-2
Muren	8-35	22-30	1.35-1.50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	35-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.37			
454A----------	0-16	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.43	5	6	1-3
Iva	16-35	22-30	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	35-60	10-20	1.35-1.55	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.43			
615C2, 615E2-----	0-14	27-35	1.30-1.40	0.2-0.6	0.14-0.16	6.1-8.4	Moderate-----	0.43	2	4L	1-2
Vanmeter	14-27	40-60	1.50-1.60	<0.06	0.12-0.14	6.1-8.4	High---------	0.32			
	27-60	---	---	<0.06	---	---	----------	----			
620A----------	0-9	10-27	1.30-1.50	0.06-0.2	0.22-0.24	5.1-7.3	Low----------	0.43	3	6	.5-2
Darmstadt	9-16	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	16-35	27-35	1.40-1.65	<0.06	0.09-0.10	6.6-9.0	Moderate-----	0.43			
	35-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low----------	0.43			
3070----------	0-12	27-35	1.15-1.35	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	12-60	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
3284----------	0-15	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
Tice	15-60	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
3288----------	0-9	27-35	1.20-1.40	0.2-0.6	0.21-0.23	5.6-8.4	Moderate-----	0.32	5	7	2-3
Petrolia	9-60	27-35	1.35-1.45	0.2-0.6	0.18-0.20	6.1-7.3	Moderate-----	0.32			
3331----------	0-7	10-20	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
Haymond	7-41	10-22	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	41-60	5-26	1.30-1.50	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.37			
3333----------	0-12	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Wakeland	12-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
3334----------	0-6	15-25	1.30-1.50	0.2-0.6	0.21-0.25	5.6-7.8	Low----------	0.43	5	6	1-3
Birds	6-60	18-27	1.40-1.60	0.2-0.6	0.20-0.22	5.1-7.8	Low----------	0.43			
3404----------	0-10	35-40	1.30-1.50	0.06-0.2	0.18-0.22	6.1-7.3	High---------	0.32	5	4	2-4
Titus	10-60	35-45	1.30-1.60	0.06-0.2	0.11-0.22	6.1-7.8	High---------	0.32			
3424----------	0-11	18-27	1.30-1.50	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.37	5	6	2-5
Shoals	11-60	12-25	1.35-1.60	0.6-2.0	0.12-0.21	6.1-8.4	Low----------	0.37			
3597----------	0-14	27-35	1.30-1.45	0.6-2.0	0.21-0.23	6.1-7.3	Moderate-----	0.28	5	7	2-4
Armiesburg	14-60	30-35	1.30-1.45	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.28			
3665----------	0-14	10-22	1.20-1.45	0.6-2.0	0.15-0.20	7.4-8.4	Low----------	0.32	5	5	1-3
Stonelick	14-60	5-18	1.30-1.55	2.0-6.0	0.08-0.14	7.4-8.4	Low----------	0.24			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
2---------- Cisne	D	None	---	---	0-2.0	Perched	Feb-Jun	>60	---	High	High	Moderate.
3A, 3B---------- Hoyleton	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High	High.
6B2---------- Fishhook	D	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High	High	High.
7C2, 7C3, 7D2----- Atlas	D	None	---	---	1.0-2.0	Perched	Apr-Jun	>60	---	High	High	Moderate.
8D2, 8E2, 8F------ Hickory	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
12---------- Wynoose	D	None	---	---	0-2.0	Perched	Mar-Jun	>60	---	High	High	High.
13A, 13B2--------- Bluford	C	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High	High	High.
14B, 14C2--------- Ava	C	None	---	---	1.5-3.5	Perched	Mar-Jun	>60	---	High	Moderate	High.
19D3---------- Sylvan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
50---------- Virden	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
112---------- Cowden	D	None	---	---	0-2.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
113A---------- Oconee	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High	High.
119C2, 119D2------ Elco	B	None	---	---	2.5-4.5	Perched	Mar-May	>60	---	High	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
131A, 131B, 131C2, 131D2, 131E---Alvin	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
134A, 134B, 134C2-Camden	B	None	---	---	>6.0	---	---	>60	---	High	Low	Moderate.
138---Shiloh	B/D	None	---	---	+1-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
142---Patton	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
155A, 155B, 155C--Stockland	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
164A, 164B---Stoy	C	None	---	---	1.0-3.0	Perched	Feb-Apr	>60	---	High	High	High.
165---Weir	D	None	---	---	+.5-2.0	Perched	Feb-Jun	>60	---	High	High	High.
173B---McGary	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	Moderate	High	Low.
178---Ruark	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jul	>60	---	High	High	High.
184A---Roby	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	Moderate	High.
214B, 214C2---Hosmer	C	None	---	---	1.5-3.0	Perched	Mar-Apr	>60	---	High	Moderate	High.
218---Newberry	C	None	---	---	0-2.0	Apparent	Mar-Jun	>60	---	High	High	High.
286A, 286B---Carmi	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
300---Westland	B/D	None	---	---	+.5-1.0	Apparent	Dec-May	>60	---	High	High	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Potential frost action	Uncoated steel	Concrete
					Ft			In				
308B, 308C2, 308D2, 308E---- Alford	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	High.
453A, 453B2---- Muren	B	None	---	---	2.0-6.0	Apparent	Mar-Apr	>60	---	High	High	Moderate.
454A---- Iva	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	High	Moderate.
615C2, 615E2---- Vanmeter	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	Low.
620A---- Darmstadt	D	None	---	---	1.0-3.0	Perched	Feb-May	>60	---	High	High	High.
3070---- Beaucoup	B/D	Frequent	Long	Mar-Jun	+.5-1.0	Apparent	Mar-Jun	>60	---	High	High	Low.
3284---- Tice	B	Frequent	Long	Jan-Jun	1.5-3.0	Apparent	Mar-Jun	>60	---	High	High	Low.
3288---- Petrolia	C/D	Frequent	Long	Mar-Jun	+.5-3.0	Apparent	Apr-Jun	>60	---	High	High	Low.
3331---- Haymond	B	Frequent	Brief	Jan-May	>6.0	---	---	>60	---	High	Low	Low.
3333---- Wakeland	C	Frequent	Brief	Jan-May	1.0-3.0	Apparent	Jan-Apr	>60	---	High	High	Low.
3334---- Birds	C/D	Frequent	Brief	Mar-Jun	+.5-1.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
3404---- Titus	B/D	Frequent	Long	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
3424---- Shoals	C	Frequent	Brief	Oct-Jun	0.5-1.5	Apparent	Jan-Apr	>60	---	High	High	Low.
3597---- Armiesburg	B	Frequent	Brief	Oct-Jun	>6.0	---	---	>60	---	High	Moderate	Low.
3665---- Stonelick	B	Frequent	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low	Low.

TABLE 18.--ENGINEERING INDEX TEST DATA

(Absence of an entry means that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ cu ft	Pct					Pct			
Alvin	86IL-033-51-1	Ap	0-10	124.4	10.2	99.5	99.3	90.3	30.8	16.3	1.5	A-2-4	SM
	51-2	Bt1	10-20	119.2	12.6	100.0	100.0	92.2	34.3	24.1	11.2	A-2-6	SC
	51-6	C	50-60	110.5	13.1	100.0	100.0	93.5	7.5	---	NP	A-3(0)	SP-SM
Iva	87IL-033-6-1	Ap	0-9	106.6	16.5	100.0	98.6	92.5	77.9	26.9	3.4	A-4(2)	ML
	6-3	Bt1	16-25	105.2	19.5	99.9	99.5	97.3	89.6	38.5	18.9	A-6(17)	CL
	6-7	2C	59-68	120.7	12.5	99.8	99.3	43.3	72.7	27.2	10.8	A-6(6)	CL
Muren	86IL-033-42-1	Ap	0-8	105.1	18.0	100.0	99.8	96.0	91.5	30.3	4.0	A-4(4)	ML
	42-4	Bt3	23-30	103.8	20.0	100.0	99.8	98.7	95.9	38.9	16.7	A-6(17)	CL
	42-6	Cg	35-60	112.0	15.7	100.0	100.0	99.4	93.9	29.4	9.2	A-4(8)	CL
Ruark	86IL-033-48-1	Ap	0-8	120.0	10.5	100.0	99.3	92.6	46.5	18.0	2.5	A-4(0)	SM
	48-4	Btg2	21-34	111.6	16.0	100.0	100.0	95.8	58.0	32.8	19.3	A-6(8)	CL
	48-5	Cg	34-60	122.3	11.7	100.0	99.5	94.5	36.5	22.3	8.6	A-4(0)	SC
Westland	86IL-033-46-1	Ap	0-10	120.9	11.3	96.8	94.3	84.4	56.9	20.6	4.5	A-4(0)	CL-ML
	46-4	Bt3	26-38	121.5	11.5	79.5	71.1	58.9	38.5	34.4	18.0	A-6(2)	CL
	46-6	2C1	44-52	120.8	11.0	94.5	88.5	74.1	14.1	---	NP	A-2-4	SP-SM

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alford	Fine-silty, mixed, mesic Typic Hapludalfs
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Armiesburg	Fine-silty, mixed, mesic Fluventic Hapludolls
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Ava	Fine-silty, mixed, mesic Typic Fragiudalfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Bluford	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Carmi	Coarse-loamy, mixed, mesic Typic Hapludolls
Cisne	Fine, montmorillonitic, mesic Mollic Albaqualfs
Cowden	Fine, montmorillonitic, mesic Mollic Albaqualfs
Darmstadt	Fine-silty, mixed, mesic Albic Natraqualfs
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
Fishhook	Fine-silty, mixed, mesic Aquic Hapludalfs
Haymond	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Hosmer	Fine-silty, mixed, mesic Typic Fragiudalfs
Hoyleton	Fine, montmorillonitic, mesic Aquollic Hapludalfs
Iva	Fine-silty, mixed, mesic Aeric Ochraqualfs
McGary	Fine, mixed, mesic Aeric Ochraqualfs
*Muren	Fine-silty, mixed, mesic Aquic Hapludalfs
Newberry	Fine-silty, mixed, mesic Mollic Ochraqualfs
Oconee	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Patton	Fine-silty, mixed, mesic Typic Haplaquolls
Petrolia	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Roby	Coarse-loamy, mixed, mesic Aquic Hapludalfs
Ruark	Fine-loamy, mixed, mesic Typic Ochraqualfs
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Shoals	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Stockland	Loamy-skeletal, mixed, mesic Typic Hapludolls
Stonelick	Coarse-loamy, mixed (calcareous), mesic Typic Udifluvents
Stoy	Fine-silty, mixed, mesic Aquic Hapludalfs
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Titus	Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls
Vanmeter	Fine, illitic, mesic Typic Eutrochrepts
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Weir	Fine, montmorillonitic, mesic Typic Ochraqualfs
Westland	Fine-loamy, mixed, mesic Typic Argiaquolls
Wynoose	Fine, montmorillonitic, mesic Typic Albaqualfs

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