



United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Cumberland County, Illinois



How to Use This Soil Survey

General Soil Map

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

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

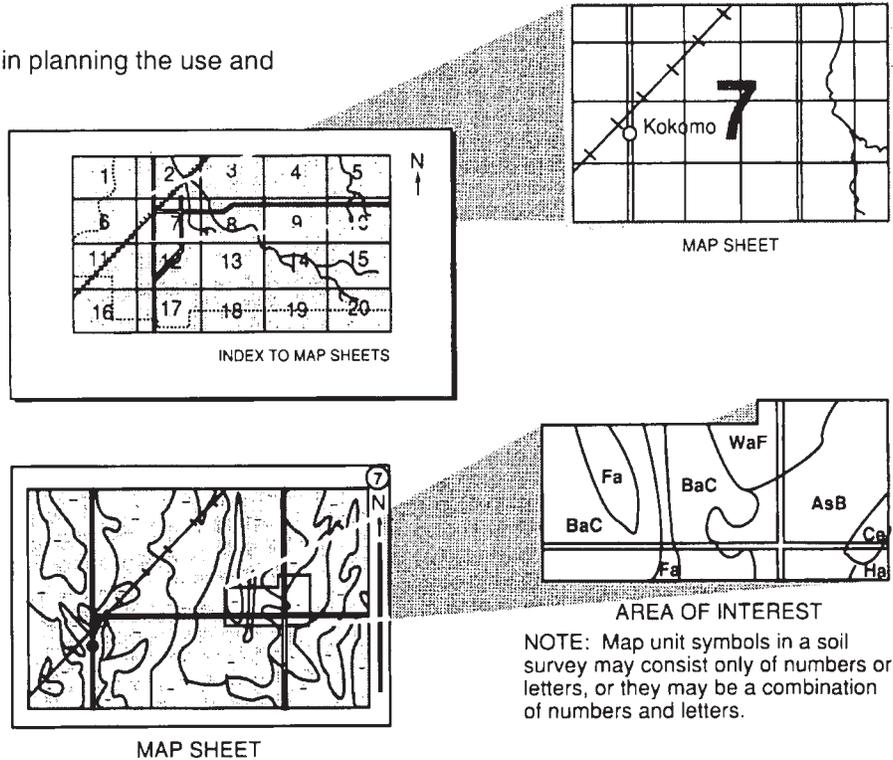
Detailed Soil Maps

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

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

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

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



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

Major fieldwork for this soil survey was completed in June 1992. Soil names and descriptions were approved in September 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. 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 Cumberland County Soil and Water Conservation District. The cost was shared by the Cumberland County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale. This soil survey is Illinois Agricultural Experiment Station Soil Report 165.

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Cover: The Embarras River is the main watercourse in Cumberland County.

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

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Foreword

This soil survey contains information that can be used in land-planning programs in Cumberland 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 moderately deep to bedrock. 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.

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Soil Survey of Cumberland County, Illinois

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

CUMBERLAND COUNTY is in the east-central part of Illinois (fig. 1). It has a total area of 221,292 acres, or about 346 square miles. In 1980, the county had a population of 10,062 and Toledo, the county seat, had a population of 1,284 (State of Illinois, 1985).

Cumberland County is bordered on the north by Coles County, on the west by Shelby and Effingham Counties, on the east by Clark County, and on the south by Jasper and Effingham Counties. The soils in the uplands are nearly level to very steep and formed mainly in silty windblown material, called loess. The soils on flood plains adjacent to rivers and streams are level or nearly level and formed in alluvium.

Elevations in the county range from about 699 feet above sea level in an area on the county line directly east of Janesville to about 502 feet above sea level in an area where the Embarras River crosses the county line into Jasper County.

Agriculture is the main industry in the county. The major cultivated crops are corn, soybeans, and winter wheat. Dairy farming is important, mostly in the southwestern part of the county (fig. 2). Approximately 6 percent of the county is wooded.

This survey updates the soil survey of Cumberland County published in 1940 (Smith and others, 1940). It provides additional information and has larger maps that show the soils in greater detail.

General Nature of the County

This section provides general information about the county. It describes history, towns and transportation facilities, farming, natural resources, and climate.

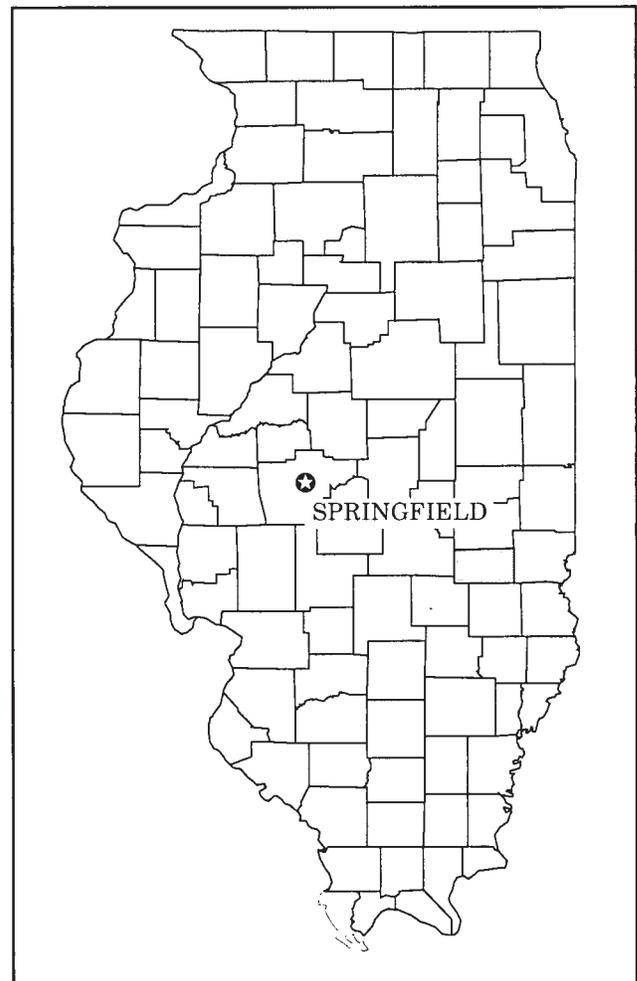


Figure 1.—Location of Cumberland County in Illinois.



Figure 2.—A dairy farm in the southwestern part of Cumberland County.

History

The region now known as Cumberland County was first included in Crawford County, which was organized in 1816. Subsequently, the Cumberland region was included Clark County, which was organized in 1819, and then was included in Coles County, which was organized 1831. On March 2, 1843, Coles County was divided and the new county of Cumberland with its present boundaries was established (Anonymous, 1884).

The name of the county name came from the original name of U.S. Highway 40, i.e., "The Cumberland Road." This very important thoroughfare extended west from Cumberland, Maryland, through Wheeling, West Virginia, and Columbus, Ohio, and eventually terminated at Vandalia, Illinois. It was constructed through Cumberland County in 1835.

The first county seat was located in Greenup, in the east-central part of the county. In 1855, the county government was moved to Prairie City, now the village of Toledo, which is located in the geographical center of the county. The first courthouse was built in 1856. It was destroyed by fire in 1885 and was replaced by the present brick structure in 1887.

Towns and Transportation Facilities

Neoga, the largest village in the county, is in the northwest part of the county, along U.S. Highway 45. Interstate Highway 57, running north and south, bypasses Neoga directly to the east. It has facilities of the Norfolk and Western and the Illinois Central (Gulf) Railroads.

Greenup is located at the intersection of U.S. Highway 40 and Illinois Highway 130 and at the south terminus of Illinois Highway 121. Interstate Highway 70 and its interchange with Illinois Highway 130 are on the north side of town. Greenup has facilities of the Consolidated Railroad.

Toledo is along Illinois Highway 121. A number of smaller communities that declined after they were no longer needed as distribution centers are in scattered areas throughout the county.

Farming

Hay and broomcorn were grown extensively in the county until the late 1970's. At one time, Neoga was known as the "Hay Capitol of the World" and Greenup was considered one of the largest broomcorn centers

in the country (Illinois Agricultural Extension Service, 1974). Corn and soybeans have historically been the main crops in the county. They accounted for 88 percent of the county's farm production in 1987. Winter wheat, hay, popcorn, broomcorn, canola, and buckwheat are also grown. A few orchards raise apples and peaches, and there is some commercial pumpkin production.

Livestock production is important to the economy of the county. The county has about 46,000 hogs and more than 9,500 cattle. About 5,377 acres is used for pasture (United States Department of Commerce, 1989).

Natural Resources

Soil is the chief natural resource in Cumberland County. An estimated 800 farms make up about 82 percent of the total acreage in the county. Corn and soybeans are the major crops; they are grown on approximately 40 and 45 percent of the cropland, respectively. Wheat, a secondary crop, is grown on about 12 percent of the acreage of cropland. Other farm products include milk, cattle, hogs, hay, popcorn, orchard fruit, and timber. Many of the soils used as cropland are nearly level or gently sloping. They are steeper adjacent to drainageways and in the moraine

outwash region along the northern edge of the county. Cropland yields in the county are generally near the average for Illinois.

Woodland makes up about 15,000 acres in the county. Much of this acreage is unimproved land along drainageways. The woodland provides some suitable wildlife habitat. Pastured areas make up about 3,000 acres of the county, much of which is used for cattle and horses. The county has more than 700 acres of ponds and lakes and about 180 miles of streams.

Subsurface natural resources include water, sand and gravel, oil, and coal. Wells dug or drilled into aquifers provide water for most of the farms and municipalities in the county. Sand and gravel are being mined in several areas. The coal reserves, estimated at 4 billion tons, have not been mined. Some crude oil is being produced along the southern edge and eastern part of the county (fig. 3).

Climate

The Illinois State Water Survey in Champaign, Illinois, helped prepare this section.

Table 1 gives data on temperature and precipitation for the county as recorded at Charleston, Illinois, in the period 1961 to 1990. Table 2 shows probable dates



Figure 3.—An oil well in an area of the Bluford-Wynoose-Darmstadt association.

of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 29.6 degrees F and the average daily minimum temperature is 21.4 degrees. The lowest temperature on record is -22 degrees. In summer, the average temperature is 74.4 degrees and the average daily maximum temperature is 84.7 degrees. The highest recorded temperature is 103 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 40.04 inches. Of this, 22.62 inches, or 56 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 11.29 inches.

The average seasonal snowfall is about 22 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 and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By

observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

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

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

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

For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table

within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

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

General Soil Map Units

The general soil map in 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.

The names of the soils identified on the general soil map of this county do not fully agree with those of the soils identified on the general soil map in the published soil surveys of adjacent counties. Differences result from variations in the extent of the major soils in the associations. They do not necessarily affect broad land use planning because the soils having different names are similar in terms of use and behavior.

Soil Descriptions

1. Wynoose-Bluford Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained, silty soils that formed in loess and loamy sediments; on uplands

This association consists of soils on broad Illinoian till plains throughout the county. The Wynoose soils are on broad flats. The Bluford soils are on broad interfluves, low swells, head slopes, shoulders, and side slopes along drainageways. Both of the soils formed under forest vegetation. Slopes generally range from 0 to 5 percent.

This association makes up about 29 percent of the county. It is about 68 percent Wynoose and similar

soils, 29 percent Bluford and similar soils, and 3 percent minor soils (fig. 4).

The Wynoose soils are poorly drained, are nearly level, and have a very slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is light gray, mottled, firm silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part of the subsoil is light brownish gray, firm and very firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is light gray, firm clay loam.

The Bluford soils are somewhat poorly drained, are nearly level and gently sloping, and have a slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is firm and mottled. In sequence downward, it is brown and grayish brown silty clay loam; light yellowish brown, slightly brittle silt loam; light brownish gray, brown, strong brown, gray, and yellowish brown, slightly brittle silty clay loam and silt loam; and yellowish brown, light brownish gray, and dark yellowish brown, slightly brittle loam.

Of minor extent in this association are Coulterville, Darmstadt, Huey, and Virden soils. Coulterville, Darmstadt, and Huey soils have a concentration of sodium in the subsoil. The somewhat poorly drained Coulterville soils are on head slopes and on side slopes along drainageways. The somewhat poorly drained Darmstadt soils are on swells. They are closely intermingled with areas of the Bluford soils. The poorly drained Huey soils are closely intermingled with areas of the Wynoose soils. The poorly drained Virden soils are in shallow, closed depressions. They have a thick dark surface layer.

Most areas of this association are used for cultivated crops. A few are used for pasture and hay. The Wynoose soils are moderately suited and the Bluford soils well suited to the crops commonly grown in the county. This association is well suited to pasture and hay. Wetness and erosion are management concerns.

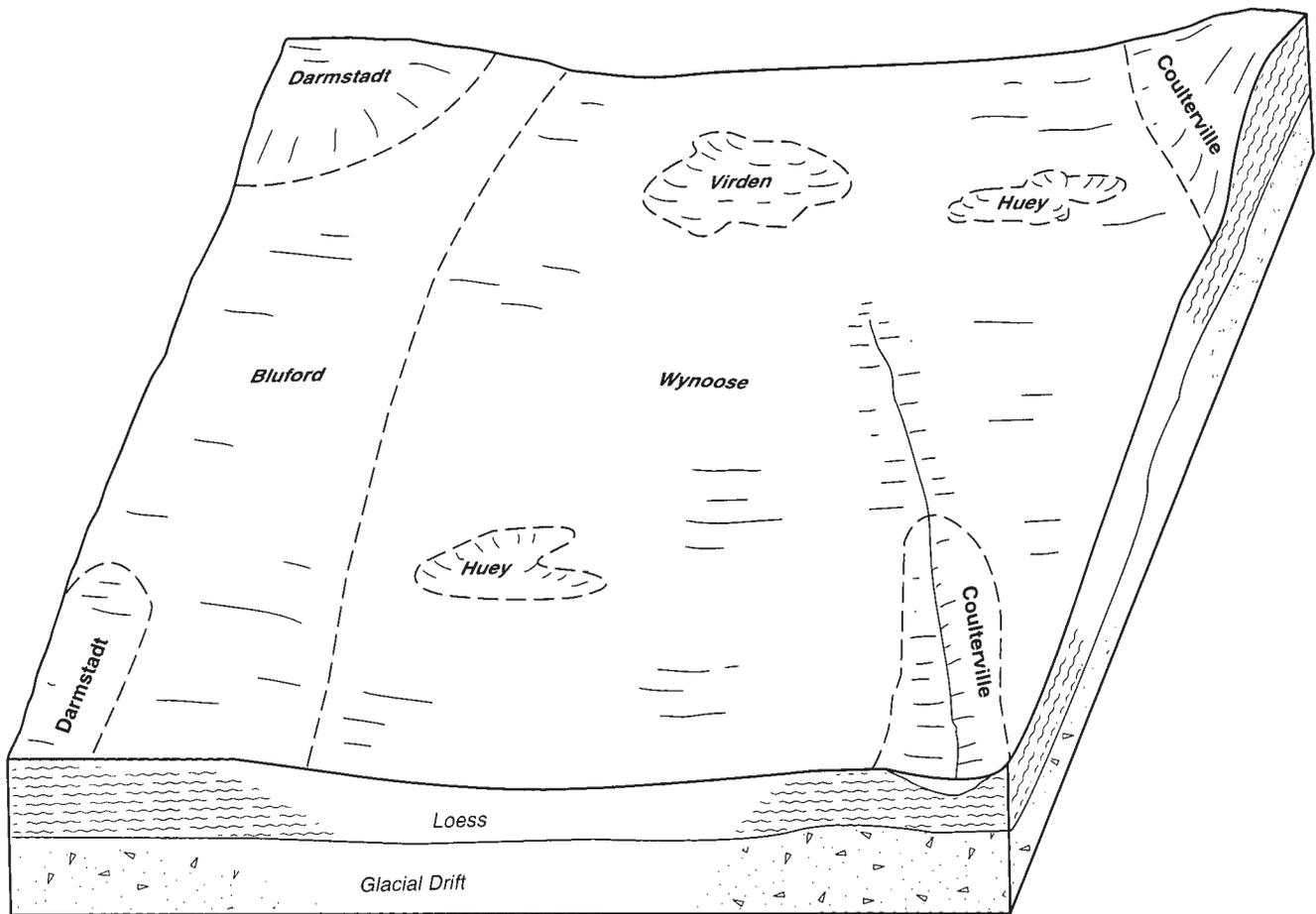


Figure 4.—Typical pattern of soils and parent material in the Wynoose-Bluford association.

This association generally is poorly suited to the development of sites for dwellings and septic tank absorption fields. The seasonal high water table, the very slow or slow permeability, and the shrink-swell potential are limitations affecting these uses.

2. Hickory-Bluford-Ava Association

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

This association consists of soils on side slopes, convex ridgetops, and the outer edges of broad flats on Illinoian till plains that are deeply incised by drainageways. It is throughout the county. The Hickory soils are on nose slopes and side slopes along major drainageways and streams. The Bluford soils are on broad interfluves, low swells, head slopes, the shoulders of ridges, and side slopes along drainageways. The Ava soils are on convex, narrow ridges, shoulders, nose slopes, and side slopes along

drainageways. All of the soils formed under forest vegetation. Slopes generally range from 0 to 60 percent.

This association makes up about 26 percent of the county. It is about 36 percent Hickory and similar soils, 34 percent Bluford and similar soils, 25 percent Ava and similar soils, and 5 percent minor soils (fig. 5).

The Hickory soils are well drained, are strongly sloping to very steep, and have a moderately permeable subsoil. Typically, the surface layer is dark brown, very friable loam about 2 inches thick. The subsurface layer is brown, very friable loam about 3 inches thick. The subsoil is about 40 inches thick. It is yellowish brown. The upper 5 inches of the subsoil is friable loam, and the lower 35 inches is firm clay loam. The substratum to a depth of 60 inches is yellowish brown, firm sandy loam.

The Bluford soils are somewhat poorly drained, are nearly level and gently sloping, and have a slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The

subsurface layer is brown, mottled, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is firm and mottled. In sequence downward, it is brown and grayish brown silty clay loam; light yellowish brown, slightly brittle silt loam; light brownish gray, brown, strong brown, gray, and yellowish brown, slightly brittle silty clay loam and silt loam; and yellowish brown, light brownish gray, and dark yellowish brown, slightly brittle loam.

The Ava soils are moderately well drained, are gently sloping and moderately sloping, and have a very slowly permeable subsoil. Typically, the surface layer is brown, very friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. In sequence downward, it is yellowish brown, friable silt loam; yellowish brown, mottled, friable silty clay loam; strong brown, mottled, firm silty clay loam; and strong brown, brown, and dark yellowish brown, mottled, firm, slightly brittle silty clay loam and loam.

Of minor extent in this association are Holton, Marseilles, Orion, Thebes, and Wirt soils. The somewhat poorly drained Holton and Orion soils and the well drained Wirt soils formed in alluvium on

narrow, flat flood plains along drainageways. The moderately well drained Marseilles soils are on the lower third of side slopes along drainageways. They formed in thin loamy overburden and in shale residuum. Shale commonly crops out on the streambanks. The well drained Thebes soils are on narrow interfluves and side slopes along major streams.

The nearly level and gently sloping areas on ridgetops and the gently sloping and moderately sloping areas on side slopes generally have been cleared of trees and are used for cultivated crops or pasture. The steeper areas on side slopes are used mainly as woodland.

The nearly level to strongly sloping areas are well suited to woodland. The steep and very steep areas are moderately suited to woodland. The nearly level areas are well suited and the gently sloping areas moderately suited to the cultivated crops commonly grown in the county. When the nearly level or gently sloping areas are used as cropland, the main management needs are measures that control erosion, improve drainage, and maintain fertility. In the

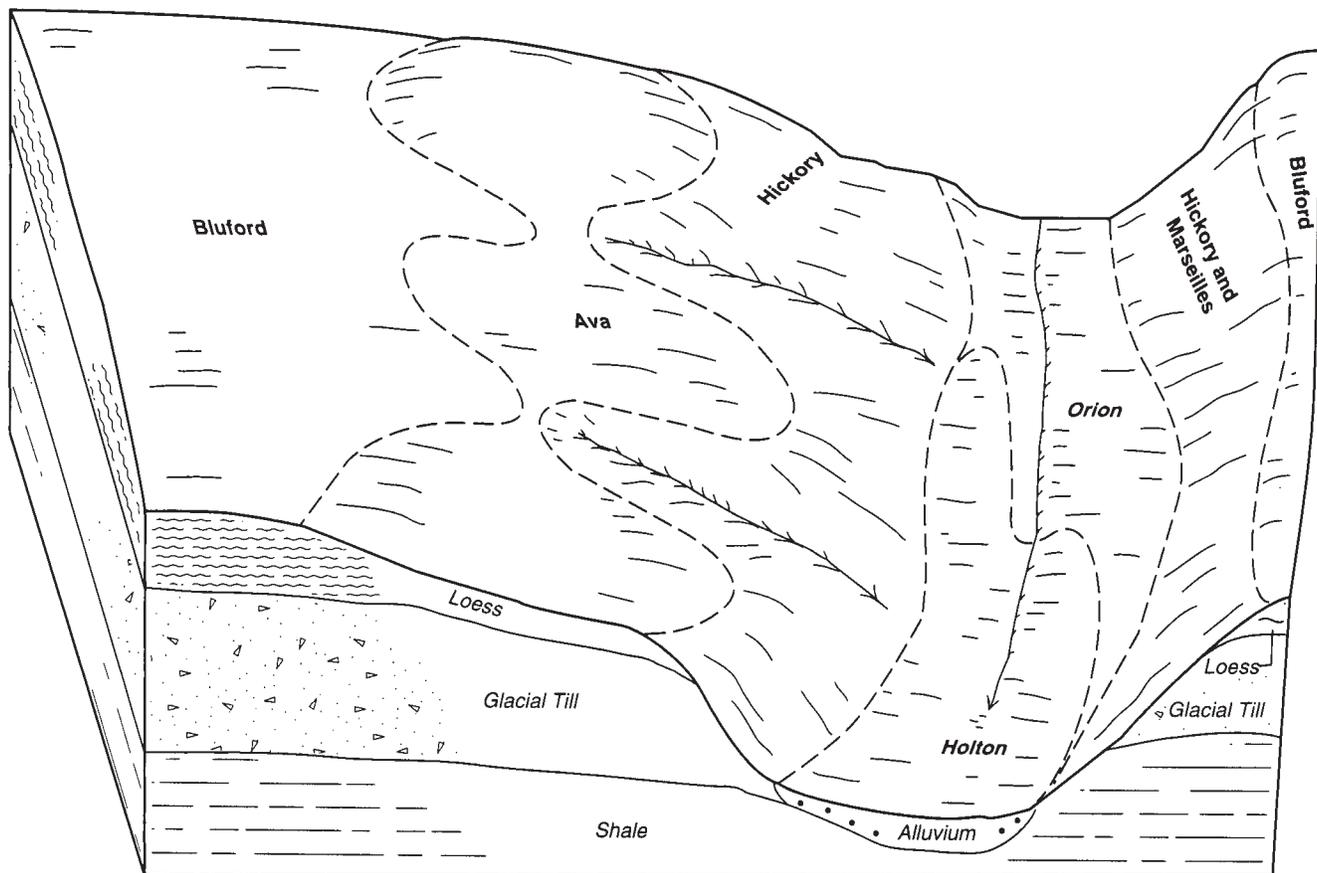


Figure 5.—Typical pattern of soils and parent material in the Hickory-Bluford-Ava association.

moderately sloping to very steep areas, the main management needs are measures that control erosion and maintain fertility. In the steep and very steep areas used as woodland, the slope restricts the use of logging equipment.

The strongly sloping Hickory soils are moderately suited to the development of sites for dwellings and septic tank absorption fields. The shrink-swell potential and the slope are management concerns. The steep and very steep Hickory soils generally are not suited to these uses because of the slope. The Bluford and Ava soils are poorly suited to these uses because of the shrink-swell potential, the very slow or slow permeability, and the seasonal high water table.

3. Cisne-Newberry-Hoyleton Association

Nearly level, poorly drained and somewhat poorly drained, silty soils that formed in loess and loamy sediments; on uplands

This association consists of soils on broad Illinoian till plains in the northern part of the county. The Cisne soils are on broad flats. The Newberry soils are in

shallow depressions and at the head of drainageways. The Hoyleton soils are on broad flats and low swells. All of the soils formed under prairie vegetation. Slopes generally range from 0 to 2 percent.

This association makes up about 19 percent of the county. It is about 60 percent Cisne and similar soils, 20 percent Newberry and similar soils, 14 percent Hoyleton and similar soils, and 6 percent minor soils (fig. 6).

The Cisne soils are poorly drained and have a very slowly permeable subsoil. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled, friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part of the subsoil is dark gray and gray, firm silty clay loam. The next part is gray, very firm silty clay loam. The lower part is gray, very firm loam.

The Newberry soils are poorly drained and have a slowly permeable subsoil. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown

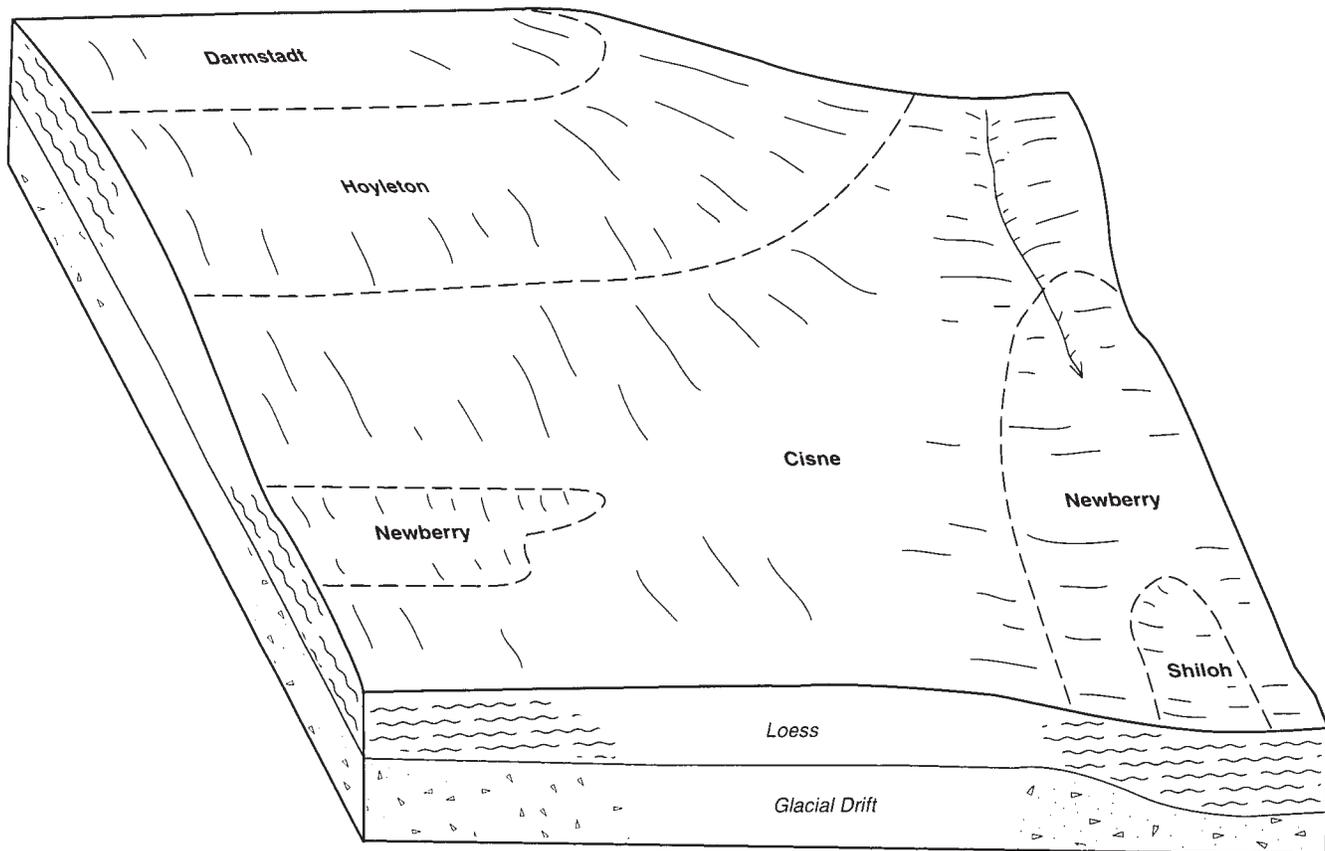


Figure 6.—Typical pattern of soils and parent material in the Cisne-Newberry-Hoyleton association.

and light brownish gray, mottled, friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part of the subsoil is gray, friable silty clay loam. The next part is gray, firm silty clay loam. The lower part is gray and dark gray, firm silt loam.

The Hoyleton soils are somewhat poorly drained and have a slowly permeable subsoil. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown, mottled, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. In sequence downward, it is yellowish brown, firm silty clay loam; brown and yellowish brown, very firm silty clay and silty clay loam; brown, light brownish gray, and strong brown, friable silty clay loam; and yellowish brown, friable silt loam.

Of minor extent in this association are Darmstadt, Piasa, and Shiloh soils. Darmstadt and Piasa soils have a high content of sodium in the subsoil. The somewhat poorly drained Darmstadt soils are closely intermingled with areas of the Hoyleton soils. The poorly drained Piasa soils are closely intermingled with areas of the Cisne soils. The very poorly drained Shiloh soils are in closed depressions. Their black surface layer is thicker than that of the major soils.

Most areas of this association are used for cultivated crops. A few are used for pasture and hay. The association is well suited to the crops commonly grown in the county and to pasture and hay. Wetness and erosion are management concerns.

This association generally is poorly suited to the development of sites for dwellings and septic tank absorption fields. The seasonal high water table, the very slow or slow permeability, and the shrink-swell potential are limitations affecting these uses.

4. Bluford-Wynoose-Darmstadt Association

Nearly level, somewhat poorly drained and poorly drained, silty soils that formed in loess and loamy sediments; on uplands

This association consists of soils on broad Illinoian till plains, mostly in the southeastern and western parts of the county. The Bluford soils are on broad interfluves and flats and on low swells. The Wynoose soils are on broad flats. The Darmstadt soils are on low swells. All of the soils formed under forest vegetation. Slopes generally range from 0 to 2 percent.

This association makes up about 7 percent of the county. It is about 41 percent Bluford and similar soils,

26 percent Wynoose and similar soils, 17 percent Darmstadt and similar soils, and 16 percent minor soils (fig. 7).

The Bluford soils are somewhat poorly drained and have a slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is firm and mottled. In sequence downward, it is brown and grayish brown silty clay loam; light yellowish brown, slightly brittle silt loam; light brownish gray, brown, strong brown, gray, and yellowish brown, slightly brittle silty clay loam and silt loam; and yellowish brown, light brownish gray, and dark yellowish brown, slightly brittle loam.

The Wynoose soils are poorly drained and have a very slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is light gray, mottled, firm silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part of the subsoil is light brownish gray, firm and very firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is light gray, firm clay loam.

The Darmstadt soils are somewhat poorly drained and have a very slowly permeable subsoil that is high in content of sodium. Typically, the surface layer is dark brown, friable silt loam about 10 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches. It is mottled and firm. The upper part of the subsoil is yellowish brown silty clay loam. The next part is grayish brown and light brownish gray silty clay loam and silt loam. The lower part is light brownish gray loam.

Of minor extent in this association are Coulterville, Huey, and Tamalco soils. These soils have a high content of sodium in the subsoil. The somewhat poorly drained Coulterville soils are on head slopes and on side slopes along drainageways. The poorly drained Huey soils are closely intermingled with areas of the Wynoose soils. The moderately well drained Tamalco soils are closely intermingled with areas of the Darmstadt and Bluford soils.

Most areas of this association are used for cultivated crops. A few are used for pasture and hay. The Bluford soils are well suited and the Darmstadt and Wynoose soils moderately suited to the crops commonly grown in the county. This association is well suited to pasture and hay. Wetness is the main management concern. The high content of sodium in the Darmstadt soils results in moisture stress during

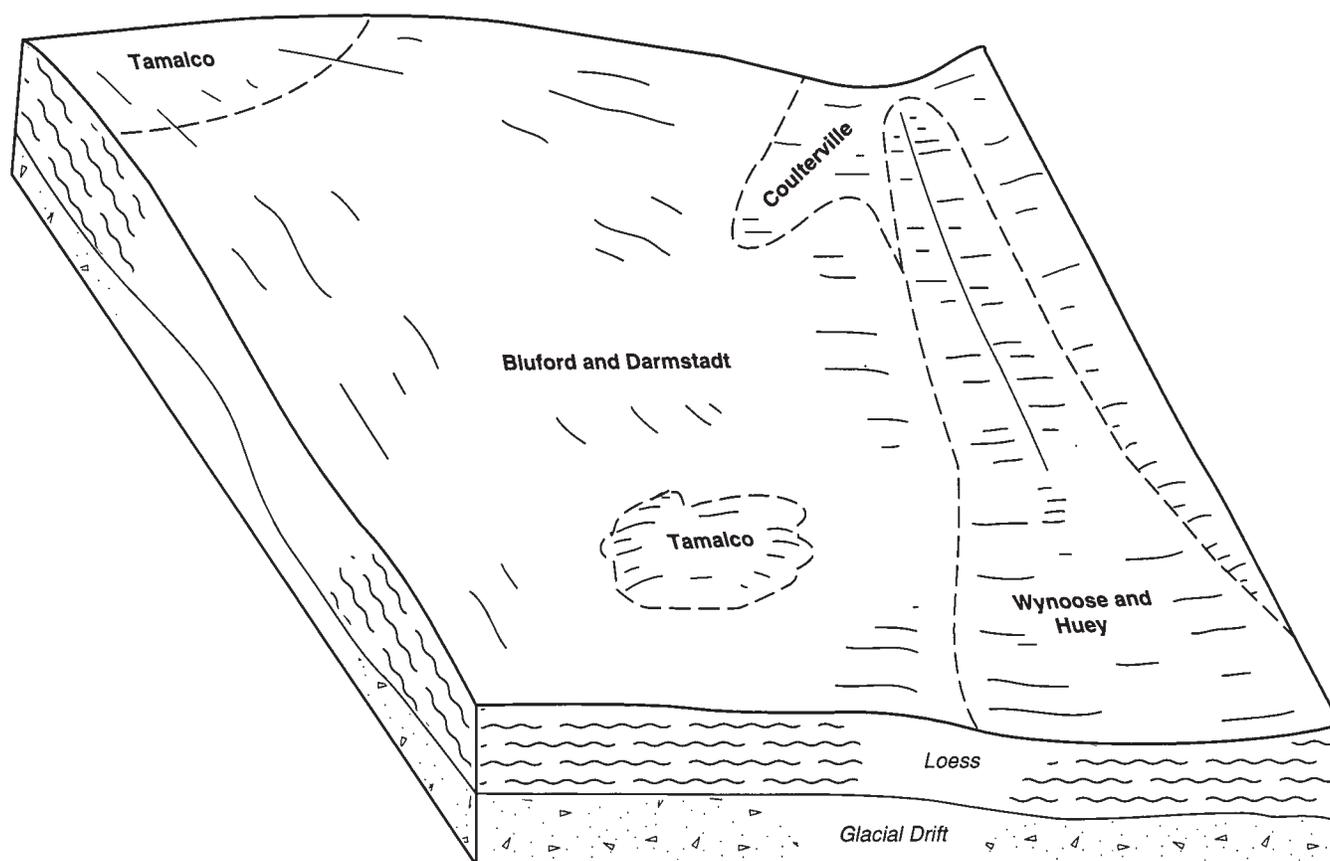


Figure 7.—Typical pattern of soils and parent material in the Bluford-Wynoose-Darmstadt association.

dry periods and excess moisture during wet periods. The sodium also restricts the availability and uptake of some plant nutrients.

This association generally is poorly suited to the development of sites for dwellings and septic tank absorption fields. The seasonal high water table, the very slow or slow permeability, and the shrink-swell potential are limitations affecting these uses.

5. Sabina-Miami-Xenia Association

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

This association consists of soils on gently undulating to rolling Wisconsinan till plains and moraines that are deeply incised by a well defined dendritic drainage system. It occurs only in the north-central part of the county. The Sabina soils are on broad interfluvies. The Miami soils are on narrow, gently sloping ridges and on the steeper convex, uneven side slopes along draws and drainageways. The Xenia soils are on ridges and side slopes along

drainageways. All of the soils formed under forest vegetation. Slopes range from 0 to 60 percent.

This association makes up about 4 percent of the county. It is about 32 percent Sabina and similar soils, 25 percent Miami and similar soils, 21 percent Xenia and similar soils, and 22 percent minor soils (fig. 8).

The Sabina soils are somewhat poorly drained, are nearly level, and have a moderately slowly permeable subsoil. Typically, the surface layer is grayish brown, very friable silt loam about 8 inches thick. The subsurface layer is brown, mottled, very friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part of the subsoil is brown, friable silty clay loam. The next part is yellowish brown, mottled, firm silty clay loam. The lower part is yellowish brown, mottled, firm clay loam.

The Miami soils are well drained, are gently sloping to very steep, and have a moderately permeable subsoil. Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 31 inches thick. It is yellowish brown. The upper part of the subsoil is friable clay loam. The next part is firm

clay loam. The lower part is calcareous, firm loam. The substratum to a depth of 60 inches is yellowish brown, calcareous, firm loam.

The Xenia soils are moderately well drained, are gently sloping, and have a moderately slowly permeable subsoil. Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 38 inches thick. It is yellowish brown. The upper part of the subsoil is friable silt loam. The next part is mottled, friable silty clay loam. The lower part is mottled, firm silty clay loam and clay loam. The substratum to a depth of 60 inches is brown, calcareous, firm loam.

Of minor extent in this association are Comfrey, Drummer, Holton, Orion, and Sexton soils. The poorly drained Comfrey and somewhat poorly drained Holton and Orion soils are on narrow, flat flood plains along streams. The poorly drained Drummer and Sexton soils are on low, broad flats and at the head of drainageways on uplands.

The nearly level and gently sloping areas on ridges

and the gently sloping and moderately sloping areas on side slopes are used mainly for cultivated crops or pasture. The steeper areas are used mainly as woodland.

The nearly level and gently sloping areas are well suited to all of the cultivated crops commonly grown in the county. When the nearly level and gently sloping areas are used as cropland, the main management needs are measures that control erosion, improve drainage, and maintain fertility. In the moderately sloping to very steep areas, the main management needs are measures that control erosion and maintain fertility. This association generally is well suited to woodland. The steep and very steep areas, however, are less well suited because the slope restricts the use of some logging equipment.

This association generally is poorly suited to the development of sites for septic tank absorption fields. The gently sloping to strongly areas of the Miami soils are moderately suited to the development of sites for dwellings. The Sabina and Xenia soils generally are

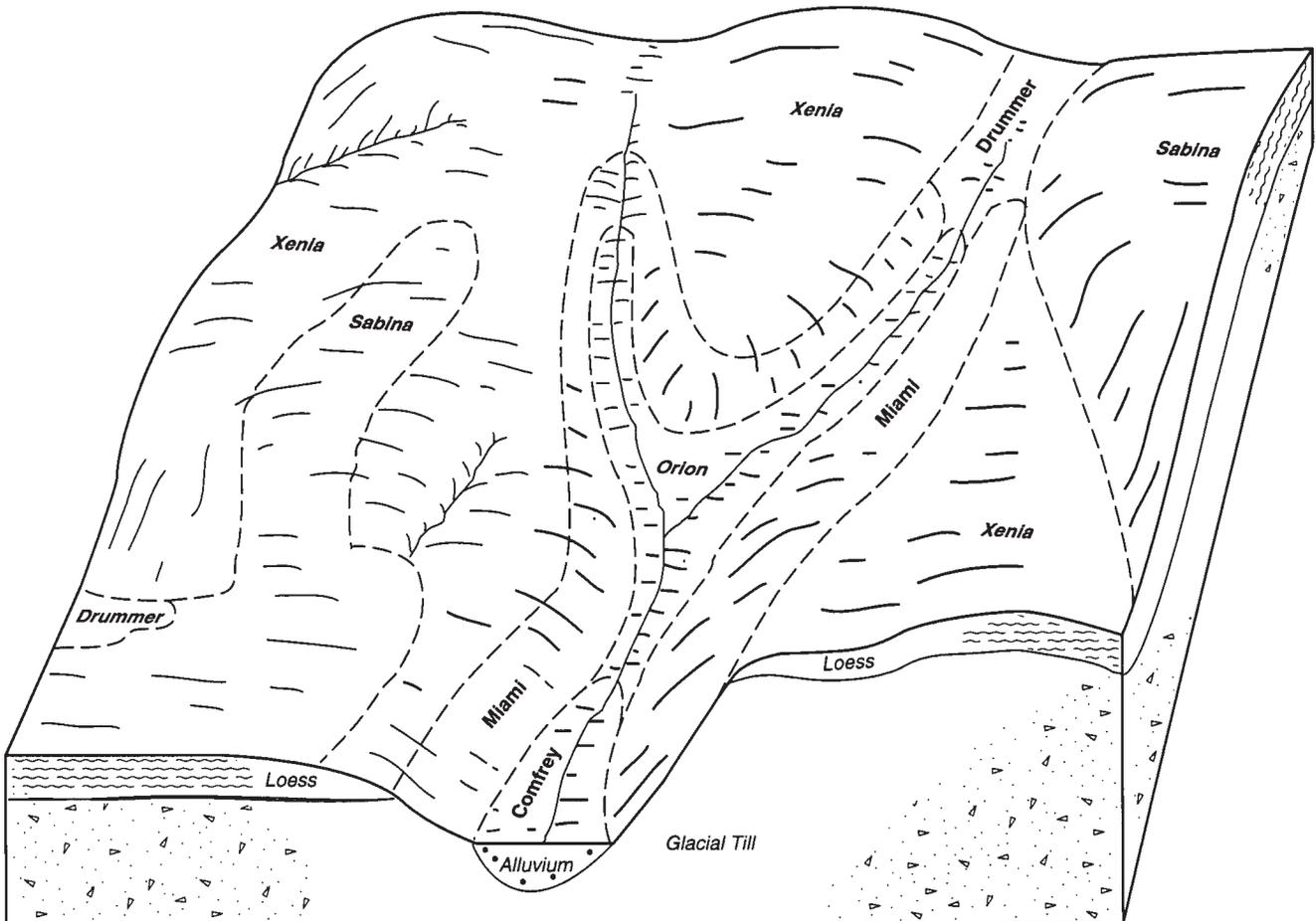


Figure 8.—Typical pattern of soils and parent material in the Sabina-Miami-Xenia association.

poorly suited the development of sites for dwellings. The shrink-swell potential and the slope are limitations affecting these uses. The seasonal high water table also is a limitation in areas of the Xenia and Sabina soils.

6. Starks-Drummer-Camden Association

Nearly level and gently sloping, poorly drained, somewhat poorly drained, and well drained, silty soils that formed in loess and stratified outwash; on terraces and uplands

This association consists of soils on a narrow outwash plain at the base of a Wisconsin moraine, on stream terraces, and on till plains. It is in the northern part of the county. The Starks soils are on broad flats, at the head of drainageways, and on narrow ridges and side slopes. The Drummer soils are in nearly level to depressional areas. The Camden soils are on swells and terrace treads and risers. All of the soils formed under mixed forest and prairie vegetation. Slopes range from 0 to 5 percent.

This association makes up about 3 percent of the county. It is about 44 percent Starks and similar soils, 27 percent Drummer and similar soils, 23 percent Camden and similar soils, and 6 percent minor soils (fig. 9).

The Starks soils are somewhat poorly drained and are nearly level and gently sloping. Typically, the

surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 3 inches thick. The subsoil is about 35 inches thick. In sequence downward, it is light yellowish brown and pale brown, mottled, friable silty clay loam; light yellowish brown, mottled, firm silty clay loam; grayish brown, mottled, firm loam; and brown, mottled, friable sandy loam. The upper part of the substratum is stratified light brownish gray and dark yellowish brown, mottled, very friable silt loam and loamy sand. The lower part to a depth of 60 inches is yellowish brown, mottled, firm loam.

The Drummer soils are poorly drained and nearly level. Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is friable silty clay loam about 10 inches thick. The upper part of the subsurface layer is black. The lower part is very dark grayish brown and mottled. The subsoil extends to a depth of 60 inches. The upper part of the subsoil is dark grayish brown and grayish brown, mottled, firm silty clay loam. The lower part is mottled grayish brown, dark grayish brown, light brownish gray, and yellowish brown, friable, stratified sandy clay loam, sandy loam, and loam.

The Camden soils are well drained and are nearly level and gently sloping. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part of the subsoil is dark yellowish brown, friable silt loam and

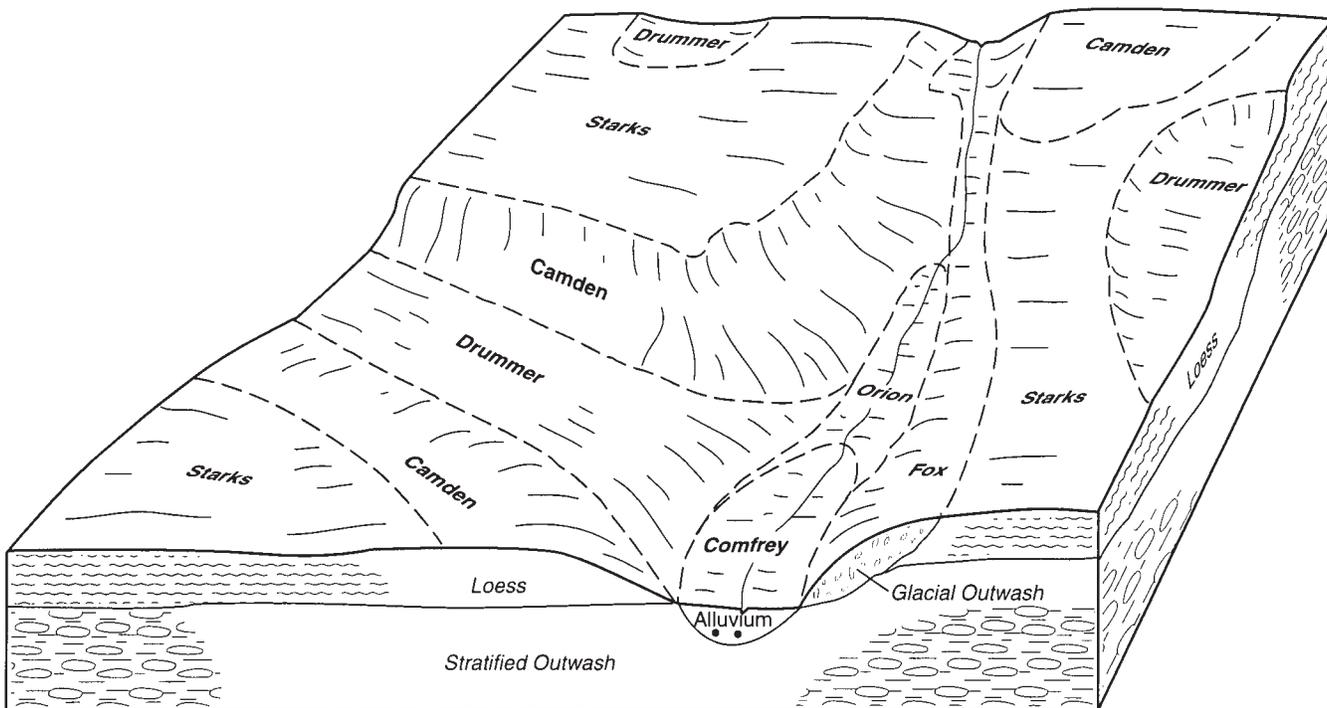


Figure 9.—Typical pattern of soils and parent material in the Starks-Drummer-Camden association.

silty clay loam. The lower part is brown, very friable sandy clay loam. The substratum to a depth of 60 inches is brown, very friable gravelly sandy loam.

Of minor extent in this association are Comfrey, Fox, Holton, and Orion soils. The poorly drained Comfrey and somewhat poorly drained Holton and Orion soils are on narrow, flat flood plains along streams. The well drained Fox soils are on risers adjacent to the Camden soils and on swells, where they are intermingled with areas of the Starks soils.

Most areas of this association are used for cultivated crops. A few are used for pasture and hay. The association generally is well suited to the crops commonly grown in the county and to pasture and hay. The main management needs are measures that control erosion on the gently sloping Starks soils and on the gently and moderately sloping Camden soils. Maintaining the existing drainage systems and the tilth and fertility of the soils is important.

The Camden soils generally are only moderately suited to the development of sites for dwellings because of the shrink-swell potential. They are well suited to the development of sites for septic tank absorption fields. The Starks soils are poorly suited to these uses because of the seasonal high water table. The Drummer soils are generally unsuited because of ponding.

7. Holton-Wirt-Holly Association

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

This association consists of soils on flood plains along the major streams and tributaries in the county. The Holton soils are in flat areas along or slightly back from the stream channels. The Wirt soils are on natural levees and in flat areas adjacent to drainageways and stream channels. The Holly soils are in flat areas back from the stream channels, in slackwater depressions, and in old drainageways. All of the soils formed under forest vegetation. Slopes generally range from 0 to 2 percent.

This association makes up about 12 percent of the county. It is about 40 percent Holton and similar soils, 27 percent Wirt and similar soils, 18 percent Holly and similar soils, and 15 percent minor soils (fig. 10.)

The Holton soils are somewhat poorly drained and level. Typically, the surface layer is dark grayish brown, friable loam about 7 inches thick. The subsoil is about 25 inches thick. It is very friable. The upper part of the subsoil is dark grayish brown, mottled silt loam. The

next part is dark grayish brown and brown, mottled, stratified loam and loamy sand. The lower part is dark grayish brown, mottled silt loam. The upper part of the substratum is grayish brown, mottled, very friable, stratified loam and sandy loam. The lower part to a depth of 60 inches is yellowish brown, mottled, loose sand.

The Wirt soils are well drained and nearly level. Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is yellowish brown. The upper part of the subsoil is very friable fine sandy loam. The next part is friable loam. The lower part is friable fine sandy loam. The upper part of the substratum is mottled yellowish brown, grayish brown, and brown, friable fine sandy loam. The lower part to a depth of 60 inches is gray, mottled, very friable loamy fine sand.

The Holly soils are poorly drained and level. Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 35 inches thick. It is mottled and friable. The upper part of the subsoil is dark gray and gray loam. The lower part is gray, stratified loam and silt loam. The substratum to a depth of 60 inches is mottled yellowish brown, grayish brown, and brown, friable sandy clay loam.

Of minor extent in this association are Blackoar, Hickory, Miami, and Sarpy soils. The poorly drained Blackoar soils are on broad flats away from the stream channels. The well drained Hickory and Miami soils are on side slopes of the bordering uplands. The excessively drained Sarpy soils are on natural levees along stream channels.

Many areas of this association are used for cultivated crops. Some are used for hay or pasture, and some are used as woodland. A few areas have been idle and are covered with briars, brush, and small trees.

The Holton soils are moderately suited to the crops commonly grown in the county and to pasture and hay and are well suited to woodland. The Wirt soils are moderately suited to the crops commonly grown in the county and are well suited to pasture and hay and to woodland. The Holly soils are well suited to the crops commonly grown in the county and to pasture and hay and are moderately suited to woodland. The frequent flooding (fig. 11) and the seasonal high water table are the main management concerns. Levees have limited application because of the narrow nature of the valleys and the likelihood of increasing the damage to adjacent properties by the overflow diverted to them.

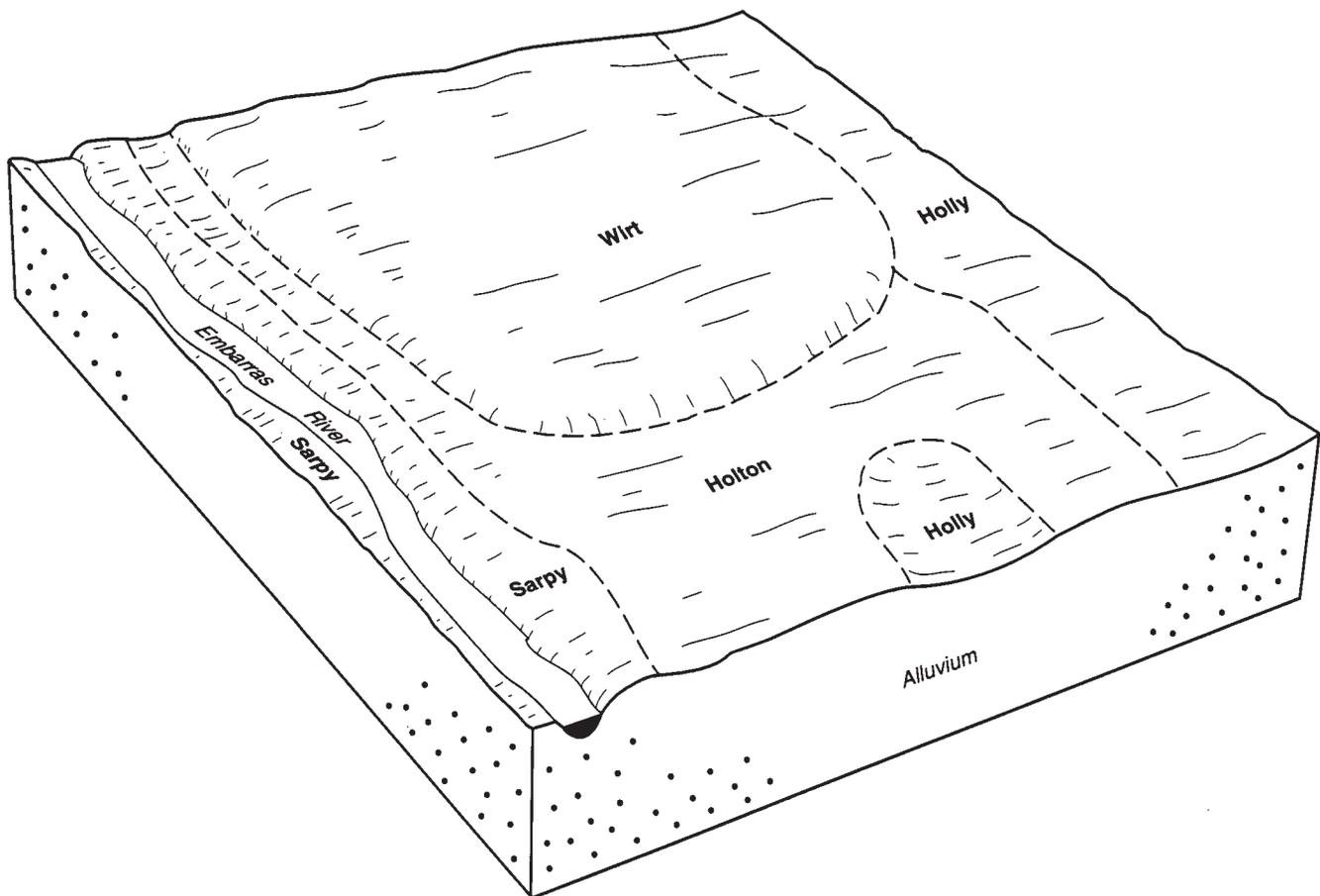


Figure 10.—Typical pattern of soils and parent material in the Holton-Wirt-Holly association.

Maintenance of the existing drainage systems and of soil fertility is necessary for maximum production in protected areas.

The major soils generally are unsuited to the development of sites for dwellings and septic tank absorption fields because of the flooding.

Broad Land Use Considerations

The soils in Cumberland County vary widely in their suitability for major land uses, including cultivated crops, pasture and hay, woodland, urban development, and wildlife habitat.

Most of the acreage in the county is used for cultivated crops, primarily corn and soybeans. The major soils in associations 1, 3, 4, 5, and 6 generally are well suited or moderately suited to cultivated crops. A seasonal high water table is the main limitation in associations 1, 3, 4, and 6. Darmstadt soils, which are major soils in association 4, have a high content of sodium in the subsoil. The sodium lowers yields and increases the hazard of water

erosion. Water erosion is a hazard in association 5. The soils in association 7 are subject to frequent flooding, mostly from late winter through early summer. The flooding can delay planting and cause slight to severe crop damage. The seasonal high water table limits the use of some of the soils in this association for cultivated crops. The soils in association 2 generally are well suited, moderately suited, or poorly suited to cultivated crops. The major limitation is the slope. Some areas of this association are so steep that they are not suited to crops.

Much of the acreage that is used for hay and pasture in the county is in associations 2, 5, and 6. Ava, Miami, Camden, Starks, and Xenia soils generally are well suited to grasses and legumes for forage. The slope limits the suitability of Hickory soils, and the seasonal high water table limits the suitability of Sabina, Bluford, and Drummer soils.

About 15,000 acres in the county is used as woodland. The wooded areas are primarily on side slopes along drainageways and on the steeper slopes adjacent to creeks and the Embarras River. Most of



Figure 11.—Flooding in an area of the Holton-Wirt-Holly association.

the soils in the county are moderately suited or well suited to trees. On some of the soils, equipment limitations are moderate or severe because of wetness or the slope. These limitations can be overcome by harvesting during the drier periods and by using special equipment.

Very few areas in the county are developed for urban uses. In general, the gently sloping Ava and Miami soils and the strongly sloping Hickory soils have the best potential for these uses. These soils are mainly in associations 2 and 5. Most of the other major soils in the county are limited by a seasonal high water table, restricted permeability, a high shrink-swell

potential, low strength, or a high potential for frost action. The soils in association 7 are on flood plains and are generally unsuitable for urban uses because of flooding.

The suitability for wildlife habitat generally is good throughout the county. Associations 2, 5, and 7 are well suited to both openland and woodland wildlife habitat. Darmstadt soils, which are mainly in association 4, are only moderately suited to openland and woodland wildlife habitat, but the other major soils in this association are well suited to these kinds of wildlife habitat. Associations 1 and 3 are well suited to wetland wildlife habitat.

Detailed Soil Map Units

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

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

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

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

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

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Hoyleton silt loam, 0 to 2 percent slopes, is a phase of the Hoyleton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Ava-Blair complex, 2 to 7 percent slopes, eroded, is an example.

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

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the

soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

2—Cisne silt loam

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Broad flats
Shape of areas: Irregular
Size of areas: 10 to 240 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess and the underlying loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: Within a depth of 1 foot
Content of organic matter: 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 20 inches—dark grayish brown and grayish brown, mottled, friable silt loam

Subsoil:
20 to 30 inches—dark gray, mottled, firm silty clay loam
30 to 44 inches—gray, mottled, firm silty clay loam
44 to 54 inches—gray, mottled, very firm silty clay loam
54 to 60 inches—gray, mottled, very firm loam

Inclusions

Contrasting inclusions:

- Soils that are brown in the upper part of the subsoil and are in the slightly higher positions

Similar inclusions:

- Soils that have a thicker dark surface soil

- Soils that have less clay in the subsoil
- Soils that have a lighter colored surface layer

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the very slow permeability, but a combination of surface ditches and land leveling can reduce the wetness.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing can reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Installing foundation drains lowers the water table.
- On sites for dwellings without basements, reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 4W
Productivity index: 115 (high level of management)

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

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Broad flats
Shape of areas: Irregular or linear
Size of areas: 10 to 100 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess and the underlying loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Content of organic matter: 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 12 inches—brown, mottled, friable silt loam

Subsoil:
 12 to 15 inches—yellowish brown, mottled, firm silty clay loam
 15 to 30 inches—brown and yellowish brown, mottled, very firm silty clay and firm silty clay loam
 30 to 45 inches—mottled brown, light brownish gray, and strong brown, friable silty clay loam
 45 to 60 inches—yellowish brown, mottled, friable silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Cisne soils, which are in landform positions slightly lower than those of the Hoyleton soil
- The somewhat poorly drained Darmstadt soils, which are in landform positions similar to those of the Hoyleton soil and have a concentration of sodium in the subsoil

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 considerations:

- Surface ditches help to remove excess surface water.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing can reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed to help overcome the wetness and the slow permeability.

Interpretive Groups*Land capability classification:* 2w*Woodland ordination symbol:* 4A*Productivity index:* 115 (high level of management)**3B—Hoyleton silt loam, 2 to 5 percent slopes****Composition**

Hoyleton soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting*Landscape:* Uplands*Landform:* Illinoian till plains*Landform position:* Low swells, head slopes of draws, and shoulders and side slopes along drainageways*Shape of areas:* Irregular*Size of areas:* 5 to 10 acres*Major use:* Cropland**Soil Properties and Qualities***Drainage class:* Somewhat poorly drained*Permeability:* Slow*Parent material:* Loess and the underlying loamy sediments*Runoff:* Medium*Available water capacity:* High*Seasonal high water table:* 1 to 3 feet below the surface*Content of organic matter:* Moderate*Erosion hazard:* Moderate*Shrink-swell potential:* High*Potential for frost action:* High**Typical Profile***Surface layer:*

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

Subsurface layer:

9 to 15 inches—yellowish brown, friable silt loam

Subsoil:

15 to 19 inches—yellowish brown and brown, mottled, firm silty clay loam

19 to 45 inches—pale brown, mottled, very firm silty clay loam

45 to 60 inches—grayish brown, mottled, firm silty clay loam

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Darmstadt soils, which are in the slightly lower, less sloping positions and have a concentration of sodium in the subsoil

Similar inclusions:

- Soils that are not so gray in the subsoil
- Soils that have a lighter colored surface layer
- Moderately eroded soils that have fragments of subsoil material the surface layer

Use and Management**Cropland***Suitability:* Well suited*Management considerations:*

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings*Suitability:* Poorly suited*Management considerations:*

- Onsite investigation is required. Installing subsurface tile drains near the foundation helps to overcome the wetness.

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 4A

Productivity index: 114 (high level of management)

5B2—Blair silt loam, 2 to 5 percent slopes, eroded

Composition

Blair soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or oval

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Loamy water-worked sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

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 10 inches—mixed brown and yellowish brown, friable loam

Subsoil:

10 to 30 inches—yellowish brown and light yellowish brown, mottled, friable loam

30 to 60 inches—gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which are in landform positions similar to those of the Blair soil and contain more clay in the subsoil than the Blair soil.
- The somewhat poorly drained Bluford soils, which are near the head of drainageways and contain more clay in the subsoil than the Blair soil.

Similar inclusions:

- Soils that formed in loess and the underlying paleosol

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Installing foundation drains lowers the water table.
- On sites for dwellings without basements, extending the footings below the subsoil or reinforcing the

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Subsurface tile drains that are installed higher on the side slopes than the absorption field lower the water table.
- Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 4A

Productivity index: 101 (high level of management)

5B3—Blair silt loam, 2 to 5 percent slopes, severely eroded

Composition

Blair soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or oval

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Loamy water-worked sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 4 inches—yellowish brown, friable silt loam

Subsoil:

4 to 34 inches—grayish brown and yellowish brown, mottled, friable clay loam and loam

34 to 50 inches—mottled grayish brown, yellowish brown, and brown, firm loam and clay loam

50 to 58 inches—grayish brown, mottled, firm silt loam

Substratum:

58 to 60 inches—mottled dark grayish brown, yellowish brown, and strong brown, firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which are in landform positions similar to those of the Blair soil and contain more clay in the subsoil than the Blair soil
- The somewhat poorly drained Bluford soils, which are in the slightly higher landform positions near the head of drainageways and contain more clay and less sand in the subsoil than the Blair soil

Similar inclusions:

- Soils that formed in loess and the underlying paleosol

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Measures that control erosion are needed in areas used for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting, 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, compaction, and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- Establishing pasture and hay in areas of this soil helps to control erosion.
- Seedbed preparation is difficult on side slopes where the subsoil is exposed.
- A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and

applications of fertilizer help to keep the pasture or hayland in good condition and prevent surface compaction and excessive runoff.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Installing foundation drains lowers the water table.
- On sites for dwellings without basements, extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Subsurface tile drains that are installed higher on the side slopes than the absorption field lower the water table.
- Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4A

Productivity index: 93 (high level of management)

5C2—Blair silt loam, 5 to 10 percent slopes, eroded

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or oval

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Loamy water-worked sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 8 inches—brown, friable silt loam

Subsoil:

8 to 13 inches—yellowish brown, mottled, friable silty clay loam

13 to 20 inches—dark grayish brown, mottled, friable clay loam

20 to 40 inches—dark grayish brown and dark gray, mottled, firm clay loam

40 to 52 inches—dark brown and strong brown, mottled, firm clay loam

52 to 60 inches—gray, mottled, friable sandy clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which are in landform positions similar to those of the Blair soil and contain more clay in the subsoil than the Blair soil
- The well drained Hickory soils, which are in the more sloping landform positions downslope from the Blair soil

Similar inclusions:

- Soils that formed in loess and the underlying paleosol
- Soils that formed in loess and the underlying loamy sediments and are less gray in the upper part of the subsoil
- Soils that are less gray in the upper part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

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

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.

- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Land shaping by cutting and filling helps to overcome the slope.
- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- On sites for dwellings without basements, 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 considerations:

- Curtain drains in the areas adjacent to the absorption field lower the water table.
- Enlarging the absorption area helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4A

Productivity index: 99 (high level of management)

5C3—Blair silt loam, 5 to 10 percent slopes, severely eroded

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or oval

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Loamy water-worked sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—yellowish brown, friable silt loam

Subsoil:

7 to 28 inches—yellowish brown, mottled, friable silty clay loam

28 to 43 inches—yellowish brown, mottled, firm loam

43 to 58 inches—mottled grayish brown, light brownish gray, and brown, firm clay loam

Substratum:

58 to 60 inches—light brownish gray, mottled, very firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which are in landform positions similar to those of the Blair soil and contain more clay in the subsoil than the Blair soil
- The well drained Hickory soils, which are in the more sloping landform positions downslope from the Blair soil

Similar inclusions:

- Soils that formed in loess and the underlying paleosol
- Soils that formed in loess and the underlying loamy sediments and are less gray in the upper part of the subsoil
- Soils that are less gray in the upper part of the subsoil

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- Erosion can be controlled by a system of conservation tillage that leaves crop residue on the

surface after planting, by contour farming, and by a crop rotation that is dominated by forage crops.

- Tilling when the soil is wet causes surface cloddiness, 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.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Establishing pasture plants or hay on this soil improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Seedbed preparation is difficult on these severely eroded side slopes. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Land shaping by cutting and filling helps to overcome the slope.
- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- On sites for dwellings without basements, 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 considerations:

- Curtain drains in the areas adjacent to the absorption field lower the water table.
- Enlarging the absorption area helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 4e

Woodland ordination symbol: 4A

Productivity index: 91 (high level of management)

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

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Linear

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate in the upper part of the solum and slow in the lower part

Parent material: Loess and an underlying paleosol that formed in glacial till

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.0 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 5 inches—grayish brown, very friable silt loam

Subsoil:

5 to 23 inches—yellowish brown and brown, mottled, friable silty clay loam

23 to 33 inches—grayish brown, mottled, firm silty clay loam

33 to 60 inches—gray, mottled, firm silty clay

Inclusions

Contrasting inclusions:

- The well drained Ursa soils, which are in the more sloping landform positions and contain more clay in the upper part of the subsoil than the Fishhook soil

Similar inclusions:

- Soils having a gray paleosol that formed in till within a depth of 20 inches
- Soils that formed in less than 20 inches of loess and contain less clay in the lower part of the subsoil
- Soils that have a paleosol at a greater depth

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- On sites for dwellings with basements, reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile 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: 2e

Woodland ordination symbol: 4C

Productivity index: 66 (high level of management)

7B2—Atlas silt loam, 2 to 5 percent slopes, eroded

Composition

Atlas soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Linear

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Very slow

Parent material: A thin mantle of loess and an underlying paleosol that formed in glacial till

Runoff: Rapid

Available water capacity: Moderate

Seasonal high water table: 1 to 2 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 4 inches—brown, friable silt loam

Subsoil:

4 to 8 inches—brown, mottled, friable silt loam

8 to 12 inches—yellowish brown, mottled, firm silty clay loam

12 to 30 inches—very dark gray, mottled, very firm silty clay loam

30 to 56 inches—dark gray, mottled, very firm clay loam and silty clay loam

Substratum:

56 to 60 inches—light gray, mottled, very firm clay loam

Inclusions

Contrasting inclusions:

- The well drained Ursa soils, which are on convex slopes and in the more sloping landform positions
- The somewhat poorly drained Blair soils, which are in landform positions similar to those of the Atlas soil and have less clay in the subsoil than the Atlas soil

Similar inclusions:

- Soils having a gray paleosol that formed in till at a depth of 20 to 40 inches
- Severely eroded soils that have more clay in the surface layer
- Soils that have a concentration of sodium in the subsoil

Use and Management**Cropland***Suitability:* Well suited*Management considerations:*

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness, compaction, and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings*Suitability:* Poorly suited*Management considerations:*

- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields*Suitability:* Poorly suited*Management considerations:*

- Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces the wetness.
- Installing specially designed systems that include

sand filters helps to overcome the very slow permeability.

Interpretive Groups*Land capability classification:* 2e*Woodland ordination symbol:* 4C*Productivity index:* 52 (high level of management)**7B3—Atlas silty clay loam, 2 to 5 percent slopes, severely eroded****Composition**

Atlas soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting*Landscape:* Uplands*Landform:* Illinoian till plains*Landform position:* Side slopes along drainageways*Shape of areas:* Linear*Size of areas:* 5 to 20 acres*Major use:* Cropland**Soil Properties and Qualities***Drainage class:* Somewhat poorly drained*Permeability:* Very slow*Parent material:* A thin mantle of loess and an underlying paleosol that formed in glacial till*Runoff:* Rapid*Available water capacity:* Moderate*Seasonal high water table:* 1 to 2 feet below the surface*Content of organic matter:* Low*Erosion hazard:* Severe*Shrink-swell potential:* High*Potential for frost action:* High**Typical Profile***Surface layer:*

0 to 4 inches—yellowish brown, friable silty clay loam

Subsoil:

4 to 9 inches—yellowish brown, mottled, friable silty clay loam

9 to 50 inches—gray and light brownish gray, mottled, firm clay loam

50 to 60 inches—light olive gray, mottled, firm loam

Inclusions*Contrasting inclusions:*

- The well drained Ursa soils, which are on convex slopes and in the more sloping landform positions
- The somewhat poorly drained Blair soils, which are

in landform positions similar to those of the Atlas soil and have less clay in the subsoil than the Atlas soil

Similar inclusions:

- Soils having a gray paleosol that formed in till at a depth of 20 to 40 inches
- Moderately eroded soils that have less clay in the surface layer
- Soils that have a concentration of sodium in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that control erosion are needed in areas used for corn, soybeans, or small grain.
- A system of conservation tillage that leaves crop residue on the surface after planting, 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, compaction, and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- Establishing pasture and hay in areas of this soil helps to control erosion.
- Seedbed preparation is difficult on side slopes where the subsoil is exposed.
- A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and prevent surface compaction and excessive runoff.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation helps to overcome the wetness.

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces the wetness.
- Installing specially designed systems that include sand filters helps to overcome the very slow permeability.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4C

Productivity index: 43 (high level of management)

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

Composition

Atlas soil and similar inclusions: 80 to 95 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways

Shape of areas: Long and narrow or irregular

Size of areas: 2 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Very slow

Parent material: A thin mantle of loess and an underlying paleosol that formed in glacial till

Runoff: Rapid

Available water capacity: Moderate

Seasonal high water table: 1 to 2 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 6 inches—mixed brown and yellowish brown, friable silt loam

Subsoil:

6 to 16 inches—dark yellowish brown, mottled, firm silty clay loam

16 to 36 inches—grayish brown, mottled, very firm silty clay

36 to 45 inches—grayish brown, mottled, very firm silty clay loam

45 to 60 inches—light gray, mottled, firm clay loam

Inclusions*Contrasting inclusions:*

- The well drained Hickory soils, which are in the more sloping landform positions

Similar inclusions:

- Severely eroded soils that have more clay in the surface layer
- Soils that have slopes of less than 5 percent
- Soils that have less clay in the subsoil
- Soils that have less sand in the subsoil
- Soils that have a higher proportion of brown colors in the subsoil
- Soils that have a more alkaline subsoil

Use and Management**Cropland**

Suitability: Poorly suited

Management considerations:

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

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited

Management considerations:

- Seedling mortality and the windthrow hazard are management concerns.
- Planting mature stock reduces the seedling mortality rate. Some replanting may be necessary.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the windthrow hazard.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4C

Productivity index: 50 (high level of management)

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

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Side slopes along drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 5 to 60 acres
Major use: Pasture, cropland, or woodland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: A thin mantle of loess and an underlying paleosol that formed in glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: 1 to 2 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsoil:
6 to 11 inches—yellowish brown, mottled, firm silty clay loam
11 to 35 inches—light brownish gray, mottled, very firm silty clay
35 to 60 inches—gray, mottled, very firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Blair soils, which have less clay in the subsoil than the Atlas soil and are in landform positions similar to those of the Atlas soil
- The well drained Hickory soils, which have less clay in the subsoil than the Atlas soil and lower are on the side slopes

Similar inclusions:

- Soils that have slopes of less than 10 percent
- Soils that have a higher proportion of brown colors in the subsoil

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Returning crop residue to the soil and adding other organic material help to prevent surface crusting and compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion
- A no-till method of seeding or pasture renovation on the contour helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited

Management considerations:

- Seedling mortality and the windthrow hazard are management concerns.
- Planting mature stock reduces the seedling mortality rate. Some replanting may be necessary.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the windthrow hazard.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings*Suitability:* Poorly suited*Management considerations:*

- Onsite investigation is required. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table.

Septic tank absorption fields*Suitability:* Poorly suited*Management considerations:*

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups*Land capability classification:* 4e*Woodland ordination symbol:* 4C*Productivity index:* 47 (high level of management)**7D3—Atlas silty clay loam, 10 to 15 percent slopes, severely eroded****Composition**

Atlas soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting*Landscape:* Uplands*Landform:* Illinoian till plains*Landform position:* Side slopes along drainageways*Shape of areas:* Long and narrow*Size of areas:* 3 to 30 acres*Major use:* Cropland or pasture and hay**Soil Properties and Qualities***Drainage class:* Somewhat poorly drained*Permeability:* Very slow*Parent material:* A paleosol that formed in glacial till*Runoff:* Rapid*Available water capacity:* Moderate*Seasonal high water table:* 1 to 2 feet below the surface*Content of organic matter:* Low*Erosion hazard:* Severe*Shrink-swell potential:* High*Potential for frost action:* High**Typical Profile***Surface layer:*

0 to 4 inches—mixed yellowish brown and brown, firm silty clay loam

Subsoil:

4 to 11 inches—gray, mottled, very firm silty clay loam

11 to 34 inches—dark gray, mottled, very firm silty clay

34 to 60 inches—gray, mottled, very firm silty clay

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Blair soils, which have less clay in the subsoil than the Atlas soil and are in landform positions similar to those of the Atlas soil
- The well drained Hickory soils, which have less clay in the subsoil than the Atlas soil and are lower on the side slopes

Similar inclusions:

- Soils that have more sand in the surface soil
- Soils that have a higher proportion of brown colors in the subsoil
- Soils that have slopes of less than 10 percent or more than 15 percent

Use and Management**Cropland***Suitability:* Generally unsuited because of the slope and severe erosion**Pasture and hay***Suitability:* Poorly suited*Management considerations:*

- Establishing pasture plants or hay on this soil improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Seedbed preparation is difficult on these severely eroded side slopes. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Moderately suited

Management considerations:

- Seedling mortality and the windthrow hazard are management concerns.
- Planting mature stock reduces the seedling mortality rate. Some replanting may be necessary.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the windthrow hazard.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet state and local guidelines.

Interpretive Groups

Land capability classification: 6e

Woodland ordination symbol: 4C

Productivity index: 39 (high level of management)

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

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Nose slopes and side slopes along major drainageways and streams

Shape of areas: Linear or irregular

Size of areas: 3 to 10 acres

Major use: Woodland or pasture and hay

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Glacial till or a thin mantle of loess and the underlying glacial till

Runoff: Rapid

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 5 inches—mixed brown and yellowish brown, friable loam

Subsoil:

5 to 10 inches—yellowish brown, friable loam

10 to 30 inches—dark yellowish brown, mottled, firm clay loam

30 to 39 inches—mottled strong brown, dark yellowish brown, and gray, firm clay loam

39 to 49 inches—gray, mottled, very firm gravelly clay loam

Substratum:

49 to 56 inches—yellowish brown, mottled, firm loam

56 to 60 inches—mottled dark yellowish brown, light brownish gray, and gray, very firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Marseilles soils, which are on side slopes below the Hickory soil

and have weathered bedrock at a depth of 20 to 40 inches

- The well drained Ursa soils, which are in the higher landform positions and contain more clay in the subsoil than the Hickory soil
- The somewhat poorly drained Wakeland soils, which are in the lower landform positions along drainageways and formed in silty alluvium

Similar inclusions:

- Moderately well drained soils that have gray mottles in the lower part of the subsoil
- Severely eroded soils that contain more clay in the surface layer

Use and Management

Cropland

Suitability: Moderately suited

- A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue

on the surface after planting help to keep soil loss within tolerable limits.

- Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and productivity.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion (fig. 12).
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- A no-till method of seeding or pasture renovation on



Figure 12.—A protective cover of grasses in an area of Hickory loam, 10 to 15 percent slopes, eroded. Holly silt loam, frequently flooded, is in the cropped area in the background.

the contour helps to establish forage species and control erosion.

- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited

Management considerations:

- 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 considerations:

- 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: 3e

Woodland ordination symbol: 5A

Productivity index: 72 (high level of management)

8D3—Hickory clay loam, 10 to 15 percent slopes, severely eroded

Composition

Hickory soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Nose slopes and side slopes along major drainageways and streams

Shape of areas: Linear or irregular

Size of areas: 3 to 10 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Glacial till

Runoff: Rapid

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 3 inches—mixed very dark grayish brown and yellowish brown, friable clay loam

Subsoil:

3 to 10 inches—yellowish brown, firm clay loam

10 to 20 inches—yellowish brown, mottled, firm clay loam

20 to 30 inches—gray, mottled, firm loam

Substratum:

30 to 60 inches—mottled yellowish brown and light brownish gray, calcareous, very firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Marseilles soils, which are on side slopes below the Hickory soil and have weathered shale at a depth of 20 to 40 inches
- The well drained Ursa soils, which are in the higher landform positions and contain more clay in the subsoil than the Hickory soil
- The somewhat poorly drained Wakeland soils, which are in the lower landform positions along drainageways and formed in silty alluvium

Similar inclusions:

- Moderately well drained soils that have gray mottles in the lower part of the subsoil
- Moderately eroded soils that contain less clay in the surface layer

Use and Management**Cropland***Suitability:* Poorly suited*Management considerations:*

- A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting 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, help to prevent surface crusting, and increase the rate of water infiltration.

Pasture and hay*Suitability:* Moderately suited*Management considerations:*

- Establishing pasture and hay crops helps to control erosion.
- Seedbed preparation is difficult on severely eroded side slopes where the subsoil is exposed.
- A no-till method of seeding or pasture renovation on the contour helps to control further erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- The plants should not be grazed until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to prevent surface compaction and excessive runoff.

Dwellings*Suitability:* Moderately suited*Management considerations:*

- 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 considerations:*

- 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:* 4e*Woodland ordination symbol:* 5A*Productivity index:* 66 (high level of management)**8F—Hickory loam, 15 to 30 percent slopes****Composition**

Hickory soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting*Landscape:* Uplands*Landform:* Illinoian till plains*Landform position:* Side slopes along major drainageways and streams*Shape of areas:* Linear or irregular*Size of areas:* 15 to 80 acres*Major use:* Woodland or pasture**Soil Properties and Qualities***Drainage class:* Well drained*Permeability:* Moderate*Parent material:* Glacial till or a thin mantle of loess and the underlying glacial till*Runoff:* Rapid*Available water capacity:* High*Seasonal high water table:* More than 6 feet below the surface*Content of organic matter:* Moderately low*Erosion hazard:* Severe*Shrink-swell potential:* Moderate*Potential for frost action:* Moderate**Typical Profile***Surface layer:*

0 to 2 inches—dark brown, very friable loam

Subsurface layer:

2 to 5 inches—brown, very friable loam

Subsoil:

5 to 10 inches—yellowish brown, friable loam

10 to 45 inches—yellowish brown, firm clay loam

Substratum:

45 to 60 inches—yellowish brown, firm sandy loam

Inclusions

Contrasting inclusions:

- The moderately well drained Marseilles soils, which are on side slopes below the Hickory soil and have weathered shale at a depth of 20 to 40 inches
- The well drained Ursa soils, which are in the higher, less sloping landform positions and contain more clay in the subsoil than the Hickory soil
- The somewhat poorly drained Wakeland soils, which are in the lower landform positions along streams and drainageways and formed in silty alluvium

Similar inclusions:

- Moderately well drained soils that have gray mottles in the lower part of the subsoil.

Use and Management

Cropland

Suitability: Generally unsuited because of the slope and the erosion hazard

Pasture and hay

Suitability: Poorly suited

Management considerations:

- Erosion control is needed when grasses and legumes are established in the pastured areas.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- A permanent cover of pasture plants helps to control erosion and maintains tilth.
- A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
- In areas where the pasture is established, interseeding legumes with a no-till seeder improves the quality of the forage.

Woodland

Suitability: Moderately suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after

logging operations have been completed help to control erosion.

- The use of machinery is limited to periods when the soil is firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 6e

Woodland ordination symbol: 5R

Productivity index: 64 (high level of management)

8G—Hickory loam, 30 to 60 percent slopes

Composition

Hickory soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along major drainageways and streams

Shape of areas: Linear or irregular

Size of areas: 15 to 100 acres

Major use: Woodland or pasture

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate
Parent material: Glacial till or a thin mantle of loess and the underlying glacial till
Runoff: Rapid
Available water capacity: High
Seasonal high water table: More than 6 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

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

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

Subsoil:
 10 to 16 inches—yellowish brown, friable loam
 16 to 35 inches—yellowish brown, mottled, firm clay loam
 35 to 48 inches—mottled yellowish brown, light brownish gray, and strong brown, firm clay loam
 48 to 60 inches—mottled yellowish brown, light brownish gray, and brown, very firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Marseilles soils, which are on side slopes below the Hickory soil and have weathered shale at a depth of 20 to 40 inches
- The well drained Ursa soils, which are in the higher, less sloping landform positions and contain more clay in the subsoil than the Hickory soil
- The somewhat poorly drained Wakeland soils, which are in the lower landform positions along drainageways and formed in silty alluvium

Similar inclusions:

- Moderately well drained soils that have gray mottles in the lower part of the subsoil
- Moderately eroded soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Generally unsuited because of the slope and the erosion hazard

Pasture and hay

Suitability: Generally unsuited because of the slope and the erosion hazard

Woodland

Suitability: Moderately suited
Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soil is firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited
Management considerations:

- The wooded areas provide habitat for deer, wild turkeys, squirrels, and other woodland wildlife. Establishing or maintaining plants that provide food and cover for wildlife is difficult because of the slope and the hazard of erosion.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 5R
Productivity index: 38 (high level of management)

12—Wynoose silt loam

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Broad flats

Shape of areas: Irregular
Size of areas: 10 to 160 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess and the underlying loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: Within a depth of 1 foot
Content of organic matter: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsurface layer:
 8 to 16 inches—light gray, mottled, firm silt loam

Subsoil:
 16 to 23 inches—light brownish gray, mottled, firm silty clay loam
 23 to 42 inches—light brownish gray, mottled, very firm silty clay loam
 42 to 52 inches—grayish brown, mottled, firm silty clay loam
 52 to 60 inches—light gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Bluford soils, which are in the slightly higher landform positions
- The poorly drained Racoon soils, which contain less clay in the subsoil than the Wynoose soil and are in lower depressional areas
- The poorly drained Huey soils, which have a concentration of sodium in the subsoil and are in the lower landform positions

Similar inclusions:

- Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:

- Measures that maintain the drainage system are

needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the very slow permeability, but a combination of surface ditches and land leveling can reduce the wetness.

- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing foundation drains lowers the water table.
- On sites for dwellings without basements, reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 4W

Productivity index: 105 (high level of management)

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

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Broad flats and interfluves
Shape of areas: Irregular or linear
Size of areas: 10 to 160 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess and the underlying loamy sediments
Runoff: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Content of organic matter: 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—brown, mottled, friable silt loam

Subsoil:
 16 to 35 inches—brown and grayish brown, mottled, firm silty clay loam
 35 to 40 inches—light yellowish brown, mottled, firm silt loam
 40 to 58 inches—mottled light brownish gray, brown, strong brown, light gray, and yellowish brown, firm silty clay loam and silt loam
 58 to 60 inches—mottled yellowish brown, light brownish gray, and dark yellowish brown, firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Wynoose soils, which are in the slightly lower landform positions
- The somewhat poorly drained Darmstadt soils,

which have a concentration of sodium in the subsoil and are in landform positions similar to those of the Bluford soil

Similar inclusions:

- Soils that have a darker surface layer
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Surface ditches help to remove excess surface water.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed to overcome the wetness and the slow permeability.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4A

Productivity index: 110 (high level of management)

13B—Bluford silt loam, 2 to 5 percent slopes

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Low swells and shoulders

Shape of areas: Long and narrow or irregular

Size of areas: 5 to 110 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Slow

Parent material: Loess and the underlying loamy sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

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 12 inches—pale brown, friable silt loam

Subsoil:

12 to 25 inches—brown, mottled, firm silty clay loam

25 to 36 inches—brown, mottled, firm silty clay loam and silty clay

36 to 60 inches—grayish brown, mottled, firm silt loam and loam

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which have less clay in the subsoil than the Bluford soil and are on ridges and knolls above the Bluford soil

Similar inclusions:

- Soils that have less sand in the lower part of the subsoil
- Eroded soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required.
- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups*Land capability classification: 2e**Woodland ordination symbol: 4A**Productivity index: 109 (high level of management)***13B2—Bluford silt loam, 2 to 5 percent slopes, eroded****Composition**

Bluford soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting*Landscape: Uplands**Landform: Illinoian till plains**Landform position: Head slopes and side slopes**Shape of areas: Linear or oval**Size of areas: 5 to 20 acres**Major use: Cropland***Soil Properties and Qualities***Drainage class: Somewhat poorly drained**Permeability: Slow**Parent material: Loess and the underlying loamy sediments**Runoff: Medium**Available water capacity: High**Seasonal high water table: 1 to 3 feet below the surface**Content of organic matter: Moderately low**Erosion hazard: Moderate**Shrink-swell potential: Moderate**Potential for frost action: High***Typical Profile***Surface layer:*

0 to 3 inches—brown, friable silt loam

Subsurface layer:

3 to 9 inches—pale brown, mottled, friable silt loam

Subsoil:

9 to 14 inches—pale brown, mottled, friable silt loam

14 to 43 inches—mottled brown, pale brown, yellowish brown, and light brownish gray, firm silty clay loam

43 to 50 inches—mottled pale brown, yellowish brown, and light brownish gray, firm, slightly brittle silty clay loam

50 to 60 inches—light brownish gray, mottled, very firm, slightly brittle silt loam

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Coulterville soils, which have a concentration of sodium in the subsoil and are in landform positions similar to those of the Bluford soil

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in an underlying paleosol that formed in till
- Soils that formed in loamy water-worked sediments

Use and Management**Cropland***Suitability: Well suited**Management considerations:*

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
- Returning crop residue to the soil and adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay*Suitability: Well suited**Management considerations:*

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings*Suitability: Poorly suited**Management considerations:*

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields*Suitability: Poorly suited*

Management considerations:

- Installing subsurface tile 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:* 2e*Woodland ordination symbol:* 4A*Productivity index:* 106 (high level of management)**14B—Ava silt loam, 2 to 5 percent slopes****Composition**

Ava soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting*Landscape:* Uplands*Landform:* Illinoian till plains*Landform position:* Convex, narrow ridges and nose slopes*Shape of areas:* Linear or irregular*Size of areas:* 3 to 20 acres*Major use:* Cropland, pasture, or woodland**Soil Properties and Qualities***Drainage class:* Moderately well drained*Permeability:* Moderate in the upper part of the solum and very slow in the lower part*Parent material:* Loess and the underlying silty or loamy sediments*Runoff:* Medium*Available water capacity:* High*Seasonal high water table:* 1.5 to 3.5 feet below the surface*Content of organic matter:* Moderately low*Erosion hazard:* Slight*Shrink-swell potential:* Moderate*Potential for frost action:* High**Typical Profile***Surface layer:*

0 to 7 inches—brown, very friable silt loam

Subsoil:

7 to 11 inches—yellowish brown, friable silt loam

11 to 21 inches—yellowish brown, mottled, friable silty clay loam

21 to 30 inches—strong brown, mottled, firm silty clay loam

30 to 60 inches—strong brown, brown, and dark

yellowish brown, mottled, firm, slightly brittle silty clay loam and loam

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Bluford soils, which contain more clay in the subsoil than the Ava soil and are on broad interfluvial areas and in gently sloping areas at the head of drainageways
- The well drained Princeton soils, which are on the slightly higher upland ridges near major streams and contain more sand throughout than the Ava soil

Similar inclusions:

- Soils that formed in less than 30 inches of loess
- Soils that contain more sand in the upper part of the subsoil

Use and Management**Cropland***Suitability:* Well suited*Management considerations:*

- Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain productivity and tilth.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Woodland*Suitability:* Well suited*Management considerations:*

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to

prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Installing subsurface tile drains near the foundation helps to overcome the wetness.
- On sites for dwellings without basements, reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed to overcome the very slow permeability and the wetness.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 4A

Productivity index: 104 (high level of management)

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

Composition

Ava soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Shoulders and side slopes

Shape of areas: Linear

Size of areas: 5 to 15 acres

Major use: Woodland, pasture, or cropland

Soil Properties and Qualities

Drainage class: Moderately well drained

Permeability: Moderate in the upper part of the solum and very slow in the lower part

Parent material: Loess and the underlying silty or loamy sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—mixed brown and yellowish brown, friable silt loam

Subsoil:

7 to 30 inches—yellowish brown and pale brown, firm silty clay loam and silt loam

30 to 45 inches—yellowish brown, very firm, brittle silty clay loam

45 to 60 inches—yellowish brown, very firm, brittle clay loam and loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Bluford soils, which contain more clay in the subsoil than the Ava soil and are in the less sloping areas at the head of drainageways
- The well drained Princeton soils, which are in the slightly higher landform positions along major streams and contain more sand throughout than the Ava soil

Similar inclusions:

- Soils that formed in less than 30 inches of loess
- Soils that have a redder subsoil
- Soils that formed in loamy sediments and contain more sand in the surface layer and the upper part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, contour farming, and a conservation

tillage system that leaves crop residue on the surface after planting help to control erosion.

- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.
- Land shaping by cutting and filling helps to overcome the slope.
- On sites for dwellings without basements, reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing curtain drains higher on the side slopes than the absorption field lowers the water table.
- Installing specially designed systems that include sand filters helps to overcome the very slow permeability.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4A

Productivity index: 96 (high level of management)

27B2—Miami silt loam, 2 to 5 percent slopes, eroded

Composition

Miami soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes along drainageways; narrow ridges

Shape of areas: Irregular or linear

Size of areas: 4 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and slow in the substratum

Parent material: Calcareous glacial till or loess and the underlying calcareous glacial till

Runoff: Medium

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 7 inches—brown, friable silt loam

Subsoil:

7 to 13 inches—yellowish brown, friable clay loam

13 to 28 inches—yellowish brown, firm clay loam

28 to 38 inches—yellowish brown, calcareous, firm loam

Substratum:

38 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Xenia soils, which are on the wider interfluves and formed in 22 to 40 inches of loess and in the underlying glacial till

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in the underlying glacial till
- Soils that are calcareous within a depth of 20 inches

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
- Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited

Management considerations:

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- 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: 2e

Woodland ordination symbol: 5A

Productivity index: 115 (high level of management)

27C2—Miami loam, 5 to 10 percent slopes, eroded

Composition

Miami soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or linear

Size of areas: 5 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and slow in the substratum

Parent material: Calcareous glacial till or loess and the underlying calcareous glacial till

Runoff: Medium

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 5 inches—brown, friable loam

Subsoil:

5 to 20 inches—yellowish brown and dark yellowish brown, friable clay loam
 20 to 26 inches—brown, friable clay loam

Substratum:

26 to 60 inches—yellowish brown, calcareous, firm loam

Inclusions*Contrasting inclusions:*

- The moderately well drained Xenia soils, which are on the higher interfluves and formed in 22 to 40 inches of loess and in the underlying glacial till
- The poorly drained Comfrey soils, which are in the lower landform positions along drainageways and formed in loamy alluvium

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in the underlying glacial till
- Severely eroded soils that have more clay in the surface layer

Use and Management**Cropland**

Suitability: Moderately suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Moderately suited

Management considerations:

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- 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: 3e

Woodland ordination symbol: 5A

Productivity index: 113 (high level of management)

27C3—Miami loam, 5 to 10 percent slopes, severely eroded**Composition**

Miami soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or linear

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and slow in the substratum

Parent material: Calcareous glacial till

Runoff: Medium

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 5 inches—brown, friable loam

Subsoil:

5 to 24 inches—dark yellowish brown, firm clay loam

24 to 36 inches—yellowish brown, calcareous, firm loam

Substratum:

36 to 60 inches—yellowish brown, calcareous, very firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Xenia soils, which are on the higher interfluvies and formed in 22 to 40 inches of loess and in the underlying glacial till
- The poorly drained Comfrey soils, which are in the lower landform positions along drainageways and formed in loamy alluvium

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in the underlying glacial till
- Moderately eroded soils that have less clay in the surface layer
- Soils that are calcareous within a depth of 20 inches

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

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

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Establishing pasture plants or hay on this soil improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Seedbed preparation is difficult on these severely eroded side slopes. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely

deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited

Management considerations:

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

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- 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: 4e

Woodland ordination symbol: 5A

Productivity index: 104 (high level of management)

27D2—Miami loam, 10 to 15 percent slopes, eroded

Composition

Miami soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes along drainageways

Shape of areas: Irregular or linear

Size of areas: 5 to 15 acres

Major use: Pasture or cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and slow in the substratum

Parent material: Calcareous glacial till or loess and the underlying calcareous glacial till

Runoff: Rapid

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 5 inches—brown, friable loam

Subsurface layer:

5 to 8 inches—mixed brown and yellowish brown, friable loam

Subsoil:

8 to 19 inches—yellowish brown, friable clay loam

19 to 35 inches—dark yellowish brown, firm clay loam

Substratum:

35 to 60 inches—yellowish brown, calcareous, very firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Comfrey soils, which are in the lower landform positions along drainageways and formed in loamy alluvium
- The somewhat poorly drained Wakeland soils, which are in the lower landform positions along drainageways and formed in silty alluvium

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in the underlying glacial till
- Severely eroded soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.

- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- A no-till method of seeding or pasture renovation on the contour helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited

Management considerations:

- Land shaping by cutting and filling helps to overcome the slope.
- Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- 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: 4e

Woodland ordination symbol: 5A

Productivity index: 108 (high level of management)

27E—Miami loam, 15 to 30 percent slopes**Composition**

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

Setting

Landscape: Uplands
Landform: Wisconsinan till plains
Landform position: Side slopes along drainageways
Shape of areas: Linear or irregular
Size of areas: 5 to 60 acres
Major use: Woodland or pasture

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the solum and slow in the substratum
Parent material: Calcareous glacial till or loess and the underlying calcareous glacial till
Runoff: Rapid
Available water capacity: Moderate
Seasonal high water table: More than 6 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

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

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

Subsoil:
 9 to 13 inches—yellowish brown, friable clay loam
 13 to 23 inches—brown, firm clay loam
 23 to 31 inches—dark brown, calcareous, firm clay loam

Substratum:
 31 to 60 inches—yellowish brown, calcareous, very firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which are in the lower landform positions along streams and drainageways and formed in loamy alluvium
- The well drained Marseilles soils, which are on side slopes below the Miami soil and have weathered shale at a depth of 20 to 40 inches

Similar inclusions:

- Soils that are calcareous within a depth of 20 inches
- Soils that have more sand in the subsoil

Use and Management**Cropland**

Suitability: Generally unsuited because of the slope and the erosion hazard

Pasture and hay

Suitability: Poorly suited

Management considerations:

- Erosion control is needed when grasses and legumes are established in the pastured areas.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- A permanent cover of pasture plants helps to control erosion and maintains tilth.
- A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
- In areas where the pasture is established, interseeding legumes with a no-till seeder improves the quality of the forage.

Woodland

Suitability: Moderately suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soil is firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 6e

Woodland ordination symbol: 5R

Productivity index: 95 (high level of management)

27G—Miami loam, 30 to 60 percent slopes

Composition

Miami soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes along drainageways

Shape of areas: Linear or irregular

Size of areas: 10 to 100 acres

Major use: Woodland or pasture

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and slow in the substratum

Parent material: Calcareous glacial till or loess and the underlying calcareous glacial till

Runoff: Rapid

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 2 inches—very dark grayish brown, friable loam

Subsurface layer:

2 to 6 inches—brown, friable loam

Subsoil:

6 to 14 inches—brown, friable clay loam

14 to 24 inches—brown, firm clay loam

24 to 34 inches—yellowish brown, calcareous, firm loam

Substratum:

34 to 60 inches—brown, calcareous, very firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which are in the lower landform positions along streams and drainageways and formed in loamy alluvium
- The well drained Marseilles soils, which are on side slopes below the Miami soil and have weathered shale at a depth of 20 to 40 inches

Similar inclusions:

- Soils that are calcareous within a depth of 20 inches
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Generally unsuited because of the slope and the erosion hazard

Pasture and hay

Suitability: Generally unsuited because of the slope and the erosion hazard

Woodland

Suitability: Moderately suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soil is firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.

- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The wooded areas provide habitat for deer, wild turkeys, squirrels, and other woodland wildlife. Establishing or maintaining plants that provide food and cover for wildlife is difficult because of the slope and the hazard of erosion.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e

Woodland ordination symbol: 5R

Productivity index: 65 (high level of management)

48—Ebbert silt loam

Composition

Ebbert soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Low areas and shallow, closed depressions

Shape of areas: Oval or irregular

Ponding: Occurring for brief periods in spring

Size of areas: 3 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Very poorly drained

Permeability: Slow

Parent material: Loess

Runoff: Ponded

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderate

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

7 to 12 inches—very dark gray, friable silty clay loam

12 to 18 inches—grayish brown, mottled, friable silt loam

Subsoil:

18 to 31 inches—dark gray, mottled, firm silty clay loam

31 to 52 inches—grayish brown, mottled, firm silty clay loam

Substratum:

52 to 60 inches—grayish brown, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Hoyleton soils, which are on low swells and ridges and are not subject to ponding

Similar inclusions:

- Soils that have a thinner surface soil
- Soils that have more clay in the subsoil
- Soils in which the lower part of the surface soil is darker

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the slow permeability, but shallow surface drains and surface inlet tile are suitable.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water infiltration.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: Not assigned

Productivity index: 135 (high level of management)

50—Viriden silt loam**Composition**

Viriden soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Low areas and shallow, closed depressions

Shape of areas: Circular or linear

Ponding: Occurring for brief periods in spring

Size of areas: 10 to 160 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderately slow

Parent material: Loess and the underlying loamy sediments

Runoff: Ponded

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile*Surface layer:*

0 to 6 inches—very dark gray, friable silt loam

Subsurface layer:

6 to 11 inches—very dark gray, mottled, friable silt loam

Subsoil:

11 to 16 inches—dark grayish brown, mottled, firm silty clay loam

16 to 38 inches—dark grayish brown, mottled, very firm silty clay

38 to 57 inches—light brownish gray, mottled, firm silty clay loam

57 to 60 inches—light brownish gray, mottled, friable silty clay loam

Inclusions*Contrasting inclusions:*

- The poorly drained Piasa soils, which have a thinner dark surface soil than that of the Viriden soil, have a concentration of sodium in the subsoil, and are in the slightly higher landform positions

Similar inclusions:

- Soils that have a thinner dark surface soil
- Soils that have less clay in the subsoil
- Soils that have a dark surface soil more than 24 inches thick
- Soils that have less than 60 inches of loess

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Shallow surface drains (fig. 13), subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- 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.



Figure 13.—A shallow surface drain in an area of Virden silt loam.

- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches, subsurface tile, and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 135 (high level of management)

109—Raccoon silt loam

Composition

Raccoon soil and similar inclusions: 100 percent

Contrasting inclusions: 0 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: The head of drainageways; shallow, closed depressions

Shape of areas: Linear or irregular

Ponding: Occurring for brief periods in spring

Size of areas: 10 to 70 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Slow

Parent material: Loess and silty local alluvium

Runoff: Ponded

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderately low

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

8 to 12 inches—dark gray, mottled, friable silt loam

12 to 26 inches—grayish brown and light brownish gray, mottled, friable silt loam

Subsoil:

26 to 42 inches—light brownish gray and gray, mottled, firm silty clay loam

42 to 51 inches—gray and light gray, mottled, friable silty clay loam

51 to 60 inches—gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:

- None

Similar inclusions:

- Soils that have a darker surface layer
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the slow permeability, but shallow surface drains and surface inlet tile are suitable.
- Tilling when the soil is wet causes surface

compaction and decreases the rate of water infiltration.

- Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water infiltration.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 4W

Productivity index: 115 (high level of management)

120—Huey silt loam

Composition

Huey soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Broad flats and shallow depressions

Shape of areas: Irregular

Ponding: Occurring for brief periods in spring

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Very slow

Parent material: Loess and the underlying loamy sediments and paleosol, which formed in till

Runoff: Very slow

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

9 to 12 inches—light brownish gray, mottled, friable silt loam

Subsoil:

12 to 16 inches—light brownish gray, mottled, friable silt loam

16 to 37 inches—light brownish gray, mottled, firm silty clay loam

37 to 42 inches—light brownish gray, mottled, friable silt loam

42 to 60 inches—gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Bluford and Darmstadt soils, which are in the slightly higher landform positions

Similar inclusions:

- Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the very slow permeability, but a combination of surface ditches and land leveling can reduce the wetness.

- A high content of exchangeable sodium in the subsoil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Interpretive Groups

Land capability classification: 4w

Woodland ordination symbol: 3T

Productivity index: 92 (high level of management)

132A—Starks silt loam, 0 to 2 percent slopes

Composition

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

Setting

Landscape: Uplands and terraces

Landform: Stream terraces, outwash plains, and till plains

Landform position: Broad flats
Shape of areas: Irregular or oval
Size of areas: 5 to 30 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess or silty material and the underlying stratified, loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsurface layer:
 8 to 11 inches—pale brown, mottled, friable silt loam

Subsoil:
 11 to 24 inches—light yellowish brown and pale brown, mottled, friable silty clay loam
 24 to 29 inches—light yellowish brown, mottled, firm silty clay loam
 29 to 37 inches—grayish brown, mottled, firm loam
 37 to 46 inches—brown, mottled, friable sandy loam

Substratum:
 46 to 54 inches—stratified light brownish gray and dark yellowish brown, mottled, very friable silt loam and loamy sand
 54 to 60 inches—yellowish brown, mottled, firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Sexton soils, which have more clay in the subsoil than the Starks soil and are in lower landform positions
- The poorly drained Drummer soils, which have more clay in the subsoil than the Starks soil, have a darker surface soil, and are in lower landform positions

Similar inclusions:

- Soils that have loamy outwash at a depth of 40 to 60 inches
- Soils that have more sand in the surface soil and in the upper part of the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditches and subsurface drains reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains lowers the water table.
- Grading and land shaping help to remove excess surface water.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4A

Productivity index: 125 (high level of management)

132B—Starks silt loam, 2 to 5 percent slopes

Composition

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

Setting

Landscape: Uplands and terraces

Landform: Till plains, stream terraces, and outwash plains

Landform position: The head of drainageways, narrow ridges, and side slopes

Shape of areas: Linear or irregular

Size of areas: 5 to 15 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Loess or silty material and the underlying stratified, loamy outwash

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

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 14 inches—brown, mottled, friable silt loam

Subsoil:

14 to 22 inches—light olive brown, mottled, firm silty clay loam

22 to 32 inches—mottled grayish brown, yellowish brown, and strong brown, firm silty clay loam

32 to 50 inches—light brownish gray, mottled, very firm loam

50 to 60 inches—mottled light brownish gray, yellowish brown, and strong brown, firm sandy loam

Inclusions

Contrasting inclusions:

- The well drained Camden and Thebes soils, which are in landform positions similar to those of the Starks soil

Similar inclusions:

- Soils that have outwash below a depth of 40 inches
- Soils that have more sand in the surface soil and subsoil
- Soils that have Illinoian-age sediments in the substratum
- Moderately eroded soils that have a thinner surface soil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
- Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains lowers the water table.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 4A
 Productivity index: 124 (high level of management)

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

Composition

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

Setting

Landscape: Uplands and terraces
Landform: Outwash plains and stream terraces
Landform position: Terrace treads and swells
Shape of areas: Irregular
Size of areas: 5 to 70 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the solum and moderately rapid in the substratum
Parent material: Loess or silty material and the underlying loamy outwash
Runoff: Slow
Available water capacity: High
Seasonal high water table: More than 6 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
 8 to 12 inches—dark yellowish brown, friable silt loam
 12 to 35 inches—dark yellowish brown, friable silty clay loam
 35 to 46 inches—brown, very friable sandy clay loam

Substratum:
 46 to 60 inches—brown, very friable gravelly sandy loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Starks soils, which are in the lower landform positions

Similar inclusions:

- Soils that have more sand in the surface soil and in the upper part of the subsoil
- Soils that have a darker surface soil

Use and Management

Cropland

Suitability: Well suited
Management considerations:

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

Pasture and hay

Suitability: Well suited
Management considerations:

- A cover of grasses and legumes improves tilth.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields and causes surface compaction.
- Rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Moderately suited to dwellings without basements and well suited to dwellings with basements
Management considerations:

- Onsite investigation is required. On sites for dwellings without basements, 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
Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 1
Woodland ordination symbol: 7A

Productivity index: 120 (high level of management)

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

Composition

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

Setting

Landscape: Uplands and terraces

Landform: Outwash plains and stream terraces

Landform position: Swells and terrace risers

Shape of areas: Linear or irregular

Size of areas: 5 to 15 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and moderately rapid in the substratum

Parent material: Loess or silty material and the underlying loamy outwash

Runoff: Medium

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

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 10 inches—mixed dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:

10 to 14 inches—dark yellowish brown, friable silt loam

14 to 30 inches—dark yellowish brown and yellowish brown, friable silty clay loam

30 to 35 inches—brown, friable clay loam

35 to 42 inches—brown, very friable sandy loam

42 to 50 inches—brown, friable gravelly sandy clay loam

Substratum:

50 to 60 inches—yellowish brown and brown, loose, stratified sandy loam and sand

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Starks soils, which are in landform positions similar to those of the Camden soil

Similar inclusions:

- Soils that have more sand in the surface soil and in the upper part of the subsoil
- Soils that have Illinoian-age sediments in the substratum
- Moderately well drained soils that have gray colors in the lower part of the subsoil
- Moderately eroded soils in which subsoil material is mixed with the surface soil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements and well suited to dwellings with basements

Management considerations:

- Onsite investigation is required. On sites for dwellings without basements, 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

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 7A

Productivity index: 119 (high level of management)

136—Brooklyn silt loam

Composition

Brooklyn soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Outwash plains

Landform position: Broad flats and depressions

Shape of areas: Irregular

Ponding: Occurring for brief periods in spring

Size of areas: 2 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Slow

Parent material: Loess and the underlying stratified, loamy outwash

Runoff: Pondered

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderate

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

9 to 17 inches—grayish brown, mottled, friable silt loam

Subsoil:

17 to 25 inches—grayish brown, mottled, firm silty clay

25 to 45 inches—grayish brown and gray, mottled, firm silty clay loam

45 to 56 inches—gray, mottled, firm silt loam

Substratum:

56 to 60 inches—grayish brown, mottled, firm, stratified silt loam, silty clay loam, and sandy clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Millbrook soils, which are in the slightly higher landform positions and have less clay in the subsoil than the Brooklyn soil

Similar inclusions:

- Soils that formed in loess and the underlying Illinoian-age sediments
- Soils that have a lighter colored surface layer
- Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the slow permeability, but shallow surface drains and surface inlet tile are suitable.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water infiltration.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season

grasses include big bluestem, Indiangrass, and switchgrass.

- Shallow surface ditches and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 105 (high level of management)

138—Shiloh silty clay loam

Composition

Shiloh soil and similar inclusions: 100 percent

Contrasting inclusions: 0 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Shallow, closed depressions

Shape of areas: Linear or oval

Ponding: Occurring for brief periods in spring

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderately slow

Parent material: Loess and the underlying loamy sediments

Runoff: Ponded

Available water capacity: High

Seasonal high water table: 1 foot above to 1 foot below the surface

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 8 inches—black, friable silty clay loam

Subsurface layer:

8 to 18 inches—black, mottled, friable silty clay loam

Subsoil:

18 to 33 inches—black and very dark gray, mottled, firm silty clay loam

33 to 43 inches—dark gray, mottled, firm silty clay loam

43 to 60 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:

- None

Similar inclusions:

- Soils that have less clay in the subsoil
- Soils that have a dark surface soil 12 to 24 inches thick

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Shallow surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- 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.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches, subsurface tile, and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications

of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 135 (high level of management)

152—Drummer silt loam

Composition

Drummer soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands and terraces (fig. 14)

Landform: Wisconsinan till plains, outwash plains, and stream terraces

Landform position: Nearly level to depressional areas

Shape of areas: Linear or irregular

Ponding: Occurring for brief periods in spring

Size of areas: 3 to 40 acres

Major use: Cropland



Figure 14.—An area of Drummer silt loam. Starks soils are in the lighter colored area in the background.

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderately slow in the upper part of the solum and moderate in the lower part

Parent material: Loess or silty material and the underlying stratified, loamy outwash

Runoff: Pondered

Available water capacity: Very high

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 10 inches—very dark gray, friable silt loam

Subsurface layer:

10 to 14 inches—black, friable silty clay loam

14 to 20 inches—very dark grayish brown, mottled, friable silty clay loam

Subsoil:

20 to 26 inches—dark grayish brown, mottled, firm silty clay loam

26 to 50 inches—grayish brown, mottled, firm silty clay loam

50 to 60 inches—stratified grayish brown, dark grayish brown, light brownish gray, and yellowish brown, friable sandy clay loam, sandy loam, and loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Sunbury soils, which have a thinner dark surface soil than that of the Drummer soil, have more clay in the substratum, and are in slightly higher landform positions
- The somewhat poorly drained Sabina soils, which have a light colored surface soil, have more clay in the substratum than the Drummer soil, and are in slightly higher landform positions
- The somewhat poorly drained Starks soils, which have a light colored surface soil, have less clay in the subsoil than the Drummer soil, and are in slightly higher landform positions

Similar inclusions:

- Soils that have a dark surface soil more than 24 inches thick
- Soils that formed in 40 to 60 inches of loess or silty material and in the underlying glacial till

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Shallow surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- 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.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches, subsurface tile, and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding and the seasonal high water table

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding and the seasonal high water table

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 150 (high level of management)

208—Sexton silt loam

Composition

Sexton soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands and terraces

Landform: Till plains, outwash plains, and stream terraces

Landform position: Shallow, closed depressions and the head of drainageways

Shape of areas: Linear

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderate in the upper part of the solum and slow in the lower part

Parent material: Loess or silty material and the underlying stratified, loamy outwash

Runoff: Slow

Available water capacity: High

Seasonal high water table: Within 1 foot of the surface

Content of organic matter: Moderately low

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 9 inches—brown, friable silt loam that is mottled in the lower part

Subsurface layer:

9 to 21 inches—light brownish gray, mottled, friable silt loam

Subsoil:

21 to 36 inches—light brownish gray, mottled, firm silty clay loam

36 to 44 inches—grayish brown, mottled, friable silty clay loam

44 to 52 inches—light brownish gray, mottled, friable, stratified clay loam and sandy clay loam

Substratum:

52 to 60 inches—gray, mottled, friable, stratified silt loam and fine sandy loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Starks soils, which

are in the slightly higher landform positions and have less clay in the subsoil than the Sexton soil

Similar inclusions:

- Soils that have less clay in the subsoil
- Soils that have more sand in the surface layer
- Soils that have Illinoian-age sediments in the substratum
- Soils that are ponded for brief periods

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in this soil because of the slow permeability, but shallow surface drains and surface inlet tile are suitable.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water infiltration.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation 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 considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4W

Productivity index: 115 (high level of management)

212B—Thebes silt loam, 2 to 5 percent slopes**Composition**

Thebes soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands and terraces

Landform: Illinoian till plains and stream terraces

Landform position: Narrow interfluves; side slopes

Shape of areas: Linear or oval

Size of areas: 5 to 20 acres

Major use: Cropland in most areas; woodland in some areas

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and rapid in the substratum

Parent material: Loess and the underlying sandy eolian material

Runoff: Medium

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—brown, friable silt loam

Subsurface layer:

7 to 11 inches—yellowish brown, friable silt loam

Subsoil:

11 to 19 inches—yellowish brown, friable silt loam

19 to 27 inches—yellowish brown, friable silty clay loam

27 to 33 inches—yellowish brown, friable sandy loam

Substratum:

33 to 58 inches—stratified brown, yellowish brown, and light yellowish brown, very friable sandy loam, loamy sand, and sand

58 to 70 inches—grayish brown, mottled, firm silt loam

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which have less sand in the substratum than the Thebes soil and are in lower landform positions
- The somewhat poorly drained Starks soils, which are in the slightly lower landform positions

Similar inclusions:

- Soils that have more sand in the surface soil and in the upper part of the subsoil
- Soils that have Illinoian-age drift in the substratum

Use and Management**Cropland**

Suitability: Moderately suited

Management considerations:

- Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and conserve moisture.
- Selecting short-season or drought-tolerant crop varieties helps to overcome the moderate available water capacity.
- Leaving crop residue on the surface helps to conserve moisture.

Pasture and hay

Suitability: Well suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.

- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Well suited to dwellings with basements and moderately suited to dwellings without basements

Management considerations:

- On sites for dwellings without basements, 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 considerations:

- The 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: 2e

Woodland ordination symbol: 4A

Productivity index: 104 (high level of management)

218—Newberry silt loam

Composition

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

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Shallow, closed depressions and the head of drainageways

Shape of areas: Linear or irregular

Size of areas: 5 to 100 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Slow

Parent material: Loess and the underlying loamy sediments

Runoff: Slow

Available water capacity: High

Seasonal high water table: Within 1 foot of the surface

Content of organic matter: Moderate

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

9 to 20 inches—grayish brown and light brownish gray, mottled, friable silt loam

Subsoil:

20 to 27 inches—gray, mottled, friable silty clay loam

27 to 55 inches—gray, mottled, firm silty clay loam

55 to 60 inches—gray and dark gray, mottled, firm silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Piasa soils, which have a concentration of sodium in the subsoil, have more clay in the subsoil than the Newberry soil, and are in landform positions similar to those of the Newberry soil

Similar inclusions:

- Soils that have more clay in the subsoil
- Soils that have a lighter colored surface layer
- Soils that have a thicker dark surface soil and have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.

Tile drains do not function well in this soil because of the slow permeability, but shallow surface drains and surface inlet tile are suitable.

- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water infiltration.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 120 (high level of management)

219A—Millbrook silt loam, 0 to 2 percent slopes

Composition

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

Setting

Landscape: Uplands

Landform: Outwash plains

Landform position: Low ridges

Shape of areas: Irregular

Size of areas: 3 to 100 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Loess and the underlying loamy outwash

Runoff: Slow

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

8 to 14 inches—light brownish gray, mottled, friable silt loam

Subsoil:

14 to 20 inches—yellowish brown, mottled, firm silty clay loam

20 to 32 inches—grayish brown, mottled, firm silty clay loam

32 to 52 inches—light brownish gray and grayish brown, mottled, firm clay loam

Substratum:

52 to 60 inches—dark yellowish brown and yellowish brown, mottled, friable, stratified clay loam, sandy clay loam, and silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Brooklyn and Drummer soils, which are in drainageways and depressions below the Millbrook soil

Similar inclusions:

- Soils that have a surface layer that is lighter in color
- Soils that have more sand in the subsoil
- Soils that have slopes of more than 2 percent

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditches and subsurface drains reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required.
- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 1

Woodland ordination symbol: 4A

Productivity index: 140 (high level of management)

234A—Sunbury silt loam, 0 to 2 percent slopes

Composition

Sunbury soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Broad interfluves

Shape of areas: Irregular

Size of areas: 10 to 50 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate in the upper part of the solum and moderately slow in the lower part

Parent material: Loess and the underlying loamy glacial till

Runoff: Slow

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: 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

Subsoil:

9 to 15 inches—brown, mottled, friable silt loam

15 to 24 inches—brown, mottled, firm silty clay loam

24 to 41 inches—yellowish brown, mottled, firm silty clay loam

41 to 53 inches—mottled grayish brown, yellowish brown, and brown, firm loam

Substratum:

53 to 60 inches—yellowish brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Drummer soils, which have a thicker dark surface soil than that of the Sunbury soil and are in lower areas

Similar inclusions:

- Soils that have less clay in the subsoil and formed in 22 to 40 inches of loess and in the underlying glacial till
- Soils that have a lighter colored surface layer
- Soils that have a lighter colored surface layer, formed in 22 to 40 inches of loess and in the underlying glacial till, and do not have mottles in the upper part of the subsoil

Use and Management**Cropland***Suitability:* Well suited*Management considerations:*

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditches and subsurface drains reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings*Suitability:* Poorly suited*Management considerations:*

- Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
- On sites for dwellings with basements, installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields*Suitability:* Poorly suited*Management considerations:*

- Installing subsurface tile drains lowers the water table.
- Grading and land shaping help to remove surface water.
- Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups*Land capability classification:* 1*Woodland ordination symbol:* Not assigned*Productivity index:* 140 (high level of management)**236A—Sabina silt loam, 0 to 2 percent slopes****Composition**

Sabina soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting*Landscape:* Uplands*Landform:* Wisconsinan till plains*Landform position:* Broad interfluves*Shape of areas:* Irregular*Size of areas:* 5 to 60 acres*Major use:* Cropland**Soil Properties and Qualities***Drainage class:* Somewhat poorly drained*Permeability:* Moderately slow*Parent material:* Loess and the underlying loamy glacial till*Runoff:* Slow*Available water capacity:* High*Seasonal high water table:* 1.5 to 3.5 feet below the surface*Content of organic matter:* Moderately low*Erosion hazard:* Slight*Shrink-swell potential:* High*Potential for frost action:* High**Typical Profile***Surface layer:*

0 to 8 inches—grayish brown, very friable silt loam

Subsurface layer:

8 to 12 inches—brown, mottled, very friable silt loam

Subsoil:

12 to 19 inches—brown, mottled, friable silty clay loam

19 to 54 inches—yellowish brown, mottled, firm silty clay loam

54 to 60 inches—yellowish brown, mottled, firm clay loam

Inclusions*Contrasting inclusions:*

- The poorly drained Drummer soils, which have a darker surface soil than that of the Sabina soil and are in lower areas

Similar inclusions:

- Soils that have a darker surface layer
- Soils that have less clay in the subsoil and formed in 22 to 40 inches of loess and in the underlying glacial till
- Soils that formed in 22 to 40 inches of loess and in the underlying glacial till and are brown in the upper part of the subsoil

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth and helps to control erosion.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditches and subsurface drains reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and

timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
- On sites for dwellings with basements, installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains lowers the water table.
- Grading and land shaping help to remove surface water.
- Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4A

Productivity index: 130 (high level of management)

291B—Xenia silt loam, 2 to 5 percent slopes***Composition***

Xenia soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Narrow ridges; side slopes along drainageways

Shape of areas: Linear or irregular

Size of areas: 3 to 45 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained

Permeability: Moderate in the upper part of the solum and moderately slow in the lower part

Parent material: Loess and the underlying calcareous, loamy till

Runoff: Medium

Available water capacity: High
Seasonal high water table: 2.0 to 3.5 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
 7 to 12 inches—yellowish brown, friable silt loam
 12 to 16 inches—yellowish brown, mottled, friable silty clay loam
 16 to 32 inches—yellowish brown, mottled, firm silty clay loam
 32 to 45 inches—yellowish brown, mottled, calcareous, firm clay loam

Substratum:
 45 to 60 inches—brown, calcareous, firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Drummer soils, which formed in 40 to 60 inches of loess and are lower on the landscape than the Xenia soil
- The well drained Miami soils, which formed in less than 20 inches of loess and in the underlying glacial till and are more sloping than the Xenia soil

Similar inclusions:

- Soils that have more clay in the subsoil, are more gray in the upper part of the subsoil, and formed in 40 to 60 inches of loess and in the underlying glacial till

Use and Management

Cropland

Suitability: Well suited
Management considerations:

- A conservation tillage system 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 adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements and poorly suited to dwellings with basements

Management considerations:

- Installing foundation drains lowers the water table.
- On sites for dwellings without basements, extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains higher on the side slopes than the absorption field lowers the water table.
- Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 5A

Productivity index: 124 (high level of management)

322C2—Russell silt loam, 5 to 10 percent slopes, eroded

Composition

Russell soil and similar inclusions: 100 percent
 Contrasting inclusions: 0 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Side slopes and ridgetops

Shape of areas: Irregular

Size of areas: 3 to 75 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Loess and the underlying loamy glacial till

Runoff: Medium

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: 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 30 inches—brown and dark yellowish brown, firm silty clay loam

30 to 60 inches—yellowish brown and dark yellowish brown, firm clay loam

Inclusions

Contrasting inclusions:

- None

Similar inclusions:

- Soils that have more sand in the upper part of the subsoil
- Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion.
- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.

- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited

Management considerations:

- Onsite investigation is required.
- Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 5A

Productivity index: 118 (high level of management)

327B2—Fox gravelly sandy loam, 2 to 5 percent slopes, eroded

Composition

Fox soil and similar inclusions: 100 percent
Contrasting inclusions: 0 percent

Setting

Landscape: Terraces
Landform: Stream terraces
Landform position: Narrow treads and risers
Shape of areas: Linear
Size of areas: 5 to 30 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate in the solum and rapid in the substratum
Parent material: Loamy material and the underlying deposits of calcareous sand and gravel
Runoff: Medium
Available water capacity: Low
Seasonal high water table: More than 6 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—brown, friable gravelly sandy loam
4 to 7 inches—brown, friable sandy loam
Subsoil:
7 to 25 inches—brown, firm gravelly sandy clay loam
25 to 32 inches—reddish brown, friable gravelly sandy clay loam
Substratum:
32 to 60 inches—yellowish brown, calcareous, loose very gravelly sand

Inclusions

Contrasting inclusions:

- None

Similar inclusions:

- Soils that have less sand and gravel in the upper part of the solum
- Soils that have more sand and gravel in the solum

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and conserve moisture.
- Incorporation of crop residue into the soil or additions of other organic material improve tilth.
- Selecting short-season or drought-tolerant crop varieties helps to overcome the low available water capacity.

Pasture and hay

Suitability: Well suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Well suited to dwellings with basements and moderately suited to dwellings without basements

Management considerations:

- On sites for dwellings without basements, 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 considerations:

- The 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: 2e

Woodland ordination symbol: 4A

Productivity index: 101 (high level of management)

327C2—Fox gravelly sandy loam, 5 to 10 percent slopes, eroded

Composition

Fox soil and similar inclusions: 100 percent
Contrasting inclusions: 0 percent

Setting

Landscape: Terraces

Landform: Stream terraces

Landform position: Risers

Shape of areas: Linear

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and rapid in the substratum

Parent material: Loamy material and the underlying deposits of calcareous sand and gravel

Runoff: Rapid

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 6 inches—brown, friable gravelly sandy loam

Subsoil:

6 to 24 inches—brown, firm gravelly sandy clay loam

24 to 32 inches—brown, friable gravelly sandy clay loam

32 to 37 inches—brown, friable sandy loam

Substratum:

37 to 50 inches—dark yellowish brown and brown, very friable, stratified loamy sand and sand

50 to 60 inches—brown, calcareous, loose gravelly sand

Inclusions

Contrasting inclusions:

- None

Similar inclusions:

- Soils that have less sand and gravel in the upper part of the solum
- Soils that have more sand and gravel in the solum
- Soils that have glacial till in the substratum

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, improve tilth, and conserve moisture.

Pasture and hay

Suitability: Well suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- A no-till method of pasture renovation or seedbed preparation helps to conserve moisture and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Well suited to dwellings with basements and moderately suited to dwellings without basements

Management considerations:

- On sites for dwellings without basements, 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 considerations:

- The 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: 3e

Woodland ordination symbol: 4A

Productivity index: 99 (high level of management)

330—Peotone silty clay loam**Composition**

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

Setting

Landscape: Uplands

Landform: Wisconsinan till plains and outwash plains

Landform position: Shallow depressions

Shape of areas: Round or oval

Ponding: Occurring for brief periods in spring

Size of areas: 3 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Very poorly drained

Permeability: Moderately slow

Parent material: Silty sediments

Runoff: Poned

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

0 to 9 inches—black, firm silty clay loam

Subsurface layer:

9 to 15 inches—black, firm silty clay loam

Subsoil:

15 to 26 inches—very dark gray, firm silty clay loam

26 to 35 inches—dark gray, mottled, firm silty clay loam

35 to 40 inches—gray, mottled, calcareous, firm silty clay loam

Stratum:

40 to 60 inches—dark gray, mottled, calcareous, firm silt loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Millbrook soils, which are on slight rises and side slopes above the Peotone soil
- Soils that are ponded for long periods during the growing season

Similar inclusions:

- Soils in which the upper part of the subsoil is lighter in color
- Soils that contain less clay in the surface soil and subsoil

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Shallow surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Land grading helps to control the ponding.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- 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.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor tilth.
- The seasonal high water table and the ponding restrict the growth of some forage crops.
- Canarygrass, alsike clover, and ladino clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow surface ditches, subsurface tile, and tile inlets help to remove water from the soil.
- Proper stocking rates, rotation grazing, applications of fertilizer, timely harvesting, and deferred grazing when the soil is wet help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: Not assigned
Productivity index: 120 (high level of management)

353A—Toronto silt loam, 0 to 2 percent slopes

Composition

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

Setting

Landscape: Uplands
Landform: Wisconsinan till plains
Landform position: Broad ridges
Shape of areas: Irregular
Size of areas: 3 to 200 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate in upper part of the solum and moderately slow in the lower part
Parent material: Loess and the underlying loamy glacial till
Runoff: Slow
Available water capacity: High
Seasonal high water table: 1 to 3 feet below the surface
Content of organic matter: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
 8 to 14 inches—yellowish brown, mottled, firm silty clay loam
 14 to 37 inches—light brownish gray, mottled, firm silty clay loam
 37 to 44 inches—light brownish gray, mottled, firm loam

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

Inclusions

Contrasting inclusions:

- The poorly drained Drummer soils, which are in drainageways and depressions below the Toronto soil

Similar inclusions:

- Soils that have a surface layer that is lighter in color
- Soils that have more sand in the upper part of the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditches and subsurface drains reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required.
- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 135 (high level of management)

408—Aquents, loamy, nearly level**Composition**

Aquents and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Uplands

Landform: Till plains

Landform position: Flat areas modified by cutting, filling, and leveling; near residential and commercial areas and borrow and fill areas

Shape of areas: Rectangular or irregular

Size of areas: 3 to 15 acres

Major use: Idle or a nonfarm use

Soil Properties and Qualities

Drainage class: Somewhat poorly drained or poorly drained

Permeability: Moderate or moderately rapid, depending on the degree of compaction caused by construction equipment

Parent material: A mixture of loess and loamy sediments

Runoff: Slow

Available water capacity: Moderate

Seasonal high water table: 0.5 foot above to 2.0 feet below the surface

Content of organic matter: Low

Erosion hazard: Slight

Typical Profile

Surface layer:

0 to 4 inches—olive gray, calcareous, very firm silty clay loam

Substratum:

4 to 18 inches—light olive gray, mottled, calcareous, very firm gravelly silty clay loam

18 to 60 inches—very dark gray and olive gray, mottled, calcareous, very firm silty clay loam

Inclusions

Contrasting inclusions:

- Roads and buildings
- Areas of debris
- Steep sidewall areas
- Soils that have shale bedrock within a depth of 12 inches

Similar inclusions:

- Natural soil areas
- Soils that have more than 35 percent rock fragments

Use and Management**Nonfarm uses**

Suitability: Onsite investigation is needed to determine the limitations or hazards affecting the suitability of a given area for specific uses.

Management considerations:

- Surface ditches can help to remove excess water if suitable outlets are available.
- Special management is needed to establish and maintain a good cover of sod, trees, or shrubs.
- Tall fescue and crown vetch are suitable for planting.

Interpretive Groups

Land capability classification: Not assigned

Woodland ordination symbol: Not assigned

Productivity index: Not assigned

496A—Fincastle silt loam, 0 to 2 percent slopes**Composition**

Fincastle soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Wisconsinan till plains

Landform position: Flat or slightly concave areas

Shape of areas: Irregular

Size of areas: 3 to 200 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate in the upper part of the solum and moderately slow in the lower part

Parent material: Loess and the underlying loamy glacial till

Runoff: Slow

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 8 inches—brown, friable silt loam

Subsurface layer:

8 to 11 inches—grayish brown, mottled, firm silt loam

Subsoil:

11 to 32 inches—yellowish brown, mottled, firm silty clay loam

32 to 50 inches—yellowish brown, mottled, firm clay loam and loam

Substratum:

50 to 60 inches—yellowish brown, mottled, calcareous, friable loam

Inclusions

Contrasting inclusions:

- The poorly drained Drummer soils, which are in shallow depressions and drainageways below the Fincastle soil

Similar inclusions:

- Soils that have a darker surface layer
- Soils that have stratified loam and loamy sand in the substratum

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available.
- Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required.
- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4A

Productivity index: 130 (high level of management)

570C2—Martinsville silt loam, 5 to 10 percent slopes, eroded

Composition

Martinsville soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Terraces and uplands

Landform: Stream terraces and outwash plains

Landform position: Side slopes

Shape of areas: Irregular

Size of areas: 5 to 35 acres

Major use: Woodland or cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part of the solum and moderately rapid in the lower part

Parent material: A thin mantle of loess and the underlying loamy outwash
Runoff: Medium
Available water capacity: High
Seasonal high water table: More than 6 feet below the surface
Content of organic matter: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

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

Subsoil:
 8 to 20 inches—dark yellowish brown, firm loam
 20 to 28 inches—brown, firm clay loam
 28 to 60 inches—yellowish brown and dark yellowish brown, firm sandy loam and sandy clay loam

Inclusions

Contrasting inclusions:
 • The poorly drained Brooklyn and Drummer and somewhat poorly drained Starks soils, which are in the less sloping areas above the Martinsville soil

Similar inclusions:
 • Soils that contain less sand and more silt in the upper part of the subsoil

Use and Management

Cropland

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

Pasture and hay

Suitability: Well suited
Management considerations:
 • A cover of grasses and legumes improves tilth and helps to control erosion.
 • Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
 • Proper stocking rates, rotation grazing, timely

deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
 • Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
 • The plants should not be grazed or clipped until they are sufficiently established.

Woodland

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

Wildlife habitat

Suitability: Well suited
Management considerations:
 • Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Well suited to dwellings with basements and moderately suited to dwellings without basements
Management considerations:
 • Onsite investigation is required.
 • On sites for dwellings without basements, 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
Management considerations:
 • Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4A
 Productivity index: 108 (high level of management)

581B2—Tamalco silt loam, 2 to 5 percent slopes, eroded

Composition

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

Setting

Landscape: Uplands
Landform: Illinoian till plains
Landform position: Narrow ridges and side slopes
Shape of areas: Linear or oval
Size of areas: 5 to 30 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Very slow
Parent material: Loess and the underlying loamy sediments
Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: 2.5 to 5.0 feet below the surface
Content of organic matter: Moderate
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsoil:
 9 to 23 inches—brown, firm silty clay and silty clay loam
 23 to 38 inches—yellowish brown, mottled, firm silty clay loam
 38 to 47 inches—mottled brown and gray, firm silty clay loam
 47 to 60 inches—yellowish brown, mottled, firm loam

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which are in landform positions similar to those of the Tamalco soil, contain less clay in the subsoil than the Tamalco soil, and do not have a concentration of sodium in the subsoil
- The somewhat poorly drained Darmstadt soils, which are in the less sloping, lower areas

Similar inclusions:

- Soils that have less clay in the subsoil
- Well drained soils that have a yellowish brown subsoil without mottles
- Soils that have slopes of less than 2 percent

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting 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 help to maintain tilth and fertility and increase the rate of water infiltration.
- A high content of exchangeable sodium in the subsoil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Climatically adapted forage and hay plants grow well on this soil.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Moderately suited

Management considerations:

- Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.
- On sites for dwellings with basements, installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains higher on the slopes than the absorption field lowers the water table.
- Increasing the size of the filter field or replacing the

soil with more permeable material helps to overcome the very slow permeability.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 4T

Productivity index: 71 (high level of management)

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

Composition

Darmstadt soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Low swells on broad flats

Shape of areas: Irregular

Size of areas: 3 to 100 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Very slow

Parent material: Loess and the underlying loamy sediments

Runoff: Slow

Available water capacity: Moderate

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown, friable silt loam

Subsurface layer:

9 to 15 inches—light brownish gray, mottled, friable silt loam

Subsoil:

15 to 26 inches—brown, mottled, firm silty clay

26 to 44 inches—grayish brown, mottled, firm silty clay loam

44 to 53 inches—light brownish gray, mottled, firm silty clay loam

Substratum:

53 to 60 inches—light brownish gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:

- The poorly drained Huey soils, which are in the lower flat areas
- Hoyleton soils, which have a darker surface layer than that of the Darmstadt soil and have a low content of sodium in the subsoil

Similar inclusions:

- Soils that contain more clay in the subsoil
- Soils in which the sodium concentration is nearer the surface

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Surface ditches help to remove excess water.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.
- A high content of exchangeable sodium in the subsoil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required.
- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields

must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 4T

Productivity index: 80 (high level of management)

621B2—Coulterville silt loam, 2 to 5 percent slopes, eroded

Composition

Coulterville soil and similar inclusions: 75 to 95 percent

Contrasting inclusions: 5 to 25 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Head slopes and side slopes along drainageways

Shape of areas: Linear

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Slow

Parent material: Loess and the underlying loamy sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Low

Erosion hazard: Moderate

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 8 inches—brown, friable silt loam

Subsoil:

8 to 24 inches—yellowish brown and brown, mottled, friable silty clay loam

24 to 44 inches—mottled light brownish gray, brown, and strong brown, friable silt loam

44 to 55 inches—mottled grayish brown, brown, and strong brown, firm silt loam

55 to 60 inches—mottled yellowish brown, light brownish gray, and strong brown, firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Blair soils, which have more sand in the subsoil than the Coulterville soil, do not have a concentration of sodium in the subsoil, and are in landform positions similar to those of the Coulterville soil
- The somewhat poorly drained Bluford soils, which have more clay in the subsoil than the Coulterville soil, do not have a concentration of sodium in the subsoil, and are in landform positions similar to those of the Coulterville soil
- The somewhat poorly drained Fishhook soils, which do not have a concentration of sodium in the subsoil and have a paleosol that formed in till at a depth of 20 to 40 inches

Similar inclusions:

- Soils that have a sodium concentration of more than 15 percent in the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting 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 help to maintain tilth and fertility and increase the rate of water infiltration.
- A high content of exchangeable sodium in the subsoil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.

Pasture and hay

Suitability: Well suited

Management considerations:

- Climatically adapted forage and hay plants grow well on this soil.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture

or hayland in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing curtain 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: 2e

Woodland ordination symbol: 4A

Productivity index: 105 (high level of management)

631B2—Princeton fine sandy loam, 2 to 5 percent slopes, eroded

Composition

Princeton soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands and terraces

Landform: Illinoian till plains and stream terraces

Landform position: Narrow ridgetops and side slopes

Shape of areas: Linear or oval

Size of areas: 5 to 20 acres

Major use: Cropland or woodland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part of the solum and moderately rapid in the lower part

Parent material: Loamy eolian material

Runoff: Medium

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Moderate

Shrink-swell potential: Low

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 5 inches—dark yellowish brown, very friable fine sandy loam

Subsoil:

5 to 20 inches—dark yellowish brown and brown, friable sandy clay loam

20 to 52 inches—strong brown, very friable sandy loam and fine sandy loam

52 to 60 inches—light yellowish brown, loose sand with bands of dark yellowish brown loamy sand

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which have less sand throughout than the Princeton soil and are in landform positions similar to those of the Princeton soil
- The somewhat poorly drained Starks soils, which have less sand in the upper part of the subsoil than the Princeton soil and are in lower landform positions

Similar inclusions:

- Soils that have less sand in the upper part of the subsoil
- Soils that have Illinoian-age sediments in the substratum
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and conserve moisture.

Pasture and hay

Suitability: Well suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely harvesting, and timely deferment of grazing help to

keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 5A

Productivity index: 106 (high level of management)

631C2—Princeton fine sandy loam, 5 to 10 percent slopes, eroded

Composition

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

Setting

Landscape: Uplands and terraces

Landform: Illinoian till plains and stream terraces

Landform position: Narrow ridgetops and side slopes

Shape of areas: Linear or irregular

Size of areas: 5 to 20 acres

Major use: Cropland or woodland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part of the solum and moderately rapid in the lower part

Parent material: Loamy eolian material

Runoff: Rapid

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Low

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 7 inches—brown, very friable fine sandy loam

Subsoil:

7 to 13 inches—yellowish brown, very friable loam

13 to 41 inches—yellowish brown, friable loam

41 to 50 inches—yellowish brown, mottled, friable fine sandy loam

50 to 58 inches—yellowish brown, very friable fine sandy loam

58 to 71 inches—yellowish brown, loose sand with bands of dark yellowish brown loamy fine sand

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which have less sand throughout than the Princeton soil and are in landform positions similar to those of the Princeton soil
- The somewhat poorly drained Blair soils, which have less sand throughout than the Princeton soil and are in lower landform positions

Similar inclusions:

- Soils that have less sand in the upper part of the subsoil
- Soils that have Illinoian-age sediments in the substratum
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and conserve moisture.

- Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, improve tilth, and conserve moisture.

Pasture and hay

Suitability: Well suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- A no-till method of pasture renovation or seedbed preparation helps to conserve moisture and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: 5A

Productivity index: 104 (high level of management)

631D2—Princeton fine sandy loam, 10 to 15 percent slopes, eroded

Composition

Princeton soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands and terraces

Landform: Illinoian till plains and stream terraces

Landform position: Side slopes along drainageways

Shape of areas: Linear

Size of areas: 5 to 15 acres

Major use: Cropland or woodland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the upper part of the solum and moderately rapid in the lower part

Parent material: Loamy eolian material

Runoff: Rapid

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Low

Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 7 inches—yellowish brown, friable fine sandy loam

Subsoil:

7 to 24 inches—strong brown, friable sandy clay loam

24 to 42 inches—strong brown, very friable sandy loam

42 to 60 inches—yellowish brown and strong brown, loose, stratified sand and sandy loam

Inclusions

Contrasting inclusions:

- The well drained Hickory soils, which formed in glacial till, have more clay throughout than the Princeton soil, and are in lower landform positions
- The well drained Ursa soils, which have a paleosol

that formed in till, have more clay throughout than the Princeton soil, and are in lower landform positions

Similar inclusions:

- Soils that have less sand in the upper part of the subsoil
- Soils that have Illinoian-age sediments in the substratum
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- A conservation tillage system that leaves crop residue on the surface after planting, a crop rotation that is dominated by forage crops, and contour farming help to control erosion and conserve moisture.
- Returning crop residue to the soil and regularly adding other organic material improve tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands and control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- A no-till method of pasture renovation or seedbed preparation helps to conserve moisture and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited

Management considerations:

- Cutting, filling, and land shaping help to overcome the slope.

Septic tank absorption fields

Suitability: Moderately suited

Management considerations:

- Installing the filter lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 4e

Woodland ordination symbol: 5A

Productivity index: 100 (high level of management)

802B—Orthents, loamy, nonacid, gently sloping

Composition

Orthents and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Uplands

Landform position: Areas modified by cutting, filling, and leveling; near residential and commercial areas, highway interchanges and overpasses, and borrow and fill areas

Shape of areas: Linear, rectangular, or irregular

Size of areas: 3 to 30 acres

Major use: Idle or a nonfarm use

Soil Properties and Qualities

Drainage class: Moderately well drained or somewhat poorly drained

Permeability: Moderate to slow, depending on the degree of compaction caused by construction equipment

Parent material: A mixture of loess and loamy sediments

Runoff: Medium
Available water capacity: Moderate
Seasonal high water table: 4 to 6 feet below the surface
Content of organic matter: Low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

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

Substratum:
 2 to 25 inches—yellowish brown and strong brown, calcareous, friable loam
 25 to 42 inches—brown and yellowish brown, calcareous, firm loam
 42 to 60 inches—yellowish brown, mottled, calcareous, firm loam

Inclusions

Contrasting inclusions:

- Roads and buildings
- Areas of debris
- Steep sidewall areas

Similar inclusions:

- Natural soil areas
- Soils that contain more than 35 percent rock fragments

Use and Management

Residential, commercial, or other nonfarm uses

Suitability: Onsite investigation is needed to determine the limitations or hazards affecting the suitability of a given area for specific uses.

Management considerations:

- A good cover of sod helps to control erosion.
- Special management is needed to establish and maintain a plant cover that helps to control runoff and erosion.

Interpretive Groups

Land capability classification: Not assigned

Woodland ordination symbol: Not assigned

Productivity index: Not assigned

802E—Orthents, loamy, nonacid, strongly sloping

Composition

Orthents and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Uplands

Landform position: Areas modified by cutting, filling, and leveling; near residential and commercial areas, highway interchanges and overpasses, and borrow and fill areas

Shape of areas: Linear, rectangular, or irregular

Size of areas: 5 to 30 acres

Major use: Idle or a nonfarm use

Soil Properties and Qualities

Drainage class: Well drained or moderately well drained

Permeability: Moderate to slow, depending on the degree of compaction caused by construction equipment

Parent material: A mixture of loess, loamy sediments, and glacial till

Runoff: Rapid

Available water capacity: Moderate

Seasonal high water table: 4 to 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:
 0 to 1 inch—dark grayish brown, very friable silt loam

Substratum:
 1 to 10 inches—brown and yellowish brown, friable silt loam and loam
 10 to 14 inches—brown, mottled, calcareous, very firm sandy loam
 14 to 44 inches—mottled strong brown, yellowish brown, and gray, very firm clay loam, silty clay loam, and silt loam
 44 to 60 inches—dark gray, friable silt loam

Inclusions

Contrasting inclusions:

- Roads and buildings
- Areas of debris
- Gently sloping areas
- Small areas of permanent water

Similar inclusions:

- Natural soil areas
- Soils that contain more than 35 percent rock fragments

Use and Management

Nonfarm uses

Suitability: Onsite investigation is needed to determine the limitations or hazards affecting the suitability of a given area for specific uses.

Management considerations:

- A good cover of sod, trees, or shrubs helps to control erosion.
- Special management is needed to establish and maintain a plant cover that helps to control runoff and erosion.

Interpretive Groups

Land capability classification: Not assigned

Woodland ordination symbol: Not assigned

Productivity index: Not assigned

844B2—Ava-Blair complex, 2 to 7 percent slopes, eroded

Composition

Ava soil and similar inclusions: 50 to 60 percent

Blair soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Convex, narrow ridges and side slopes along drainageways; Ava—narrow ridges; Blair—side slopes; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 10 to 50 acres

Major use: Cropland or woodland

Soil Properties and Qualities

Drainage class: Ava—moderately well drained; Blair—somewhat poorly drained

Permeability: Ava—moderate in the upper part of the solum and very slow in the lower part; Blair—moderately slow

Parent material: Ava—loess and the underlying silty or loamy sediments; Blair—loamy water-worked sediments

Runoff: Medium

Available water capacity: High

Seasonal high water table: 1.5 to 3.5 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Ava

Surface layer:

0 to 5 inches—dark brown, friable silt loam

Subsurface layer:

5 to 12 inches—brown, friable silt loam

Subsoil:

12 to 22 inches—dark yellowish brown and brown, firm silty clay loam

22 to 30 inches—yellowish brown, mottled, firm silty clay loam

30 to 53 inches—brown and brownish yellowish, mottled, firm, slightly brittle loam

53 to 60 inches—yellowish brown, mottled, firm, slightly brittle loam

Blair

Surface layer:

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

Subsoil:

8 to 20 inches—yellowish brown, mottled, firm silty clay loam

20 to 38 inches—grayish brown, mottled, very firm clay loam

38 to 52 inches—dark grayish brown, mottled, firm clay loam

52 to 60 inches—gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which have more clay in the subsoil than the Ava and Blair soils and have a paleosol within a depth of 20 inches
- The somewhat poorly drained Bluford soils, which have more clay in the subsoil than the Ava and Blair soils and are in landform positions similar to those of the Ava and Blair soils

Similar inclusions:

- Soils that formed in 20 to 40 inches of loess and in the underlying paleosol
- Severely eroded soils that have more clay in the surface layer
- Soils that have slopes of more than 7 percent

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Erosion can be controlled by applying a conservation tillage system that leaves crop residue on the surface after planting and by contour farming.
- Tilling when the soils are wet causes surface cloddiness and compaction and excessive runoff and erosion.
- Returning crop residue to the soils and adding other organic material improves tilth and increases the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. These soils are suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Moderately suited to dwellings without

basements and poorly suited to dwellings with basements

Management considerations:

- Installing foundation drains lowers the water table.
- On sites for dwellings without basements, extending the footings below the subsoil or reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- In areas of the Ava soil, a septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed to overcome the very slow permeability and the wetness.
- In areas of the Blair soil, installing subsurface tile drains higher on the side slopes than the absorption field lowers the water table and increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 4A

Productivity index: 100 (high level of management)

865—Pits, gravel

Composition

Pits, gravel, and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Terraces

Landform position: Open excavations, 50 to 100 feet deep, from which sand and gravel have been removed (fig. 15); mostly along the Embarras River and major streams in the northeast corner of the county

Slope range: 0 to 60 percent

Shape of areas: Linear, rectangular, or irregular

Size of areas: 15 to 240 acres

Major use: Excavation or another nonfarm use

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate to rapid, depending on the soil texture

Parent material: A mixture of sand and gravel



Figure 15.—An area of Pits, gravel, used as a source of sand and gravel.

Runoff: Slow to rapid

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: Low

Potential for frost action: Moderate

Inclusions

Contrasting inclusions:

- Roads and buildings
- Areas of debris
- Vertical sidewall areas
- Perennial or intermittent water areas, less than 2 acres in size, on the floor of the pits
- Loamy, strongly sloping Orthents in areas adjacent to the pits

Similar inclusions:

- Natural soil areas
- Loamy, gently sloping Orthents in areas adjacent to the pits
- Areas that support vegetation, such as trees, shrubs, weeds, and grasses

Use and Management

Excavation or other nonfarm uses

Suitability: Onsite investigation is needed to determine the limitations or hazards affecting the suitability of a given area for specific uses. Some areas are a good source of sand and gravel. Some are suited to recreational uses, such as hiking, camping, and fishing.

Management considerations:

- Establishing a plant cover that controls erosion

generally requires special site preparation, such as land smoothing, land leveling, and topdressing with surface soil material.

Interpretive Groups

Land capability classification: Not assigned

Woodland ordination symbol: Not assigned

Productivity index: Not assigned

889A—Bluford-Darmstadt complex, 0 to 2 percent slopes

Composition

Bluford soil and similar inclusions: 40 to 50 percent

Darmstadt soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 25 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Low swells and broad flats; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear or irregular

Size of areas: 10 to 160 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Bluford—slow; Darmstadt—very slow

Parent material: Loess and the underlying loamy sediments

Runoff: Slow

Available water capacity: Bluford—high; Darmstadt—moderate

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Bluford

Surface layer:

0 to 9 inches—dark brown, friable silt loam

Subsurface layer:

9 to 15 inches—pale brown, mottled, friable silt loam

Subsoil:

15 to 33 inches—yellowish brown, mottled, firm silty clay loam

33 to 43 inches—yellowish brown, mottled, very firm, slightly brittle silty clay loam

43 to 52 inches—mottled light brownish gray, yellowish brown, and strong brown, very firm, slightly brittle silt loam

52 to 60 inches—mottled yellowish brown, pale brown, and strong brown, firm, slightly brittle loam

Darmstadt

Surface layer:

0 to 10 inches—dark brown, friable silt loam

Subsurface layer:

10 to 13 inches—light brownish gray, mottled, friable silt loam

Subsoil:

13 to 18 inches—yellowish brown, mottled, firm silty clay loam

18 to 48 inches—grayish brown and light brownish gray, mottled, firm silty clay loam and silt loam

48 to 60 inches—light brownish gray, mottled, firm loam

Inclusions

Contrasting inclusions:

- The poorly drained Huey soils, which have more than 15 percent concentrations of sodium within 15 inches of the surface and are in the lower landform positions
- The moderately well drained Tamalco soils, which are in the slightly higher, more sloping landform positions
- The poorly drained Wynoose soils, which are in the lower landform positions

Similar inclusions:

- Soils that have 5 to 15 percent concentrations of sodium in the subsoil
- Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Surface ditches help to remove excess water.
- Tilling when the soils are wet causes surface cloddiness and compaction. Returning crop residue to the soils and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.
- A high content of exchangeable sodium in the

subsoil of the Darmstadt soil restricts the availability and uptake of some plant nutrients and causes plant stress in most years (fig. 16).

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Poorly suited

Management considerations:

- Installing subsurface tile drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed to overcome the wetness in both soils, the slow permeability in the Bluford soil, and the very slow permeability in the Darmstadt soil.

Interpretive Groups

Land capability classification: 3w



Figure 16.—Plant stress resulting from a high content of sodium in the Darmstadt soil in an area of Bluford-Darmstadt complex, 0 to 2 percent slopes.

Woodland ordination symbol: Bluford—4A;
Darmstadt—4T
Productivity index: 98 (high level of management)

890C2—Ursa-Atlas complex, 5 to 10 percent slopes, eroded

Composition

Ursa and Atlas soils and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Ursa—well drained; Atlas—somewhat poorly drained

Permeability: Ursa—slow; Atlas—very slow

Parent material: A thin mantle of loess or pedisediments and an underlying paleosol that formed in glacial till

Runoff: Rapid

Available water capacity: High

Seasonal high water table: Ursa—more than 6 feet below the surface; Atlas—1 to 2 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: High

Potential for frost action: Ursa—moderate; Atlas—high

Typical Profile

Ursa

Surface layer:

0 to 5 inches—brown, friable silt loam

Subsoil:

5 to 16 inches—yellowish brown and dark yellowish brown, friable silty clay loam

16 to 20 inches—dark grayish brown, mottled, firm silty clay loam

20 to 35 inches—dark grayish brown, mottled, very firm silty clay

35 to 53 inches—dark grayish brown, mottled, very firm clay loam

Substratum:

53 to 60 inches—strong brown, mottled, very firm clay loam

Atlas

Surface layer:

0 to 7 inches—brown, very friable silt loam

Subsoil:

7 to 12 inches—brown, mottled, friable silty clay loam

12 to 22 inches—dark gray and dark grayish brown, mottled, firm silty clay loam

22 to 60 inches—dark grayish brown, dark gray, and gray, mottled, very firm silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Blair soils, which have less clay in the subsoil than the Ursa and Atlas soils and are in higher landform positions

Similar inclusions:

- Severely eroded soils that have more clay in the surface layer
- Soils that formed in 20 to 40 inches of loess and in an underlying paleosol that formed in till

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Returning crop residue to the soils and regularly adding other organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited

Management considerations:

- Seedling mortality and the hazard of windthrow are management concerns in areas of the Atlas soil.
- Planting mature stock reduces the seedling mortality rate. Some replanting may be necessary.
- Harvesting by methods that do not leave isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- Cropland, pasture, and field border strips provide good habitat for openland wildlife. These soils are suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Leaving crop residue on the surface after harvest, delaying mowing until after the nesting season, maintaining fence rows, and establishing field border strips help to provide food and cover for wildlife.

Dwellings

Suitability: Poorly suited

Management considerations:

- Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table in the Atlas soil.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing curtain 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 soils with more permeable material helps to overcome

the slow permeability in the Ursa soil and the very slow permeability in the Atlas soil.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: Ursa—4A; Atlas—4C

Productivity index: 53 (high level of management)

890C3—Ursa-Atlas complex, 5 to 10 percent slopes, severely eroded

Composition

Ursa and Atlas soils and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Ursa—well drained; Atlas—somewhat poorly drained

Permeability: Ursa—slow; Atlas—very slow

Parent material: A paleosol that formed in glacial till or a thin mantle of loess or pedisements and an underlying paleosol that formed in glacial till

Runoff: Rapid

Available water capacity: High

Seasonal high water table: Ursa—more than 6 feet below the surface; Atlas—1 to 2 feet below the surface

Content of organic matter: Low

Erosion hazard: Severe

Shrink-swell potential: High

Potential for frost action: Ursa—moderate; Atlas—high

Typical Profile

Ursa

Surface layer:

0 to 3 inches—dark grayish brown, friable silt loam

Subsoil:

3 to 17 inches—yellowish brown, mottled, friable clay loam

17 to 38 inches—gray, mottled, firm clay loam
 38 to 48 inches—strong brown, mottled, firm clay loam
 48 to 60 inches—gray, mottled, very firm clay loam

Atlas

Surface layer:

0 to 3 inches—grayish brown, mottled, friable silty clay loam

Subsoil:

3 to 6 inches—dark gray, mottled, friable silty clay loam

6 to 37 inches—gray, mottled, firm clay loam

37 to 47 inches—mottled gray, yellowish brown, and strong brown, very firm clay loam

47 to 60 inches—gray, mottled, very firm clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Blair soils, which have less clay in the subsoil than the Ursa and Atlas soils and are in higher landform positions

Similar inclusions:

- Moderately eroded soils that have less clay in the surface layer
- Soils that formed in 20 to 40 inches of loess and in an underlying paleosol that formed in till

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, and by a crop rotation that is dominated by forage crops.
- Tilling when the soils are wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soils and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Establishing pasture plants or hay on these soils improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Seedbed preparation is difficult on these severely eroded side slopes. A no-till method of seeding or

pasture renovation helps to establish forage species and control erosion.

- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.

Dwellings

Suitability: Poorly suited

Management considerations:

- Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table in the Atlas soil.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing curtain 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 soils with more permeable material helps to overcome the slow permeability in the Ursa soil and the very slow permeability in the Atlas soil.

Interpretive Groups

Land capability classification: 4e

Woodland ordination symbol: Ursa—4A; Atlas—4C

Productivity index: 44 (high level of management)

890D2—Ursa-Atlas complex, 10 to 15 percent slopes, eroded

Composition

Ursa and Atlas soils and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Side slopes along drainageways; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 5 to 25 acres

Major use: Pasture or woodland

Soil Properties and Qualities

Drainage class: Ursa—well drained; Atlas—somewhat poorly drained

Permeability: Ursa—slow; Atlas—very slow

Parent material: A thin mantle of loess or pediments and an underlying paleosol that formed in glacial till

Runoff: Rapid

Available water capacity: High

Seasonal high water table: Ursa—more than 6 feet below the surface; Atlas—1 to 2 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: High

Potential for frost action: Ursa—moderate; Atlas—high

Typical Profile

Ursa

Surface layer:

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

Subsurface layer:

3 to 5 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:

5 to 16 inches—yellowish brown, mottled, friable silty clay loam

16 to 21 inches—very dark grayish brown, mottled, firm clay loam

21 to 38 inches—dark gray, mottled, firm clay loam

38 to 60 inches—gray, mottled, very firm clay loam

Atlas

Surface layer:

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

Subsoil:

7 to 16 inches—brown, mottled, friable clay loam

16 to 37 inches—gray, mottled, firm clay loam

37 to 59 inches—gray, mottled, very firm clay loam

Substratum:

59 to 60 inches—strong brown, very firm loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Blair soils, which have less clay in the subsoil than the Ursa and Atlas soils and are in higher landform positions
- The well drained Hickory soils, which have less clay in the subsoil than the Ursa and Atlas soils and are on side slopes below the Ursa and Atlas soils

- The somewhat poorly drained Holton soils, which have less clay throughout than the Ursa and Atlas soils, formed in loamy alluvium, and are in the lower landform positions along drainageways

Similar inclusions:

- Severely eroded soils that have more clay in the surface layer
- Soils that formed in 20 to 40 inches of loess and in an underlying paleosol that formed in till

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Adding organic material and returning crop residue to the soils help to prevent crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion
- A no-till method of seeding or pasture renovation on the contour helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Woodland

Suitability: Moderately suited

Management considerations:

- Seedling mortality and the hazard of windthrow are management concerns in areas of the Atlas soil.
- Planting mature stock reduces the seedling mortality rate. Some replanting may be necessary.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.

- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. These soils are suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Poorly suited

Management considerations:

- Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table in the Atlas soil.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Installing curtain 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 soils with more permeable material helps to overcome the slow permeability in the Ursa soil and the very slow permeability in the Atlas soil.

Interpretive Groups

Land capability classification: 4e

Woodland ordination symbol: Ursa—4A; Atlas—4C

Productivity index: 50 (high level of management)

891—Cisne-Piasa complex

Composition

Cisne soil and similar inclusions: 50 to 60 percent

Piasa soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Broad flats and shallow depressions; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Irregular

Ponding: Occurring on the Piasa soil for brief periods in spring

Size of areas: 10 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Very slow

Parent material: Loess or loess and the underlying loamy sediments

Runoff: Cisne—slow; Piasa—ponded

Available water capacity: Cisne—high; Piasa—moderate

Seasonal high water table: Cisne—within a depth of 1.0 foot; Piasa—0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Cisne

Surface layer:

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

Subsurface layer:

8 to 19 inches—light brownish gray, mottled, friable silt loam

Subsoil:

19 to 30 inches—light brownish gray, mottled, friable silty clay loam

30 to 43 inches—light brownish gray, mottled, firm silty clay loam

43 to 60 inches—mottled light brownish gray, yellowish brown, strong brown, and grayish brown, firm silt loam

Piasa

Surface layer:

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

Subsurface layer:

9 to 18 inches—grayish brown, mottled, friable silt loam

Subsoil:

18 to 36 inches—light olive gray, mottled, firm silty clay loam

36 to 45 inches—mottled light olive gray and yellowish brown, firm silty clay loam

45 to 53 inches—gray, mottled, friable silty clay loam

Substratum:

53 to 60 inches—gray, mottled, friable silt loam

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Bluford and Darmstadt soils, which have a lighter colored surface layer than that of the Cisne and Piasa soils and are in slightly higher landform positions
- The somewhat poorly drained Hoyleton soils, which are in the slightly higher landform positions

Similar inclusions:

- Soils that have a lighter colored surface layer
- Soils that have less clay in the subsoil
- Soils that have a thicker dark surface soil

Use and Management**Cropland**

Suitability: Moderately suited

Management considerations:

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tile drains do not function well in these soils because of the very slow permeability, but a combination of surface ditches and land leveling can reduce the wetness.
- A high content of exchangeable sodium in the subsoil of the Piasa soil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.
- Tilling when the soils are wet causes surface compaction and decreases the rate of water infiltration.
- Returning crop residue to the soils, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for

planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: Cisne—4W; Piasa—not assigned

Productivity index: 100 (high level of management)

896—Wynoose-Huey complex**Composition**

Wynoose soil and similar inclusions: 50 to 60 percent

Huey soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Broad flats and shallow depressions; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Irregular

Ponding: Occurring on the Huey soil for brief periods in spring

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Very slow

Parent material: Loess and the underlying loamy sediments and paleosol, which formed in till

Runoff: Wynoose—slow; Huey—very slow

Available water capacity: Wynoose—high; Huey—moderate

Seasonal high water table: Wynoose—within a depth

of 1.0 foot; Huey—0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Wynoose—high; Huey—moderate

Potential for frost action: High

Typical Profile

Wynoose

Surface layer:

0 to 9 inches—dark grayish brown, friable silt loam

Subsurface layer:

9 to 17 inches—light gray, mottled, friable silt loam

Subsoil:

17 to 40 inches—light brownish gray, mottled, firm silty clay loam

40 to 55 inches—light brownish gray and grayish brown, mottled, firm silty clay loam

55 to 60 inches—dark grayish brown, mottled, very firm silty clay loam

Huey

Surface layer:

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

Subsurface layer:

7 to 14 inches—grayish brown, mottled, friable silt loam

Subsoil:

14 to 39 inches—light brownish gray, mottled, firm silty clay loam

39 to 52 inches—mottled brownish yellow, light brownish gray, and yellowish brown, firm silt loam

Substratum:

52 to 60 inches—mottled light brownish gray, brown, and yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Bluford and Darmstadt soils, which are in the slightly higher landform positions

Similar inclusions:

- Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Measures that maintain the drainage system are

needed. Additional drainage is needed in some areas. Tile drains do not function well in these soils because of the very slow permeability, but a combination of surface ditches and land leveling can reduce the wetness.

- A high content of exchangeable sodium in the subsoil of the Huey soil restricts the availability and uptake of some plant nutrients and causes plant stress in most years.
- Tilling when the soils are wet causes surface compaction and decreases the rate of water infiltration.
- Returning crop residue to the soils, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth.
- Winter wheat and hay are subject to frost heave in some years.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of pasture plants or hay improves tilth.
- The wetness limits the choice of plants and the period of grazing or cutting.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.
- Shallow ditching and land smoothing reduce the wetness.
- Applications of fertilizer, weed control, rotation grazing, proper stocking rates, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition.

Dwellings

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the seasonal high water table and the ponding

Interpretive Groups

Land capability classification: 4w

Woodland ordination symbol: Wynoose—4W; Huey—3T

Productivity index: 92 (high level of management)

913F—Hickory-Marseilles complex, 15 to 30 percent slopes

Composition

Hickory soil and similar inclusions: 55 to 80 percent

Huey soil and similar inclusions: 25 to 45 percent
 Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Nose slopes and side slopes along major drainageways and streams; Hickory—the upper parts of the slopes; Marseilles—the lower parts of the slopes; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 10 to 70 acres

Major use: Woodland or pasture

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Hickory—moderate; Marseilles—moderate in the upper part of the solum and slow in the lower part

Parent material: Hickory—glacial till or a thin mantle of loess and the underlying glacial till; Marseilles—a thin mantle of loess or till and the underlying material weathered from shale

Runoff: Rapid

Available water capacity: Hickory—high; Marseilles—low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Hickory—moderate; Marseilles—high

Typical Profile

Hickory

Surface layer:

0 to 2 inches—very dark grayish brown, friable loam

Subsurface layer:

2 to 5 inches—dark grayish brown, friable loam

Subsoil:

5 to 9 inches—yellowish brown, friable clay loam

9 to 30 inches—yellowish brown, firm clay loam

30 to 48 inches—yellowish brown, firm loam

Substratum:

48 to 60 inches—mottled brown, yellowish brown, and gray, very firm loam

Marseilles

Surface layer:

0 to 2 inches—very dark grayish brown, very friable loam

Subsurface layer:

2 to 8 inches—dark grayish brown, very friable loam

8 to 13 inches—brown, friable loam

Subsoil:

13 to 23 inches—yellowish brown, friable silty clay loam

23 to 32 inches—yellowish brown, mottled, friable silty clay loam

Bedrock:

32 to 52 inches—dark grayish brown, brown, and yellowish brown, firm silty clay loam shale

52 to 60 inches—gray, light brownish gray, and brown, very firm shale

Inclusions

Contrasting inclusions:

- The moderately well drained Ava soils, which formed in loess and the underlying Illinoian drift and are on narrow ridges and side slopes above the Hickory and Marseilles soils
- The somewhat poorly drained Holton soils, which are in the lower areas on flood plains along streams and drainageways and formed in loamy alluvium
- The well drained Ursa soils, which formed in glacial till that has a paleosol and are on side slopes above the Hickory and Marseilles soils
- Bedrock outcrops at the base of the side slopes

Similar inclusions:

- Soils that are calcareous within a depth of 40 inches
- Soils that have more sand in the subsoil

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited

Management considerations:

- Erosion control is needed when grasses and legumes are established in the pastured areas.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.

- A permanent cover of pasture plants helps to control erosion and maintain tilth.
- A no-till method of seeding or pasture renovation helps to establish forage species and control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.
- Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.
- In areas where the pasture is established, interseeding legumes with a no-till seeder improves the quality of the forage.

Woodland

Suitability: Moderately suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soils are firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. These soils are suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e

Woodland ordination symbol: Hickory—5R;
Marseilles—3R

Productivity index: 57 (high level of management)

913G—Hickory-Marseilles complex, 30 to 60 percent slopes

Composition

Hickory soil and similar inclusions: 55 to 80 percent

Marseilles soil and similar inclusions: 25 to 45 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Nose slopes and side slopes along streams and major drainageways; Hickory—the upper parts of the slopes; Marseilles—the lower parts of the slopes; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Linear

Size of areas: 10 to 80 acres

Major use: Woodland or pasture

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Hickory—moderate; Marseilles—moderate in the upper part of the solum and slow in the lower part

Parent material: Hickory—glacial till or a thin mantle of loess and the underlying glacial till; Marseilles—a thin mantle of loess or till and the underlying material weathered from shale

Runoff: Rapid

Available water capacity: Hickory—high; Marseilles—low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Moderate

Potential for frost action: Hickory—moderate; Marseilles—high

Typical Profile

Hickory

Surface layer:

0 to 4 inches—very dark grayish brown, friable loam

Subsurface layer:

4 to 12 inches—light yellowish brown, friable loam

Subsoil:

12 to 28 inches—yellowish brown, friable clay loam

28 to 42 inches—yellowish brown, mottled, firm clay loam

42 to 52 inches—dark yellowish brown, mottled, very firm clay loam

Substratum:

52 to 60 inches—mottled grayish brown, strong brown, and brown, very firm loam

Marseilles*Surface layer:*

1 inch to 0—undecomposed leaf litter

0 to 3 inches—brown, very friable loam

Subsurface layer:

3 to 4 inches—yellowish brown, friable loam

Subsoil:

4 to 22 inches—yellowish brown, firm silty clay loam

22 to 32 inches—light olive brown, mottled, firm silt loam

Bedrock:

32 to 60 inches—olive, firm shale with a high content of silt

Inclusions*Contrasting inclusions:*

- The moderately well drained Ava soils, which formed in loess and the underlying Illinoian drift and are on narrow ridges and side slopes above the Hickory and Marseilles soils
- The somewhat poorly drained Holton soils, which are in the lower areas on flood plains along streams and drainageways and formed in loamy alluvium
- The well drained Ursa soils, which formed in glacial till that has a paleosol and are on side slopes above the Hickory and Marseilles soils
- Bedrock outcrops at the base of the side slopes

Similar inclusions:

- Soils that are calcareous within a depth of 40 inches
- Soils that have more sand in the subsoil

Use and Management**Cropland**

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Woodland

Suitability: Moderately suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soils are firm.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The wooded areas provide habitat for deer, wild turkeys, squirrels, and other woodland wildlife. Establishing or maintaining plants that provide food and cover for wildlife is difficult because of the slope and the hazard of erosion.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e

Woodland ordination symbol: Hickory—5R;
Marseilles—3R

Productivity index: 40 (high level of management)

927C2—Blair-Atlas complex, 5 to 10 percent slopes, eroded**Composition**

Blair soil and similar inclusions: 50 to 65 percent

Atlas soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Head slopes of drainageways and side slopes along drainageways; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Irregular

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Blair—moderately slow; Atlas—very slow

Parent material: Blair—loamy water-worked sediments; Atlas—a thin mantle of loess and an underlying paleosol that formed in Illinoian glacial till

Runoff: Medium

Available water capacity: Blair—high; Atlas—moderate

Seasonal high water table: Blair—1.5 to 3.5 feet below the surface; Atlas—1.0 to 2.0 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Blair—moderate; Atlas—high

Potential for frost action: High

Typical Profile

Blair

Surface layer:

0 to 3 inches—dark grayish brown, friable silt loam

Subsurface layer:

3 to 7 inches—brown, friable silt loam

Subsoil:

7 to 16 inches—yellowish brown, mottled, firm silty clay loam

16 to 30 inches—grayish brown, mottled, very firm silty clay loam

30 to 50 inches—grayish brown, mottled, firm silty clay loam

50 to 60 inches—yellowish brown, mottled, firm silty clay loam

Atlas

Surface layer:

0 to 7 inches—dark brown, friable silt loam

Subsoil:

7 to 10 inches—yellowish brown, mottled, firm silty clay loam

10 to 16 inches—light brownish gray, mottled, firm silty clay loam

16 to 33 inches—grayish brown, mottled, very firm silty clay

33 to 41 inches—gray, mottled, very firm silty clay

Substratum:

41 to 44 inches—grayish brown, mottled, firm loam

44 to 60 inches—gray, mottled, very firm clay loam

Inclusions

Contrasting inclusions:

- The well drained Hickory soils, which are downslope from the Blair and Atlas soils and are more sloping
- The well drained Ursa soils, which are in landform positions similar to those of the Blair and Atlas soils

Similar inclusions:

- Soils that have a gray paleosol at a depth of 20 to 40 inches
- Soils that have slopes of more than 10 percent

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- A crop rotation that includes 1 or more years of forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion.
- Returning crop residue to the soils and regularly adding other organic material help to maintain productivity and tilth.

Pasture and hay

Suitability: Well suited

Management considerations:

- A cover of grasses and legumes improves tilth and helps to control erosion.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Proper stocking rates, rotation grazing, timely deferment of grazing, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion
- Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.
- The plants should not be grazed or clipped until they are sufficiently established.

Dwellings

Suitability: Blair—moderately suited to dwellings

without basements and poorly suited to dwellings with basements; Atlas—poorly suited

Management considerations:

- Onsite investigation is required.

- Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling.
- Installing subsurface drains near the foundation lowers the water table.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:

- Onsite investigation is required. Absorption fields must be designed so that they meet local and state guidelines.

Interpretive Groups

Land capability classification: 3e

Woodland ordination symbol: Blair—4A; Atlas—4C

Productivity index: 82 (high level of management)

967G—Hickory-Gosport complex, 30 to 60 percent slopes

Composition

Hickory soil and similar inclusions: 40 to 60 percent

Gosport soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landscape: Uplands

Landform: Illinoian till plains

Landform position: Nose slopes and side slopes along streams and major drainageways; Hickory—the upper parts of the slopes; Gosport—the lower parts of the slopes; the two soils occurring as areas so intricately mixed that separating them in mapping is not practical

Shape of areas: Long and narrow

Size of areas: 5 to 60 acres

Major use: Woodland

Soil Properties and Qualities

Drainage class: Hickory—well drained; Gosport—moderately well drained

Permeability: Hickory—moderate; Gosport—very slow

Parent material: Hickory—glacial till or a thin mantle of loess and the underlying glacial till; Gosport—shale residuum

Runoff: Rapid

Available water capacity: Hickory—high; Gosport—low

Seasonal high water table: Hickory—more than 6.0 feet below the surface; Gosport—1.5 to 3.0 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Severe

Shrink-swell potential: Hickory—moderate; Gosport—high

Potential for frost action: Moderate

Typical Profile

Hickory

Surface layer:

0 to 3 inches—brown, friable loam

Subsurface layer:

3 to 7 inches—yellowish brown, friable loam

Subsoil:

7 to 50 inches—yellowish brown, mottled, firm clay loam

Substratum:

50 to 60 inches—yellowish brown, mottled, calcareous, firm loam

Gosport

Surface layer:

0 to 3 inches—dark grayish brown, friable silt loam

Subsurface layer:

3 to 6 inches—yellowish brown, friable silt loam

Subsoil:

6 to 26 inches—yellowish brown, firm silty clay

Bedrock:

26 to 60 inches—extremely firm clay shale

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Atlas soils, which are at the head of drainageways
- The somewhat poorly drained Bluford soils, which are on ridgetops above the Hickory soil
- The somewhat poorly drained Wakeland soils, which are on flood plains along streams and drainageways below the Gosport soil
- Bedrock outcrops at the base of the side slopes

Similar inclusions:

- Soils that are calcareous within a depth of 40 inches
- Soils that have more clay or less clay in the subsoil
- Eroded soils that have more clay in the surface layer

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Woodland

Suitability: Poorly suited

Management considerations:

- The slope causes an erosion hazard and limits the use of equipment.
- Building logging roads and skid trails on or nearly on the contour, skidding logs or trees uphill with a cable and winch, establishing grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed help to control erosion.
- The use of machinery is limited to periods when the soils are firm.
- The seedling mortality rate on the Gosport soil can be reduced by planting species that can withstand droughty conditions, by eliminating all competing vegetation near the seedlings, and by selecting the larger seedlings for planting.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow on the Gosport soil.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- The wooded areas provide habitat for deer, wild turkeys, squirrels, and other woodland wildlife. Establishing or maintaining plants that provide food and cover for wildlife is difficult because of the slope and the hazard of erosion.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e

Woodland ordination symbol: Hickory—5R; Gosport—2R

Productivity index: 28 (high level of management)

3074—Radford silt loam, frequently flooded**Composition**

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Flat areas along stream channels
on narrow valley floors of major streams

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Silty alluvium underlain by a dark buried soil that formed in silty alluvium

Runoff: Slow

Available water capacity: Very high

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderate

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

8 to 15 inches—very dark grayish brown, friable silt loam

Substratum:

15 to 28 inches—dark grayish brown, mottled, friable silt loam with thin strata of brown and yellowish brown sand

28 to 32 inches—very dark gray, mottled, very friable silt loam with thin strata of pale brown loamy fine sand

32 to 36 inches—stratified dark gray and very dark gray, mottled, friable silt loam with thin strata of brown and pale brown sand

Buried soil:

36 to 41 inches—black, mottled, friable silt loam

41 to 60 inches—very dark gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:

- The poorly drained Blackoar soils, which are in the lower landform positions and do not have a buried soil
- The poorly drained Birds soils, which are in the lower landform positions, have a lighter colored surface soil than that of the Radford soil, and do not have a buried soil

Similar inclusions:

- Soils that do not have a buried soil within a depth of 40 inches
- Soils that have a lighter colored surface soil
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and excessive runoff and erosion. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of

equipment. The equipment can be used only when the soil is firm and dry.

- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: Not assigned

Productivity index: 140 (high level of management)

3092B—Sarpy loamy fine sand, 2 to 5 percent slopes, frequently flooded

Composition

Sarpy soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Natural levees adjacent to streams and the Embarras River (fig. 17)

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 60 acres

Major use: Cropland or woodland

Soil Properties and Qualities

Drainage class: Excessively drained



Figure 17.—An area of Sarpy loamy fine sand, 2 to 5 percent slopes, frequently flooded, on a natural levee along the Embarras River.

Permeability: Rapid

Parent material: Sandy alluvium

Runoff: Slow

Available water capacity: Low

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Very low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: Low

Typical Profile

Surface layer:

0 to 4 inches—stratified very dark grayish brown and brown, very friable loamy fine sand and sand

Substratum:

4 to 17 inches—stratified brown, loose sand and loamy sand

17 to 28 inches—stratified dark grayish brown and brown, loose loamy sand and sand

28 to 33 inches—brown, calcareous, loose sand

33 to 54 inches—brown, loose loamy sand and sand

54 to 60 inches—dark grayish brown, friable fine sandy loam

60 to 66 inches—dark grayish brown, friable silt loam

66 to 72 inches—stratified dark grayish brown and brown, friable loamy fine sand and fine sand

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which have less sand in the solum than the Sarpy soil and are in lower landform positions
- The poorly drained Holly soils, which have more clay in the solum than the Sarpy soil and are in lower landform positions
- The well drained Wirt soils, which have less sand in

the solum than the Sarpy soil and are in slightly lower landform positions

Similar inclusions:

- Soils that have a thicker and darker surface soil

Use and Management

Cropland

Suitability: Poorly suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material to the soil help to conserve moisture.
- A tillage system that leaves the surface rough is effective in controlling soil blowing.
- Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Flooding can delay harvesting of hay in some years.
- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands.
- Orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include Indiangrass, switchgrass, and little bluestem.
- Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching.
- Proper stocking rates, rotation grazing, timely harvesting, and timely deferment of grazing help to keep the pasture or hayland in good condition and help to control soil blowing.

Woodland

Suitability: Moderately suited

Management considerations:

- The use of machinery is limited to periods when the soil is firm.
- Seedling mortality is high because of the low available water capacity. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.
- Controlling livestock grazing helps to prevent

destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Poorly suited

Management considerations:

- The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for wild herbaceous plants. Establishing the plants that provide food and cover for wildlife is difficult because of the flooding and the low available water capacity. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 4s

Woodland ordination symbol: 3S

Productivity index: 75 (high level of management)

3225—Holton loam, frequently flooded

Composition

Holton soil and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Narrow flats along minor streams and drainageways

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate in the solum and moderately rapid in the substratum

Parent material: Loamy alluvium

Runoff: Slow

Available water capacity: Moderate

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown, friable loam

Subsoil:

7 to 14 inches—dark grayish brown, mottled, very friable silt loam

14 to 27 inches—stratified dark grayish brown and brown, mottled, very friable loam and loamy sand

27 to 32 inches—dark grayish brown, mottled, very friable silt loam

Substratum:

32 to 43 inches—grayish brown, mottled, very friable, stratified loam and sandy loam

43 to 60 inches—yellowish brown, mottled, loose sand

Inclusions

Contrasting inclusions:

- The poorly drained Holly soils, which are in the slightly lower depressions and old drainageways and have more clay in the solum than the Holton soil
- The well drained Wirt soils, which are on the slightly higher natural levees

Similar inclusions:

- Soils that have a darker surface layer
- Soils that have less sand in the control section

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are frequently damaged by floodwater. The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and

minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Well suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5A

Productivity index: 85 (high level of management)

3226—Wirt silt loam, frequently flooded

Composition

Wirt soil and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Natural levees and flat areas adjacent to streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate in the solum and moderately rapid in the substratum

Parent material: Loamy alluvium

Runoff: Slow

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: Moderate

Typical Profile

Surface layer:

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

Subsurface layer:

4 to 15 inches—brown, friable silt loam

Subsoil:

15 to 31 inches—yellowish brown, very friable fine sandy loam

31 to 43 inches—yellowish brown, friable loam and fine sandy loam

Substratum:

43 to 55 inches—mottled yellowish brown, grayish brown, and brown, friable fine sandy loam

55 to 60 inches—gray, mottled, very friable loamy fine sand

Inclusions

Contrasting inclusions:

- The poorly drained Holly soils, which are in the lower

areas in depressions and old drainageways and have more clay in the solum than the Wirt soil

- The somewhat poorly drained Holton soils, which are in the slightly lower landform positions
- The excessively drained Sarpy soils, which are in landform positions similar to those of the Wirt soil and have more sand in the control section than the Wirt soil

Similar inclusions:

- Soils that have a darker surface soil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- Machinery should be used only when the soil is firm enough to support the equipment.
- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 7A

Productivity index: 90 (high level of management)

3284A—Tice silty clay loam, 0 to 2 percent slopes, frequently flooded

Composition

Tice soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Broad flats away from stream channels on the valley floor of the Embarras River

Shape of areas: Irregular

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: 1.5 to 3.0 feet below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 10 inches—very dark grayish brown, friable silty clay loam

Subsoil:

10 to 14 inches—brown, mottled, firm silty clay loam

14 to 24 inches—brown, firm silty clay loam

24 to 40 inches—brown and yellowish brown, mottled, firm silty clay loam

40 to 54 inches—yellowish brown, mottled, friable silty clay loam and silt loam

54 to 60 inches—yellowish brown, mottled, friable, stratified silt loam and loam

Inclusions

Contrasting inclusions:

- The poorly drained Blackoar soils, which are in the lower areas in depressions and old drainageways
- The well drained Raddle soils, which are in the slightly higher landform positions and have less clay in the surface soil and in the upper part of the subsoil than the Tice soil
- The poorly drained Titus soils, which are in the lower landform positions and have more clay in the subsoil than the Tice soil

Similar inclusions:

- Soils that have a lighter colored surface layer
- Soils that have less clay in the subsoil
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years. The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5A

Productivity index: 145 (high level of management)

3288—Petrolia silty clay loam, frequently flooded

Composition

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Backswamps on the valley floor of the Embarras River

Shape of areas: Linear or irregular

Frequency of flooding: Frequent

Duration of flooding: Long

Ponding: Occurring for long periods in spring

Size of areas: 10 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderately slow

Parent material: Silty alluvium

Runoff: Pondered

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderate

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 3 inches—very dark grayish brown, friable silty clay loam

Subsurface layer:

3 to 10 inches—dark grayish brown, mottled, friable silty clay loam

Substratum:

10 to 20 inches—grayish brown, mottled, friable silty clay loam

20 to 40 inches—gray and dark gray, mottled, firm silty clay loam

40 to 60 inches—dark gray and olive gray, mottled, very firm silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Tice soils, which have a thicker dark surface layer than that of the Petrolia soil and are in slightly higher landform positions

Similar inclusions:

- Soils that have more clay in the subsoil and have a darker surface soil
- Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding and ponding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years. The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in depressions are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the depressions.

Dwellings

Suitability: Generally unsuited because of the flooding and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding and the ponding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5W

Productivity index: 130 (high level of management)

3304A—Landes silt loam, 0 to 2 percent slopes, frequently flooded

Composition

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Natural levees adjacent to streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 70 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderately rapid in the solum and rapid in the substratum

Parent material: Loamy and sandy alluvium

Runoff: Slow

Available water capacity: Moderate

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: Moderate

Typical Profile

Surface layer:

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

Subsurface layer:

8 to 14 inches—very dark grayish brown, friable silt loam

Subsoil:

14 to 33 inches—brown and dark yellowish brown, friable fine sandy loam

Substratum:

33 to 60 inches—stratified yellowish brown and dark yellowish brown, loose sand and loamy sand

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which are in the slightly lower landform positions and have a lighter colored surface layer than that of the Landes soil

- The well drained Huntsville soils, which are in the slightly lower landform positions and have less sand in the surface soil and subsoil than the Landes soil
- The excessively drained Sarpy soils, which are in landform positions similar to those of the Landes soil and have more sand in the control section than the Landes soil

Similar inclusions:

- Soils that have a lighter colored surface soil

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and conserve moisture.

Pasture and hay

Suitability: Well suited

Management considerations:

- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- Machinery should be used only when the soil is firm enough to support the equipment.
- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable

young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 7A

Productivity index: 100 (high level of management)

3328—Holly silt loam, frequently flooded

Composition

Holly soil and similar inclusions: 75 to 85 percent

Contrasting inclusions: 15 to 25 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Old stream channels, slackwater depressions, and flat areas back from the main channel on valley floors of minor streams

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Ponding: Occurring for brief periods in spring

Size of areas: 10 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderate in the solum and moderately rapid in the substratum

Parent material: Loamy alluvium

Runoff: Poned

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown, friable silt loam

Subsoil:

9 to 24 inches—dark gray and gray, mottled, friable loam

24 to 38 inches—gray, mottled, friable loam

38 to 44 inches—gray, mottled, friable, stratified loam and silt loam

Substratum:

44 to 60 inches—mottled grayish brown, yellowish brown, and brown, friable sandy clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which are in the slightly higher landform positions and have less clay in the subsoil than the Holly soil
- The well drained Wirt soils, which are on the higher natural levees adjacent to streams and have less clay in the subsoil than the Holly soil
- The excessively drained Sarpy soils, which are on the higher natural levees adjacent to streams and have more sand in the control section than the Holly soil

Similar inclusions:

- Soils that have less clay in the subsoil
- Soils that have less sand in the surface layer and subsoil
- Soils that have a darker surface layer
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding and ponding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years. The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to

the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface and subsurface drains and surface ditches can lower the water table if suitable outlets are available.
- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the oxbows and depressions.

Dwellings

Suitability: Generally unsuited because of the flooding and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding and the ponding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5W

Productivity index: 120 (high level of management)

3331A—Haymond silt loam, 0 to 2 percent slopes, frequently flooded**Composition**

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Broad valley floors adjacent to major streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Very slow

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsoil:

7 to 36 inches—dark yellowish brown and yellowish brown, friable silt loam

36 to 48 inches—yellowish brown, mottled, friable silt loam

Substratum:

48 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Birds soils, which are in the lower areas in depressions and old drainageways
- The excessively drained Sarpy soils, which are on the higher natural levees and have more sand in the control section than the Haymond soil
- The somewhat poorly drained Wakeland soils, which are in the slightly lower areas in old drainageways

Similar inclusions:

- Soils that have a darker surface soil
- Soils that have more sand in the solum
- Soils that are flooded less than once every 2 years

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are damaged by floodwater in some years.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Well suited

Management considerations:

- Machinery should be used only when the soil is firm enough to support the equipment.
- Plant competition affects the seedlings of desirable species. The competition in openings where timber

has been harvested can be controlled by chemical or mechanical means.

- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 8A

Productivity index: 140 (high level of management)

3331B—Haymond silt loam, 2 to 5 percent slopes, eroded, frequently flooded

Composition

Haymond soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Risers along or slightly back from stream channels

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 5 to 30 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Very slow

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: 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 12 inches—mixed dark grayish brown and dark yellowish brown, friable silt loam

Subsoil:

12 to 48 inches—dark yellowish brown, friable silt loam

48 to 60 inches—yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Birds soils, which are in depressions and old drainageways
- The excessively drained Sarpy soils, which are on natural levees and have more sand in the control section than the Haymond soil

Similar inclusions:

- Soils that have a darker surface layer and more clay in lower part of the subsoil
- Soils that have more sand in the solum
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting.
- Crops are rarely damaged by floodwater.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.

- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Well suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 8A

Productivity index: 121 (high level of management)

3333—Wakeland silt loam, frequently flooded

Composition

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Shallow depressions and flat areas away from stream channels on valley floors along major streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 5 to 40 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Very slow

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

0 to 6 inches—brown, friable silt loam

Substratum:

6 to 14 inches—dark grayish brown, mottled, friable silt loam

14 to 42 inches—mottled light brownish gray, brown, yellowish brown, and grayish brown, friable silt loam

Buried soil:

42 to 51 inches—dark gray, mottled, friable silt loam

51 to 60 inches—gray, mottled, friable silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Birds soils, which are in the lower landform positions
- The well drained Haymond soils, which are in the slightly higher landform positions
- The excessively drained Sarpy soils, which are on the higher natural levees and have more sand in the control section than the Wakeland soil

Similar inclusions:

- Soils that have more sand in the solum
- Soils that have a thicker dark surface soil
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland*Suitability:* Well suited*Management considerations:*

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat*Suitability:* Moderately suited*Management considerations:*

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to

prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings*Suitability:* Generally unsuited because of the flooding**Septic tank absorption fields***Suitability:* Generally unsuited because of the flooding***Interpretive Groups****Land capability classification:* 2w*Woodland ordination symbol:* 5A*Productivity index:* 135 (high level of management)**3334—Birds silt loam, frequently flooded*****Composition***

Birds soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting*Landscape:* Flood plains*Landform:* Low flood plains*Landform position:* Shallow depressions and old stream channels on valley floors along major streams and the Embarras River*Shape of areas:* Linear*Frequency of flooding:* Frequent*Duration of flooding:* Brief*Ponding:* Occurring for brief periods in spring*Size of areas:* 5 to 30 acres*Major use:* Cropland***Soil Properties and Qualities****Drainage class:* Poorly drained*Permeability:* Moderately slow*Parent material:* Silty alluvium*Runoff:* Pondered*Available water capacity:* High*Seasonal high water table:* 0.5 foot above to 1.0 foot below the surface*Content of organic matter:* Moderately low*Erosion hazard:* None*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 22 inches—dark grayish brown and dark gray, mottled, friable silt loam

Substratum:

22 to 60 inches—dark gray, mottled, friable silt loam

Inclusions*Contrasting inclusions:*

- The somewhat poorly drained Wakeland soils, which are in the slightly higher landform positions

Similar inclusions:

- Soils that have a dark surface soil
- Soils that have more sand in the solum
- Soils that have more clay in the solum

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.

- Planting mature stock on ridges reduces the seedling mortality rate.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the oxbows and depressions.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5W

Productivity index: 125 (high level of management)

3404—Titus silty clay loam, frequently flooded**Composition**

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Backswamps on valley floors along major streams and the Embarras River

Shape of areas: Linear
Frequency of flooding: Frequent
Duration of flooding: Brief
Ponding: Occurring for long periods in spring
Size of areas: 10 to 80 acres
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Clayey alluvium
Runoff: Ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Content of organic matter: Moderate
Erosion hazard: None
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

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

Subsurface layer:
 7 to 13 inches—very dark grayish brown, friable silty clay loam

Subsoil:
 13 to 22 inches—dark gray, mottled, friable silty clay loam
 22 to 32 inches—dark gray, mottled, firm silty clay loam
 32 to 60 inches—gray, mottled, very firm silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Tice soils, which are in the higher landform positions and have less clay in the solum than the Titus soil

Similar inclusions:

- Soils that have more clay in the subsoil
- Soils that have less clay in the subsoil
- Soils that have a lighter colored surface layer
- Soils that have more sand in the surface layer and subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:

- Flooding and ponding can delay planting and harvesting and damage crops in some years.

- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Moderately suited
Management considerations:

- Shallow surface and subsurface drains and surface ditches can lower the water table if suitable outlets are available.
- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Poorly suited
Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited
Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures

that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

- Some low areas in depressions are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the depressions.

Dwellings

Suitability: Generally unsuited because of the flooding and the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding and the ponding

Interpretive Groups

Land capability classification: 4w

Woodland ordination symbol: 2W

Productivity index: 125 (high level of management)

3415—Orion silt loam, frequently flooded

Composition

Orion soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Shallow depressions and flat areas away from stream channels; narrow flats along the upper reaches of tributaries

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 50 acres

Major use: Cropland or pasture

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Recent silty alluvium underlain by a dark buried soil, which formed in silty alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: None

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

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

Substratum:

8 to 24 inches—stratified dark grayish brown, grayish brown, and brown, mottled, friable silt loam

Buried soil:

24 to 60 inches—very dark gray, friable loam

Inclusions

Contrasting inclusions:

- The poorly drained Holly soils, which are in the lower areas in depressions and old drainageways, do not have a buried soil, and have more sand in the control section than the Orion soil

Similar inclusions:

- Soils that have more sand in the control section and do not have a buried soil
- Soils that have a buried soil below a depth of 40 inches
- Soils that have a darker surface soil
- Soils that have a buried soil within a depth of 20 inches

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.

- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 2W

Productivity index: 130 (high level of management)

3424—Shoals silt loam, frequently flooded

Composition

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Narrow flats along creeks and their tributaries

Shape of areas: Long and narrow

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 200 acres

Major use: Cropland or pasture

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Loamy alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: 0.5 foot to 1.5 feet below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—brown, friable silt loam

Subsurface layer:

7 to 11 inches—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 silt loam and loam

Inclusions

Contrasting inclusions:

- The well drained Hickory soils, which are on side slopes above the Shoals soil

Similar inclusions:

- Soils that contain less sand in the substratum
- Soils that contain more clay in the surface layer
- Soils that are rarely flooded
- Soils that have a darker surface layer
- Soils that have a seasonal high water table at the surface
- Soils that are more acid in the substratum

Use and Management

Cropland

Suitability: Moderately suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.

- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 5W

Productivity index: 97 (high level of management)

3430A—Raddle silt loam, 0 to 2 percent slopes, frequently flooded

Composition

Raddle soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains

Landform: Low and high flood plains

Landform position: Broad flats slightly back from stream channels on low flood plains and on high flood plains along the Embarras River

Shape of areas: Irregular

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 100 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Slow

Available water capacity: Very high

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

6 to 12 inches—very dark grayish brown, friable silt loam

Subsoil:

12 to 42 inches—dark brown and brown, friable silt loam

42 to 60 inches—dark yellowish brown, friable silt loam

Inclusions

Contrasting inclusions:

- The poorly drained Blackoar soils, which are in the lower areas in depressions and old drainageways
- The somewhat poorly drained Lawson soils, which are in the lower areas in depressions and old drainageways and have a thicker dark surface soil than that of the Raddle soil
- The somewhat poorly drained Tice soils, which are in the slightly lower landform positions

Similar inclusions:

- Soils that have a light colored surface layer
- Soils that have a dark surface soil more than 24 inches thick
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and

hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 140 (high level of management)

3451—Lawson silt loam, frequently flooded

Composition

Lawson soil and similar inclusions: 85 to 90 percent

Contrasting inclusions: 10 to 15 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Old stream channels, depressions, and flat areas on the valley floor along the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Long

Size of areas: 10 to 70 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Slow

Available water capacity: Very high

Seasonal high water table: 1 to 3 feet below the surface

Content of organic matter: High

Erosion hazard: Slight

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

9 to 19 inches—very dark gray, friable silty clay loam
 19 to 27 inches—very dark grayish brown, friable silt loam

Substratum:

27 to 40 inches—very dark gray, mottled, friable silt loam
 40 to 46 inches—very dark grayish brown, mottled, friable silt loam with strata of brown sandy loam
 46 to 60 inches—very dark gray, mottled, friable silt loam

Inclusions*Contrasting inclusions:*

- The poorly drained Blackoar soils, which are in the lower areas in depressions and old drainageways and have a dark surface soil less than 24 inches thick
- The well drained Raddle soils, which are in the higher landform positions

Similar inclusions:

- Soils that have a dark surface soil less than 24 inches thick
- Soils that have a light colored surface layer
- Soils that have a buried soil within a depth of 40 inches
- Soils that have more sand in the control section

Use and Management**Cropland***Suitability:* Moderately suited*Management considerations:*

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Erosion or scouring is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay*Suitability:* Well suited*Management considerations:*

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.

- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland*Suitability:* Moderately suited*Management considerations:*

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- The competition from undesirable vegetation in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat*Suitability:* Well suited*Management considerations:*

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings*Suitability:* Generally unsuited because of the flooding**Septic tank absorption fields***Suitability:* Generally unsuited because of the flooding**Interpretive Groups***Land capability classification:* 4w*Woodland ordination symbol:* 2W*Productivity index:* 155 (high level of management)**3603—Blackoar silt loam, frequently flooded****Composition**

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

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Broad flats away from the stream channel, depressions, and old drainageways on valley floors along major streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 80 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderate

Parent material: Silty alluvium

Runoff: Very slow

Available water capacity: Very high

Seasonal high water table: Within a depth of 1 foot

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown, friable silt loam

Subsurface layer:

7 to 15 inches—very dark grayish brown, friable silt loam

Subsoil:

15 to 44 inches—gray, mottled, friable silt loam

44 to 60 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Lawson soils, which are in the slightly higher landform positions and have a dark surface soil more than 24 inches thick
- The somewhat poorly drained Radford soils, which are in the slightly higher landform positions and have a buried soil within a depth of 40 inches
- The somewhat poorly drained Tice soils, which are in the slightly higher landform positions

Similar inclusions:

- Soils that have more clay in the upper part of the subsoil
- Soils that have light colored surface layer
- Soils that have a dark surface layer less than 10 inches thick

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by shallow surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface and subsurface drains and surface ditches can lower the water table if suitable outlets are available.
- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in depressions and old oxbows are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the depressions and oxbows.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w

Woodland ordination symbol: 5W

Productivity index: 140 (high level of management)

3776+—Comfrey silt loam, overwash, frequently flooded

Composition

Comfrey soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains

Landform: Low flood plains

Landform position: Narrow flats along the upper reaches of tributaries; depressions and old drainageways on valley floors along major streams

Shape of areas: Linear

Frequency of flooding: Frequent

Duration of flooding: Brief

Size of areas: 10 to 60 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Moderate

Parent material: Loamy alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.5 feet below the surface

Content of organic matter: High

Erosion hazard: None

Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:

0 to 11 inches—very dark gray and very dark grayish brown, friable silt loam

Subsurface layer:

11 to 28 inches—very dark gray, firm silty clay loam

28 to 46 inches—very dark gray, mottled, firm clay loam

Subsoil:

46 to 51 inches—grayish brown, mottled, firm clay loam

Substratum:

51 to 60 inches—grayish brown, mottled, friable clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Lawson soils, which are in the slightly higher landform positions and have less sand in the control section than the Comfrey soil
- The somewhat poorly drained Radford soils, which are in the slightly higher landform positions, have less sand in the control section than the Comfrey soil, and have a buried soil within a depth of 40 inches

Similar inclusions:

- Soils that have more clay in the control section
- Soils that have less sand in the control section and have a dark surface soil less than 24 inches thick
- Soils that have a dark surface soil less than 24 inches thick
- Soils that are flooded less than once every 2 years

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by shallow surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.

- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface and subsurface drains and surface ditches can lower the water table if suitable outlets are available.
- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in depressions and old oxbows are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the depressions and oxbows.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: Not assigned

Productivity index: 135 (high level of management)

7109—Raccoon silt loam, rarely flooded

Composition

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

Setting

Landscape: Flood plains and terraces

Landform: High flood plains and low terraces

Landform position: Alluvial toeslopes on valley floors
along streams

Shape of areas: Linear

Frequency of flooding: Rare

Size of areas: 5 to 30 acres

Major use: Cropland or pasture

Soil Properties and Qualities

Drainage class: Poorly drained

Permeability: Slow

Parent material: Silty local alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: Within a depth of 1 foot

Content of organic matter: Moderately low

Erosion hazard: None

Shrink-swell potential: High

Potential for frost action: High

Typical Profile

Surface layer:

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

Subsurface layer:

7 to 16 inches—dark grayish brown and grayish brown, friable silt loam

16 to 25 inches—light grayish brown, friable silt loam

Subsoil:

25 to 34 inches—gray, firm silty clay loam

34 to 40 inches—mottled light gray, grayish brown, and yellowish brown, friable silty clay loam

40 to 60 inches—gray, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Holton soils, which are in the lower areas on valley floors and have more sand and less clay in the surface soil and subsoil than the Raccoon soil
- The somewhat poorly drained Shoals soils, which are on the slightly higher alluvial fans and footslopes and have more sand in the surface soil and subsoil than the Raccoon soil

Similar inclusions:

- Soils that have less clay in the subsoil
- Soils that are flooded more than once every 20 years
- Soils that have more sand in the surface soil and subsoil

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting and damage crops in some years.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface ditches can lower the water table if suitable outlets are available.
- 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Poorly suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- Harvesting by methods that do not isolate the remaining trees or leave them widely spaced and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland reduce the hazard of windthrow.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.
- Some low areas in depressions are wet. Wetland plants and shallow water areas, which enhance wildlife habitat, can be easily established in the depressions.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the seasonal high water table

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 4W

Productivity index: 110 (high level of management)

7134B—Camden silt loam, 2 to 5 percent slopes, eroded, rarely flooded

Composition

Camden soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains and terraces

Landform: High flood plains and low terraces

Landform position: Alluvial footslopes and low terraces along major streams and the Embarras River

Shape of areas: Linear

Frequency of flooding: Rare

Size of areas: 5 to 20 acres

Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained

Permeability: Moderate

Parent material: Silty alluvium and the underlying loamy alluvium or outwash

Runoff: Medium

Available water capacity: High

Seasonal high water table: More than 6 feet below the surface

Content of organic matter: Moderately low

Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

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

Subsoil:
 7 to 19 inches—dark yellowish brown, friable silt loam
 19 to 34 inches—yellowish brown, friable silty clay loam
 34 to 38 inches—yellowish brown, mottled, friable silty clay loam
 38 to 42 inches—stratified brown and dark yellowish brown, friable gravelly sandy clay loam and loam
 42 to 60 inches—brown, friable gravelly sandy clay loam

Inclusions

Contrasting inclusions:

- The poorly drained Holly soils, which are in the lower areas in depressions and old drainageways and have more sand in the surface layer and subsoil than the Camden soil
- The somewhat poorly drained Shoals soils, which are in the slightly lower landform positions and have more sand in the control than the Camden soil
- The somewhat poorly drained Starks soils, which are in the slightly lower landform positions

Similar inclusions:

- Soils that are flooded more than once every 20 years
- Soils that have loamy alluvium below a depth of 40 inches
- Soils that have a dark surface layer
- Soils that have less than 20 inches of silty alluvium

Use and Management

Cropland

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are rarely damaged by floodwater.
- Scour erosion is a hazard during periods of flooding if the soil is cultivated. Grass strips in critical areas reduce this hazard.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.
- Contour farming and a conservation tillage system

that leaves crop residue on the surface after planting help to maintain tilth, minimize crusting, and control runoff and erosion.

Pasture and hay

Suitability: Well suited

Management considerations:

- Flooding delays harvesting of hay in some years.
- Overgrazing reduces forage yields, causes surface compaction and poor tilth, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, restricted use during wet periods, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition and help to control erosion.
- Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- Plant competition affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means.
- Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Well suited

Management considerations:

- This soil is suitable for grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2e

Woodland ordination symbol: 7A

Productivity index: 110 (high level of management)

7424—Shoals loam, rarely flooded**Composition**

Shoals soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landscape: Flood plains and terraces

Landform: High flood plains and low terraces

Landform position: Alluvial fans, footslopes, and toeslopes

Shape of areas: Linear

Frequency of flooding: Rare

Size of areas: 5 to 20 acres

Major use: Cropland or pasture

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Permeability: Moderate

Parent material: Loamy alluvium

Runoff: Slow

Available water capacity: High

Seasonal high water table: 0.5 foot to 1.5 feet below the surface

Content of organic matter: Moderate

Erosion hazard: Slight

Shrink-swell potential: Low

Potential for frost action: High

Typical Profile

Surface layer:

0 to 8 inches—brown, friable loam

Substratum:

8 to 34 inches—brown and dark grayish brown, mottled, friable loam

34 to 56 inches—grayish brown, mottled, friable silt loam

56 to 60 inches—grayish brown, mottled, friable loam

Inclusions

Contrasting inclusions:

- The poorly drained Racoon soils, which are in the slightly lower landform positions and have less sand in the control section than the Shoals soil

Similar inclusions:

- Soils that have less sand in the control section
- Soils that have more sand and less clay in the control section
- Soils that are flooded more than once every 20 years
- Soils that have slopes of more than 2 percent

Use and Management**Cropland**

Suitability: Well suited

Management considerations:

- Flooding can delay planting and harvesting in some years.
- Crops are rarely damaged by floodwater.
- The wetness caused by flooding and the seasonal high water table can be reduced by surface ditches or subsurface drains if suitable outlets are available.
- Measures that maintain the drainage system are needed. Additional drainage is needed in some areas.
- Tilling when the soil is wet causes surface cloddiness. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Pasture and hay

Suitability: Well suited

Management considerations:

- Shallow surface drains and subsurface tile 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, timely harvesting, and applications of fertilizer help to keep the pasture or hayland in good condition.
- Canarygrass and alsike clover are suitable for planting. The suitable warm-season grasses include big bluestem, Indiangrass, and switchgrass.

Woodland

Suitability: Moderately suited

Management considerations:

- The seasonal high water table limits the use of equipment. The equipment can be used only when the soil is firm and dry.
- Planting mature stock on ridges reduces the seedling mortality rate.
- The competition from undesirable plants in openings created by timber harvesting can be controlled by chemical or mechanical means.
- Controlling livestock grazing helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.
- Measures that protect the woodland from fire are needed.

Wildlife habitat

Suitability: Moderately suited

Management considerations:

- This soil is suitable for grasses and legumes, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the seasonal high water table

Interpretive Groups

Land capability classification: 2w

Woodland ordination symbol: 5W

Productivity index: 140 (high level of management)

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 avoid 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 behavior 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, pasture, woodland, and wildlife habitat and as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the county. 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

Wayne Johanning, District Conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture

plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; the soils that meet the requirements for prime farmland are identified; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

About 160,000 acres in Cumberland County is used as cropland, and 5,400 acres is used as pasture. The soils that are used as cropland have good potential for the production of crops. This soil survey can be used as a valuable guide to the latest management techniques for increasing the efficiency of food and fiber production.

Water erosion is a major management concern in Cumberland County. In 1983, an estimated 52,000 acres of cropland was eroding at an annual rate of over 3 to 5 tons of soil per acre, which is considered to be the tolerable rate for most of the soils. Soils that have slopes of 2 percent or more are susceptible to excessive water erosion. In areas where slopes are less than 2 percent, water erosion may be a problem if runoff is concentrated. Some soils are so severely eroded that little or no surface soil remains. Blair silt loam, 5 to 10 percent slopes, severely eroded, is an example.

Water erosion is damaging for three reasons. First, soil productivity is reduced as the surface layer is lost and the subsoil becomes incorporated into the plow layer. Valuable nutrients are lost along with the surface layer. Second, erosion causes deterioration of soil tilth and reduces the rate of water infiltration. It is especially damaging on soils that have a clayey or unfavorable subsoil or have a root-restricting layer near the surface. Bluford, Cisne, and Wynoose are examples of soils that have a clayey subsoil. Darmstadt, Huey, and Piasa soils have an unfavorable

subsoil that is high in content of exchangeable sodium. The clayey soils tend to be cloddy if worked when too wet and crust after a hard rain. On these soils preparation of a good seedbed is difficult. Third, erosion allows sediment to enter drainage ditches, road ditches, streams, and lakes. Removing this sediment is very expensive. Management that controls erosion also helps to prevent sedimentation and improves the quality of water for municipal and recreational uses and for fish and wildlife.

Conservation practices that provide a protective plant cover, increase the rate of water infiltration, and reduce the runoff rate help to control water erosion. The following paragraphs describe some of the conservation practices that are suitable on the cropland in Cumberland County. In many areas a combination of these practices is needed to control water erosion. The combination needed depends on the soil characteristics and the topography.

A conservation cropping system provides a plant cover for extended periods. It is a combination of a cropping sequence (rotation) and the needed cultural and management measures. Grasses and legumes are sometimes included in the cropping sequence. The protective cover provided by these plants reduces the runoff rate, helps to control water erosion, provides nitrogen, and improves tilth. The grasses and legumes also provide feed for livestock or can be sold for cash. Smooth brome grass, orchardgrass, tall fescue, alfalfa, and red clover are commonly included in the cropping system.

Terraces are effective in controlling water erosion on some of the soils with long slopes (fig. 18). They intercept runoff and conduct it to a stable outlet at a nonerosive velocity. They are a series of ridges and channels that are properly spaced and have a proper grade in the channel. Outlets may be grassed waterways or tile outlets. Several types of terraces



Figure 18.—Terraces in an area of Miami silt loam, 2 to 5 percent slopes, eroded.

can be used, depending on the soil and the management system used in the field. Atlas, Blair, Fishhook, Ursa, and other soils in areas where the topography is irregular and slopes are commonly short and steep are not suitable for terracing. Conservation tillage, especially no-till planting, commonly can control sheet and rill erosion on these soils. Conservation tillage is a system of tillage that maintains a protective amount of crop residue on the surface throughout the year. Conversion to other uses, such as pasture, hayland, or woodland, is desirable on steep, irregular slopes.

Grassed waterways in drainageways safely dispose of runoff. They help to prevent gully erosion and can provide outlets for terraces. A grade-stabilization structure commonly is needed to provide a safe outlet for grassed waterways. Several types of structures can be used, depending on the specific site. Water- and sediment-control basins can control gully erosion in draws with small drainage areas. These are normally small embankments with tile outlets and have spacings similar to those of terraces.

Information about the design of conservation practices is available at the office of the Cumberland County Soil and Water Conservation District.

A drainage system is needed on much of the farmland in the county. Unless the poorly drained and somewhat poorly drained soils are artificially drained, the seasonal high water table can damage crops or delay planting or harvesting in most years. About 59 percent of the cropland in the county is in areas of poorly drained soils. These include Birds, Blackoar, and Holly soils on flood plains and Cisne, Newberry, and Wynoose soils on uplands. About 34 percent of the cropland is in areas of somewhat poorly drained soils. The most extensive of the somewhat poorly drained soils on uplands are Bluford, Darmstadt, and Hoyleton soils. The Holton, Tice and Wakeland soils on flood plains also are somewhat poorly drained.

The design of drainage systems differs from soil to soil. Surface ditches and tile can be used in some areas. Also, measures that control flooding are needed in areas that are subject to damaging overflow during the growing season. Standard tile lines do not function well in upland soils that are slowly permeable or very slowly permeable. Cisne and Wynoose soils are examples. Surface ditches or tile lines with surface inlets are needed in areas of these soils. In some areas land leveling helps to prevent shallow ponding.

Natural fertility is low in soils that have a high content of sodium in the subsoil. The excessive amounts of sodium in Darmstadt, Huey, and Piasa soils restrict the availability and uptake of some plant nutrients. Returning crop residue to the soils and

regularly adding manure or other organic material improve fertility and help to maintain tilth.

Natural fertility is high in Drummer, Raddle, Virden, and other soils that have a thick, dark, surface layer. These soils formed under prairie grasses or were greatly influenced by those grasses. They have a deep root zone and a high or very high available water capacity.

Natural fertility is medium in Bluford, Racoon, Wynoose, and other soils that formed under forest vegetation and have a light colored surface layer. The supply of available phosphorus and potash is low in some of these soils. Soil tests are needed to determine the amounts of lime and fertilizer needed. Assistance in determining the proper kinds or amounts of fertilizer and lime is available at the local office of the Cooperative Extension Service.

Tilth has an important effect on seed germination and the rate of water infiltration. Soils having a surface layer of silt loam that is moderate or high in content of organic matter are characterized by granular structure and good tilth. Cisne, Newberry, and Raddle soils are examples.

Soils that are low in content of organic matter have weaker structure in the surface layer than soils that have a higher content of organic matter. Examples are Ava, Blair, and Bluford soils. During periods of heavy rainfall, a crust forms on the surface of these soils. This crust is hard when dry. As a result, the rate of water infiltration decreases and the runoff rate and hazard of water erosion increase. Such management practices as no-till planting, which leaves crop residue on the surface, minimize crusting and increase the rate of water infiltration. Growing cover crops and adding manure or other organic material improve tilth.

Tilth deteriorates as a result of water erosion. As the upper part of the subsoil is incorporated into the surface layer of eroded soils, the plow layer becomes more clayey and tilth becomes poor. As a result, the rate of water infiltration decreases and the runoff rate and hazard of water erosion increase. The eroded soils are sticky when wet and hard and cloddy when dry. Examples are Atlas, Hickory, and Ursa soils. On these soils cover crops, no-till planting, or a conservation cropping system that is dominated by hay or pasture helps to control water erosion and improves tilth.

The need for an adequate amount of soil moisture during dry years is a management concern in areas of soils that have a moderate or low available water capacity. Examples are Princeton, Sarpy, and Thebes soils. Maintaining crop residue on the surface and applying a system of no-till planting commonly help to conserve the available moisture.

Smooth brome grass, orchardgrass, tall fescue, alfalfa, ladino clover, and red clover are the most common pasture and hay species grown in the county. All of these species grow well in areas of well drained to somewhat poorly drained soils. Holly, Racoon, Wynoose, and other poorly drained soils are better suited to redtop, reed canarygrass, ladino clover, and alsike clover than to other species. Native grasses, such as switchgrass, can be used to supplement forage production during the summer months. Overgrazing or grazing when the soil is wet reduces productivity and causes surface compaction and excessive runoff. Applications of fertilizer, proper stocking rates, and rotation grazing help to keep the pastures productive.

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 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations 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 5 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 (USDA, 1961). 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 and 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 the numbers 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly

because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Productivity Index

At the end of the descriptions under the heading "Detailed Soil Map Units," the soils in the county are assigned a productivity index. This index expresses the estimated yields of the major grain crops as a single percentage of the average yields obtained under basic management from many of the more productive soils in Illinois (Fehrenbacher and others, 1978). The index is a relative rather than an absolute measure of productive capacity. The higher the index, the higher the relative yield.

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 providing 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 and 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 economically to produce a sustained high yield of crops. Prime farmland produces the highest yields with minimal inputs 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 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 130,266 acres in Cumberland County, or nearly 59 percent of the total acreage, meets the requirements for prime farmland. The prime farmland is throughout the county. It generally is used for crops, mainly corn and soybeans, which account for most of the local agricultural income each year.

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

The map units in Cumberland County that are considered prime farmland are listed in table 6. 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 in this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have a seasonal high water table or are frequently flooded during the growing season qualify for prime farmland only in areas where these limitations have been overcome by such measures as drainage and flood control. The need for these measures is indicated after the map unit name in table 6. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. Most of the naturally wet soils in Cumberland County have been adequately drained.

Woodland Management and Productivity

About 15,000 acres in Cumberland County, or nearly 7 percent of the total acreage, is woodland (fig. 19). Most of the wooded areas are along the major drainageways.

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 rated. 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;



Figure 19.—A wooded area of the Hickory-Bluford-Ava association.

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*, excessive 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*, high content of rock fragments in the soil; and *L*, low strength. 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 *L*.

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 or season of

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

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable

species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are taken.

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

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

Suggested trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

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

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

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

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

of the Natural Resources Conservation Service or 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 that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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

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

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

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm

when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

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

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

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

Wildlife Habitat

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

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

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places.

Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

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

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, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, 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. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

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

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

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

Wildlife area 1 consists of the Wynoose-Bluford, Cisne-Newberry-Hoyleton, and Bluford-Wynoose-Darmstadt associations. The soils in this area generally are nearly level or gently sloping and are somewhat poorly drained or poorly drained. These soils are on uplands.

This area is used mainly as cropland. A few small areas are pastured or wooded. Wildlife habitat is fair or poor because of a lack of adequate crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows. The areas along field borders and along minor streams, the meadows, and the pastured areas provide some habitat for openland wildlife. The wildlife attracted to this area include rabbit,

coyote, red fox, quail, hawks, and many types of songbirds.

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

Wildlife area 2 consists of the Hickory-Bluford-Ava, Sabina-Miami-Xenia, and Starks-Drummer-Camden associations. The soils in this area generally are nearly level to steep and are poorly drained to well drained. This area borders the major streams and creeks in the county. It also includes all of the area affected by the Wisconsinan Glaciation.

This area is used as cropland, pasture, or woodland, and thus it provides habitat for a variety of wildlife. Wildlife habitat generally is good, especially in the areas of woodland. The wildlife attracted to this area include deer, squirrel, raccoon, rabbit, opossum, snakes, turtles, owls, doves, and many other birds.

Native trees, shrubs, and prairie plants provide the best cover if measures that exclude grazing livestock are applied. The habitat can be improved by leaving crop residue on the surface after harvest, establishing food plots of grain crops and strips of grass or grass-legume mixtures, deferring the mowing of grassy areas until August, and establishing hedgerows and windbreaks that include trees and shrubs that bear fruit and nuts.

Wildlife area 3 is the Holton-Wirt-Holly association. The soils in this area generally are nearly level and are poorly drained, somewhat poorly drained, or well drained. This area includes the bottom land and terraces along streams and creeks. It is used as cropland, woodland, or pasture, and thus it provides habitat for a variety of both upland and wetland wildlife. Wildlife habitat generally is good or fair. The wildlife attracted to this area include deer, squirrel, rabbit, raccoon, opossum, muskrat, snakes, turtles, frogs, owls, doves, ducks, and many other types of birds and waterfowl.

Native trees, shrubs, and wetland plants provide the best cover if measures that exclude grazing livestock are applied. The habitat can be improved by leaving crop residue on the surface after harvest and establishing food plots of grain crops. Wetland habitat can be improved by establishing or preserving areas

of open water; by increasing the capacity of ditches, pits, dikes, and levees to retain water; and by planting millet, buckwheat, sorghum, corn, and other crops that provide feed for waterfowl.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data 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 to 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, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

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

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

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

Sanitary Facilities

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

are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. 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, and flooding affect absorption of the effluent. Large stones 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 are less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

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

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

depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

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

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

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

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

workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

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

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

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable

compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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

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

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

Grassed waterways are natural or constructed

channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of

soil blowing, a low available water capacity, a restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

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

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

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

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

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

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

appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

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 content of organic matter. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

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

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

Rock fragments larger than 3 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 oven-dry 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

Tables 16 and 17 show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

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

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

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ -bar moisture tension. Weight is determined after the soil is dried at 105 degrees C. In table 16, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and

roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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

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

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

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

The content of organic matter in a soil can be

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

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 wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating

the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

In table 17, *cation-exchange capacity* is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

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

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased

dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Soil and Water Features

Tables 18 and 19 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

In table 18, *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 also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

In table 19, *hydrologic soil groups* are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

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

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average,

once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are depth to

the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

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

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. *Ponding duration* classes are the same as those for flooding. *Maximum ponding depth* refers to the depth of the water above the surface of the soil.

