United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
the Research Division of
the College of Agricultural
and Life Sciences,
University of Wisconsin

Soil Survey of Clark County, Wisconsin

How To Use This Soil Survey

General Soil Map

The general soil 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.

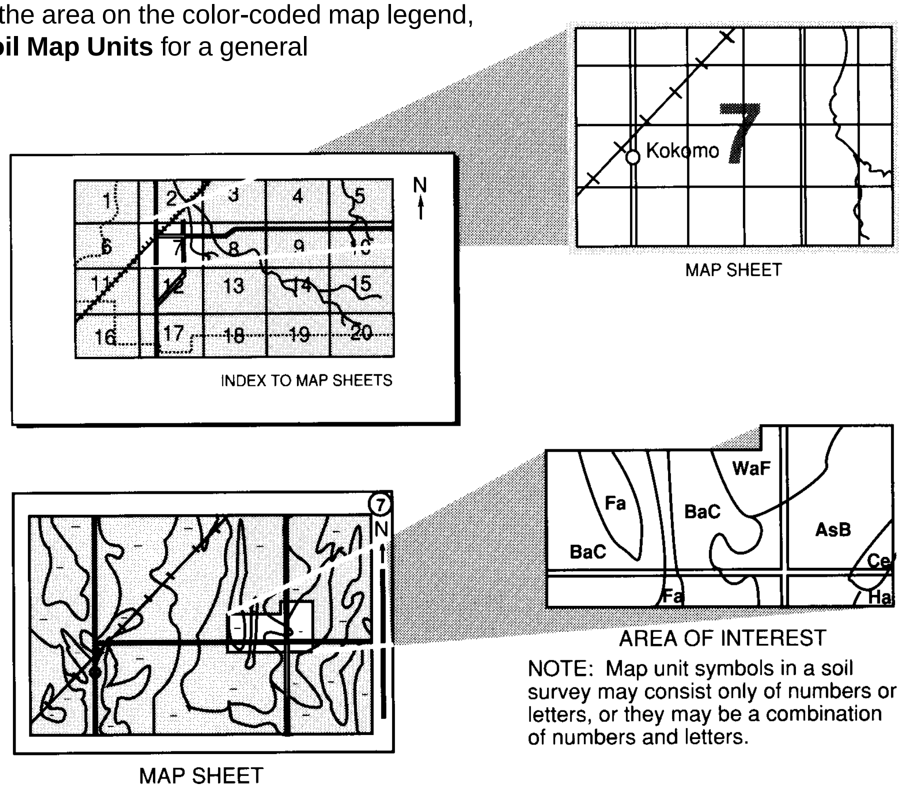
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

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**, which precedes the soil maps. 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 (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1993. Soil names and descriptions were approved in 1994. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1993. This survey was made cooperatively by the Natural Resources Conservation Service and the Research Division of the College of Agricultural and Life Sciences, University of Wisconsin. The survey is part of the technical assistance furnished to the Clark County Land Conservation Committee, which helped to finance the fieldwork.

Cover: A dairy farm in an area of Flambeau and Fallcreek soils. The woods in the background are in an area of Northmound soils.

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

Contents

Issued 2000

Foreword

This soil survey contains information that affects land use planning in Clark County, Wisconsin. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are only moderately deep to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils may be 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 or from private soil science consultants.

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Soil Survey of Clark County, Wisconsin

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CLARK COUNTY is in central Wisconsin (fig. 1). It has a total land area of 779,953 acres. The county has an extreme north-south length of 42 miles and an east-west width of 30 miles. Clark County is bordered on the north by Taylor County, on the east by Marathon and Wood Counties, on the south by Jackson County, and on the west by Jackson, Eau Claire, and Chippewa Counties.

Neillsville, in the south-central part of the county, is the county seat. In 1992, the population of Neillsville was 2,680 and the population of Clark County was 31,647 (Wisconsin Department of Administration). At that time, about 91 percent of the population was rural. About 57 percent of Clark County is used for farming, and 41 percent is forested (Wisconsin Department of Development). Clark County ranks second in the State in total cash receipts from dairy products (Wisconsin Department of Agriculture, Trade, and Consumer Protection and others).

A soil survey of the southern part of north-central Wisconsin, which includes Clark County, was published in 1918 (Whitson and others, 1918). The present survey updates this earlier survey and provides additional information and larger maps, which show the soils in greater detail.

General Nature of the County

This section provides some general information about the physical and cultural characteristics of Clark County. It describes history and development; climate; physiography, relief, and drainage; water supply; and transportation facilities and industry.

History and Development

The area now known as Clark County was common ground for the Chippewa, Menomonie, Winnebago, and Sioux Indians. It was divided into three parts by the treaty of 1825; one part went to the Chippewas, and another went to the Winnebagos. The third remained neutral. By 1837, all of the Indian land had been ceded to the United States.

Pine plantations, consisting mostly of white pine, were abundant along the Black River in the mid 1800's. The first logging and lumbering activities within the present boundaries of Clark County were initiated by the Mormons in 1844. As others expanded these activities, logging and lumbering remained the main enterprises until surpassed by agriculture near the turn of the 20th century.

Clark County was created from part of Jackson County in 1853. It was named in honor of General George Rogers Clark of Revolutionary War fame. The present county boundaries were not established until 1875, when Taylor County was formed.

The development of Clark County was hastened by railroad construction. The first railroad line was built through the southwestern part of the county by the West Wisconsin Railway Company in 1869. Another

Figure 1.—Location of Clark County in Wisconsin.

railroad passes through the northeastern part of the county.

Agriculture in the survey area was first practiced by the Indians. It increased as more land was cleared by logging activities. The early farmers raised crops for their own use. The first creameries and cheese factories were established in the 1880's. By 1895, when the logging industry was beginning to decline, factory manufacturing of cheese and butter was becoming more important. Presently, Clark County ranks second in the State in dairy production.

The general population trend for Clark County has varied. Each census for several decades after the county was created in 1853 showed an increase in population. The highest total was recorded in 1920, when 35,120 people were counted. After this, the number of residents shifted downward. In the years after World War II, the population increased slowly. The population trends in Clark County are generally similar to those of the State—the population has tended to decline in rural areas but increase in urban areas.

Climate

In Clark County, winters are very cold and summers are fairly warm. The short frost-free period during the summer limits cropping mainly to corn, forage, and small grain. Precipitation is fairly well distributed throughout the year and reaches a peak in the summer. Snow covers the ground much of the time from late fall through early spring.

Soils occasionally freeze to a depth of several feet when very cold weather occurs before the ground is appreciably covered with snow. Typically, however, the soil is frozen in only the top few inches, except where the snow has been removed.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Neillsville in the period 1951 to 1988. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is about 16 degrees F and the average daily minimum temperature is 5.5 degrees. The lowest temperature on record, which occurred on January 30, 1951, is -48 degrees. In summer, the average temperature is 67 degrees and the average daily maximum temperature is 80 degrees. The highest recorded temperature, which occurred on June 6, 1968, is 99 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 about 31 inches. Of this total, about 23 inches, or 74 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 19 inches. The heaviest 1-day rainfall during the period of record was 5 inches on August 8, 1980.

The average seasonal snowfall is 40.6 inches. The greatest snow depth at any one time during the period of record was 44 inches. On the average, 66 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and in winter. The prevailing wind is from the west or northwest. Average windspeed is highest, 11 miles per hour, in spring.

Physiography, Relief, and Drainage

Clark County is in two physiographic regions. About 95 percent of the county is in the Central Plain region, and the rest is in the Northern Highland region

(Finley, 1965). The Northern Highland region makes up a narrow strip in the northern and northeastern parts of the county along the Taylor and Marathon county lines. The Central Plain region makes up the rest of the county.

The Central Plain is underlain by Cambrian sandstone. South of Neillsville and in the southwestern part of the county, the Central Plain is mostly driftless, and thus the sandstone is near the surface. The landscape is mostly level and gently sloping and has many wet areas and some sandstone mounds (monadnocks) that range from a few feet to several hundred feet above the plain. Along the Black River the underlying Precambrian igneous and metamorphic rocks are exposed where the Cambrian sandstone has eroded away. North of Neillsville, the Central Plain consists mostly of glacial drift over Cambrian sandstone. The landscape consists mainly of level and gently sloping ground moraine with many areas of moderately well drained and somewhat poorly drained soils and a few monadnocks.

The Northern Highland region is an asymmetrical dome dominated by Precambrian igneous and metamorphic bedrock. In most places, glacial drift overlies the bedrock. The landscape is mostly a level or gently sloping ground moraine.

Relief in Clark County is largely controlled by glacial features and by the bedrock. The highest elevation, 1,460 feet, is northeast of Dorchester in the northeast corner of the county. The lowest elevation, about 883 feet, is along the shore of Lake Arbutus in the southwestern part of the county. Most of the county ranges from about 1,100 to 1,200 feet in elevation. Local differences in elevation are generally less than 100 feet. The greatest local difference is between the top of Bruce Mound (1,355 feet) and the nearby shore of Lake Arbutus (about 883 feet).

Most of Clark County is in the Black River drainage basin. The Black River flows south through the central part of the county and is part of the Mississippi River drainage system. The northwestern and west-central parts of the county are drained by the Eau Claire River, which is part of the Chippewa River drainage system. The eastern edges of the county are drained by the Eau Plaine and Yellow Rivers, which are part of the Wisconsin River drainage system.

Water Supply

Clark County has about 4,090 acres of surface water. Of this total, about 1,615 acres occurs as lakes, flowages, and ponds and about 2,475 acres occurs as rivers and streams. Water quality is variable. The water in the Black River, like most of the surface water in the southern and western parts of the county, is soft or very soft, is dark, and has low or medium potential for plant and fish production. Most of the surface water in the northern and eastern parts of the county is hard or very hard and has medium to very high potential for plant and fish production (Wisconsin Conservation Department, 1965).

Most of Clark County is underlain by Cambrian sandstone. A few areas, particularly along the Black River, are underlain by Precambrian crystalline igneous or metamorphic rock. In many places these rock formations are covered by glacial drift that ranges from about 1 foot to 120 feet in thickness (Bell and Sherrill, 1974).

Ground water is pumped from aquifers in the Cambrian and Precambrian formations and in the glacial drift. The Cambrian formation is the principal source of water; but in most areas of the county, it is thin and consists of interbedded sandstone and shale. Because of its inability to store water, in many areas the Cambrian formation yields less than 100 gallons per minute. The Precambrian formation is not a dependable source of ground water. Yields are from the weathered material at the surface and from the fractures within the bedrock and generally are less than 20 gallons per minute. The glacial drift contains good quality ground water in most areas, but yields are variable. Where the drift consists mainly of sand and gravel, yields range from 100 to more than 1,000 gallons per minute. Deposits of sand and gravel occur along some of the major rivers and streams. They are of a limited extent throughout the county. Where the drift consists mostly of glacial till, yields are generally less than 100 gallons per minute. Deposits of glacial till are extensive throughout the county but are less than 60 feet thick in most areas.

Most of the ground-water aquifers in the sandstone and the glacial drift have a relatively low content of dissolved solids, sulfates, and chlorides (Kammerer, 1984). The ground water is mostly soft but has some high concentrations of iron, manganese, and sulfides in some areas of Cambrian sandstone. Nitrates have been detected in about 80 percent of the wells in Clark County. Nitrate concentrations exceeded the maximum recommended concentration of 10 milligrams per liter in about 12 percent of the wells (Clark County, 1988).

Generally, the ground-water flow is toward local streams and rivers through seepage and spring discharge. Flow is controlled by local topography. It is well defined in areas of ridges with narrow valleys. Flow is greatest where valleys are deeply entrenched into the aquifer. Regional flow of deep aquifers is toward the Mississippi River or the Chippewa River (Zaporozec and Cotter, 1985).

Transportation Facilities and Industry

The principal north-south roads in the county are State Highways 13 and 73. The main east-west roads are Federal Highway 10 and State Highways 29, 73, and 95. Most other parts of the county are accessible by about 550 additional miles of hard-surface secondary roads and by about 1,500 miles of gravel roads (Wisconsin Department of Transportation, 1990). Most roads in agricultural areas are along section lines. Access is limited in parts of the county forests where all-weather roads are not maintained.

The county is served by two railroads. One provides service to the village of Humbird in the southwestern part of the county. The other provides service to Abbotsford, Colby, Dorchester, Owen, Unity, and Riblinger, which are in the northeastern part of the county.

There is no regular commercial air service in the county. A well maintained airport for small planes is located in Neillsville.

The major industries in Clark County, in order of income, are agriculture, public and private services, manufacturing, trade, transportation and public utilities, forestry and recreation, and construction and mining.

Dairy farming is the major agricultural enterprise. Clark County ranks second in the State in milk production and in total cash receipts from dairy products. Public and private services consist mainly of government functions, schools, and health care. Some of the major manufacturing products include industrial machinery, cardboard boxes, mobile homes, and measuring or controlling devices (Wisconsin Department of Development).

Clark County has about 277,000 acres of woodland. About 133,000 acres is county forest. These wooded areas provide pulpwood, lumber, firewood, wildlife habitat, and recreational opportunities. Some areas throughout the county are planted to conifers, such as red pine, white pine, and white spruce. Most conifers are harvested for Christmas trees.

Mining is of limited extent in the county. Commercial mineral resources include sand and gravel and crushed granite or other crushed igneous and metamorphic rocks.

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

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

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

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

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

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

The names and delineations of some of the soils in this survey do not fully agree with those in the surveys of adjacent counties. The differences are the result of variations in the extent or pattern of the soils in the survey areas, a better knowledge of soils because of recent changes in series concepts, and variations in the scale of the maps.

Soil scientists were denied access to a few tracts in the county. These areas were mapped by using knowledge of soil patterns in the surrounding area and by aerial photo interpretation. The identification of soil properties and the delineations of soil boundaries are less accurate on these tracts than in areas where soil scientists had access to the land and could examine the soils. On the detailed soil maps, these tracts are outlined with an ad hoc boundary and are labeled “Area of reduced reliability.”

General Soil Map Units

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

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

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

1. Freeon-Newood-Barronett Association

Deep and very deep, nearly level to moderately steep, poorly drained and moderately well drained, loamy and silty soils on moraines, glacial lake plains, and stream terraces

Composition

Percent of the survey area: 1.5
Extent of the components in the association:
Freeon and similar soils—24 percent
Newood and similar soils—23 percent
Barronett and similar soils—18 percent
Soils of minor extent—35 percent

Minor Soils

- The somewhat poorly drained Almena soils and the moderately well drained Spencer soils, which are very deep and formed in loess or silty alluvium underlain by loamy glacial till; on ground moraines
- The very poorly drained, very deep Cathro soils, which formed in herbaceous organic material underlain by loamy deposits; in depressions and drainageways
- The somewhat poorly drained Comstock soils and the moderately well drained Crystal Lake soils, which are very deep and formed mostly in silty lacustrine deposits; on glacial lake plains and stream terraces
- The somewhat poorly drained, deep Magnor soils, which formed in loess or silty alluvium underlain by dense, loamy glacial till; on moraines

Soil Properties and Qualities

Freeon

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 2 to 15 percent
Depth class: Deep to dense, loamy glacial till
Drainage class: Moderately well drained
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate or high
Texture of the surface layer: Silt loam

Newood

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 2 to 15 percent
Depth class: Deep or very deep to dense, loamy glacial till
Drainage class: Moderately well drained
Permeability: Moderate in the upper part of the loamy till, slow in the next part, and very slow in the lower part
Available water capacity: Moderate
Texture of the surface layer: Sandy loam

Barronett

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty part and moderately slow in the stratified part

Available water capacity: High
Texture of the surface layer: Silt loam

Use and Management

Dominant land uses: Cropland in most areas of the Freeon soils and in some areas of the Newood soils and wetland wildlife habitat in most areas of the Barronett soils
Other uses: Pasture or woodland

Major management concerns affecting cropland: Freeon—water erosion, droughtiness, nutrient and pesticide loss, poor tilth, and rock fragments; Newood—water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and rock fragments; Barronett (in drained areas)—nutrient and pesticide loss, wetness, ponding, poor tilth, low strength, and frost hazard

Major management concerns affecting wildlife habitat: Freeon and Newood—generally unsuited because of insufficient moisture; Barronett—excessive sedimentation, chemical and nutrient pollution

Major management concerns affecting pasture: Freeon—water erosion, nutrient and pesticide loss, and rock fragments; Newood—water erosion, soil blowing, nutrient and pesticide loss, and rock fragments; Barronett—wetness, ponding, and low strength

Major management concerns affecting woodland: Freeon and Newood—equipment limitation and plant competition; Barronett—equipment limitation, windthrow hazard, plant competition, and seedling mortality

2. Almena-Spencer Association

Very deep, nearly level to sloping, somewhat poorly drained and moderately well drained, silty soils on ground moraines

Composition

Percent of the survey area: 2
Extent of the components in the association:
Almena and similar soils—51 percent
Spencer and similar soils—38 percent
Soils of minor extent—11 percent

Minor Soils

- The poorly drained Auburndale soils in depressions and drainageways
- The poorly drained Fordum soils and the moderately well drained Moppet soils, which formed in loamy alluvium underlain by sandy alluvium; on flood plains
- The moderately well drained, deep Freeon soils, which formed in loess or silty alluvium underlain by dense, loamy glacial till

Soil Properties and Qualities

Almena

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

Spencer

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 2 to 12 percent
Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Major management concerns affecting cropland: Almena—wetness, poor tilth, and low strength; Spencer—water erosion, nutrient and pesticide loss, poor tilth, and low strength

Major management concerns affecting woodland: Almena—equipment limitation, windthrow hazard, and plant competition; Spencer—equipment limitation and plant competition

Major management concerns affecting pasture: Almena—low strength; Spencer—water erosion, nutrient and pesticide loss, and low strength

3. Loyal-Withee-Marshfield Association

Very deep, nearly level to sloping, poorly drained to moderately well drained, silty soils on ground moraines

Composition

Percent of the survey area: 38
Extent of the components in the association (fig. 2):
Loyal and similar soils—54 percent
Withee and similar soils—20 percent

Marshfield and similar soils—10 percent
Soils of minor extent—16 percent

Minor Soils

• The very poorly drained Beseman soils, which formed in herbaceous organic material and are underlain by loamy alluvium; in depressions and drainageways
• The very poorly drained Dawson soils, which formed in herbaceous organic material and are underlain by sandy deposits; in depressions and drainageways
• The very poorly drained Loxley soils, which formed in herbaceous organic material; in depressions and drainageways
• The poorly drained Fordum soils and the moderately well drained Moppet soils, which formed in loamy alluvium underlain by sandy alluvium; on flood plains

Soil Properties and Qualities

Loyal

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 1 to 12 percent
Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

Withee

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

Marshfield

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

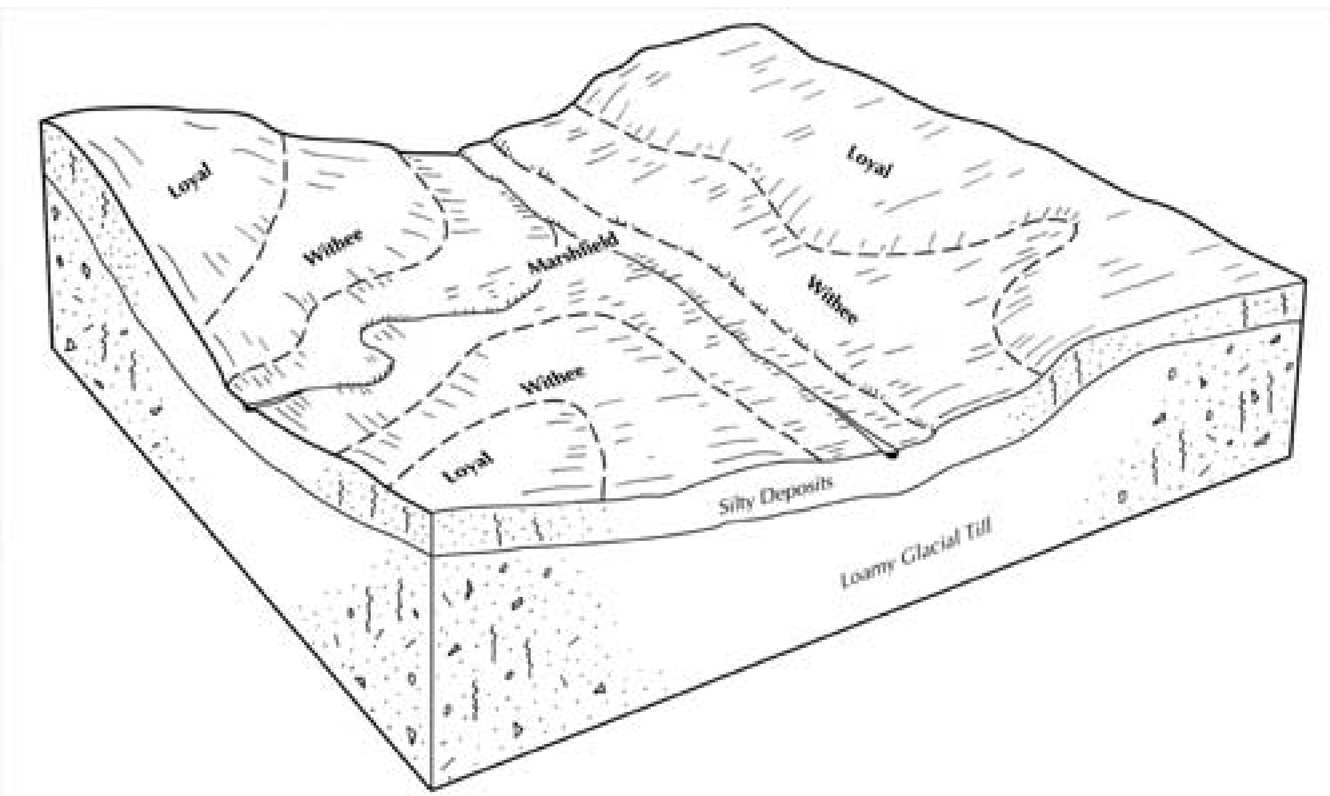

Figure 2.—Pattern of soils and parent material in the Loyal-Withee-Marshfield association.

Use and Management

Dominant land uses: Cropland in most areas of the Loyal and Withee soils and wetland wildlife habitat in most areas of the Marshfield soils
Other uses: Woodland or pasture

Major management concerns affecting cropland: Loyal—water erosion, nutrient and pesticide loss, and poor tilth; Withee—wetness, poor tilth, and low strength; Marshfield (in drained areas)—nutrient and pesticide loss, wetness, ponding, poor tilth, low strength, and frost hazard

Major management concerns affecting wetland wildlife habitat: Loyal and Withee—generally unsuited because of insufficient moisture; Marshfield—excessive sedimentation, chemical and nutrient pollution

Major management concerns affecting woodland: Loyal—equipment limitation and plant competition; Withee and Marshfield—equipment limitation, windthrow hazard, plant competition, and seedling mortality

Major management concerns affecting pasture: Loyal—water erosion and nutrient and pesticide loss; Withee—low strength; Marshfield—wetness, ponding, and low strength

4. Maplehurst-Rib-Menahga Association

Very deep, nearly level and gently sloping, poorly drained, somewhat poorly drained, and excessively drained, sandy and silty soils on stream terraces

Composition

Percent of the survey area: 2.5
Extent of the components in the association:
Maplehurst and similar soils—18 percent
Rib and similar soils—15 percent
Menahga and similar soils—12 percent
Components of minor extent—55 percent

Minor Components

- The moderately well drained Aftad soils, which formed mostly in loamy lacustrine deposits
- The moderately well drained Brander soils, which formed in silty alluvium underlain by sandy outwash
- The poorly drained Fordum soils and the moderately well drained Moppet soils, which formed in loamy alluvium underlain by sandy alluvium; on flood plains
- The very poorly drained Markey soils, which formed in herbaceous organic material underlain by sandy outwash
- Pits
- The somewhat poorly drained Plover soils, which formed mostly in loamy lacustrine deposits
- The well drained Rosholt soils, which formed in loamy alluvium underlain by sandy outwash
- The well drained Rozellville soils, which formed in loamy glacial till over loamy residuum; on ground moraines

Soil Properties and Qualities

Maplehurst

Position on the landscape: Slightly concave treads
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: High
Texture of the surface layer: Silt loam

Rib

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Moderate
Texture of the surface layer: Silt loam

Menahga

Position on the landscape: Slightly convex or linear treads
Slope range: 0 to 6 percent
Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid or very rapid
Available water capacity: Low
Texture of the surface layer: Loamy sand

Use and Management

Dominant land uses: Cropland in most areas of the Maplehurst soils, wetland wildlife habitat in most areas of the Rib soils, and woodland in most areas of the Menahga soils
Other use: Pasture

Major management concerns affecting cropland: Maplehurst—wetness, poor tilth, and low strength; Rib—generally unsuited because of excessive wetness and ponding; Menahga—soil blowing, droughtiness, and nutrient and pesticide loss

Major management concerns affecting wetland wildlife habitat: Maplehurst and Menahga—generally unsuited because of insufficient moisture; Rib—excessive sedimentation, chemical and nutrient pollution

Major management concerns affecting woodland: Maplehurst—equipment limitation, windthrow hazard, and plant competition; Rib—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Menahga—equipment limitation and seedling mortality

Major management concerns affecting pasture: Maplehurst—low strength; Rib—wetness, ponding, and low strength; Menahga—soil blowing, droughtiness, and nutrient and pesticide loss

5. Withee-Kert-Hiles Association

Moderately deep and very deep, nearly level to sloping, somewhat poorly drained and moderately well drained, silty soils on ground moraines and pediments

Composition

Percent of the survey area: 10
Extent of the components in the association:
Withee and similar soils—33 percent
Kert and similar soils—21 percent
Hiles and similar soils—12 percent
Soils of minor extent—34 percent

Minor Soils

- The poorly drained, very deep Auburndale soils, which formed in loess or silty alluvium underlain by loamy glacial till; in depressions and drainageways of ground moraines
- The moderately well drained, very deep Flambeau soils, which formed in loamy glacial till; on ground moraines
- The moderately well drained, very deep Loyal soils, which formed in loess or silty alluvium underlain by loamy glacial till; on ground moraines
- The poorly drained Fordum soils and the moderately well drained Moppet soils, which are very deep and formed in loamy alluvium underlain by sandy alluvium; on flood plains
- The poorly drained, moderately deep Veedum soils, which formed in loess or silty alluvium over residuum derived from the underlying interbedded sandstone and shale; in depressions and drainageways of pediments

Soil Properties and Qualities

Withee

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Texture of the surface layer: Silt loam

Kert

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Silt loam

Hiles

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 1 to 12 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Silt loam

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Major management concerns affecting cropland: Withee—wetness, poor tilth, and low strength; Kert—droughtiness, wetness, and low strength; Hiles—water erosion, droughtiness, and nutrient and pesticide loss

Major management concerns affecting woodland: Withee—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Kert—equipment limitation, windthrow hazard, and plant competition; Hiles—equipment limitation and plant competition

Major management concerns affecting pasture: Withee and Kert—low strength; Hiles—water erosion, droughtiness, and nutrient and pesticide loss

6. Flambeau-Merrillan-Fallcreek Association

Moderately deep and very deep, nearly level to moderately steep, somewhat poorly drained and moderately well drained, loamy soils on ground moraines and pediments

Composition

Percent of the survey area: 12
Extent of the components in the association (fig. 3):
Flambeau and similar soils—41 percent
Merrillan and similar soils—14 percent
Fallcreek and similar soils—12 percent
Soils of minor extent—33 percent

Minor Soils

- The very poorly drained, very deep Beseman soils, which formed in herbaceous organic material and are underlain by loamy alluvium; in depressions and drainageways of moraines
- The very poorly drained, very deep Dawson soils, which formed in herbaceous organic material and are underlain by sandy deposits; in depressions and drainageways of moraines
- The very poorly drained, very deep Loxley soils, which formed in herbaceous organic material; in depressions and drainageways of moraines
- The poorly drained, very deep Capitola soils, which formed in loamy alluvium underlain by loamy glacial till; in drainageways of ground moraines
- The moderately well drained, moderately deep Humbird soils, which formed in loamy alluvium over residuum derived from the underlying interbedded sandstone and shale; on pediments
- The poorly drained Fordum soils and the moderately well drained Moppet soils, which are very deep and formed in loamy alluvium underlain by sandy alluvium; on flood plains
- The well drained, moderately deep Northmound soils, which formed mostly in loess or in a mixture of loess and residuum derived from the underlying sandstone; on monadnocks
- The poorly drained, moderately deep Veedum soils, which formed in loess or silty alluvium over residuum derived from the underlying interbedded sandstone and shale; in depressions and drainageways of pediments

Soil Properties and Qualities

Flambeau

Position on the landscape: Summits, shoulders, and backslopes
Slope range: 1 to 20 percent
Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Texture of the surface layer: Sandy loam and loam

Merrillan

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Sandy loam and fine sandy loam

Fallcreek

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Texture of the surface layer: Loam

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Major management concerns affecting cropland: Flambeau—water erosion, soil blowing, and nutrient and pesticide loss; Merrillan—soil blowing, droughtiness, wetness, poor tilth, and low strength; Fallcreek—wetness, poor tilth, and low strength

Major management concerns affecting woodland: Flambeau—equipment limitation, erosion hazard, and plant competition; Merrillan and Fallcreek—equipment limitation, windthrow hazard, and plant competition

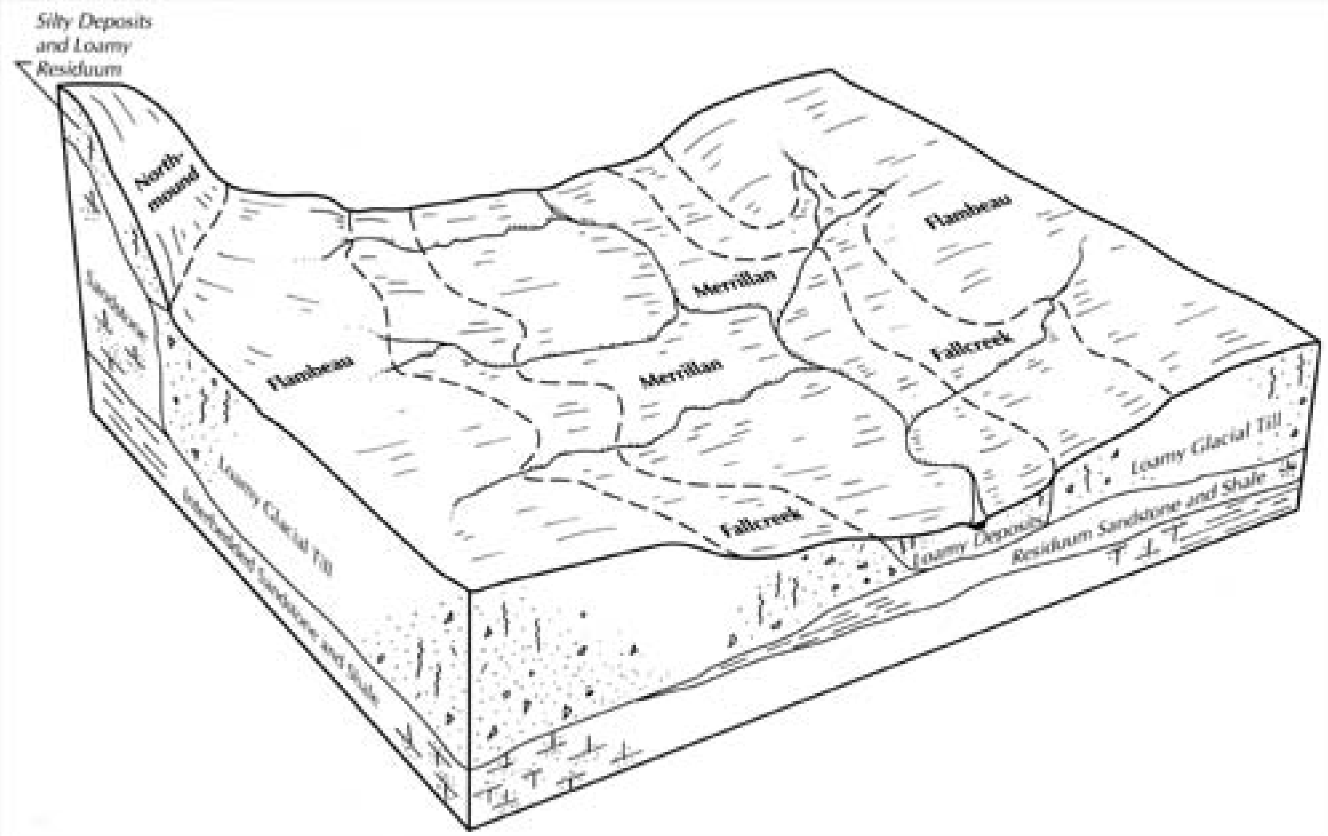

Figure 3.—Pattern of soils and parent material in the Flambeau-Merrillan-Fallcreek association.

Major management concerns affecting pasture:
Flambeau—water erosion, soil blowing, and nutrient and pesticide loss; Merrillan—soil blowing and low strength; Fallcreek—low strength

7. Merrillan-Veedum-Humbird Association

Moderately deep, nearly level to moderately steep, poorly drained to moderately well drained, loamy and mucky soils on pediments

Composition

Percent of the survey area: 12
Extent of the components in the association:
Merrillan and similar soils—31 percent
Veedum and similar soils—23 percent
Humbird and similar soils—17 percent
Soils of minor extent—29 percent

Minor Soils

- The very poorly drained Citypoint soils, which formed in herbaceous organic material over residuum derived from the underlying interbedded sandstone and shale; in depressions
- The somewhat poorly drained Fallcreek soils and the moderately well drained Flambeau soils, which are very deep and formed in loamy glacial till; on ground moraines

Soil Properties and Qualities

Merrillan

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Fine sandy loam

Veedum

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Muck

Humbird

Position on the landscape: Nose slopes, summits, shoulders, and backslopes
Slope range: 1 to 20 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Sandy loam and fine sandy loam

Use and Management

Dominant land uses: Woodland or cropland in most areas of the Merrillan soils and in gently sloping and sloping areas of the Humbird soils
Other uses: Wetland wildlife habitat in most areas of the Veedum soils; pasture

Major management concerns affecting woodland: Merrillan—equipment limitation, windthrow hazard, and plant competition; Veedum—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Humbird—equipment limitation, erosion hazard, plant competition, and seedling mortality

Major management concerns affecting cropland: Merrillan—soil blowing, droughtiness, wetness, poor tilth, and low strength; Veedum (in drained areas)—droughtiness, nutrient and pesticide loss, wetness, ponding, low strength, and frost hazard; Humbird—water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and poor tilth

Major management concerns affecting wetland wildlife habitat: Merrillan and Humbird—generally unsuited because of insufficient moisture; Veedum—excessive sedimentation, chemical and nutrient pollution

Major management concerns affecting pasture: Merrillan—soil blowing and low strength; Veedum—soil blowing, wetness, ponding, and low strength; Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss

8. Fairchild-Elm Lake-Ludington Association

Moderately deep, nearly level to moderately steep, poorly drained to moderately well drained, sandy and mucky soils on pediments

Composition

Percent of the survey area: 14
Extent of the components in the association (fig. 4):
Fairchild and similar soils—28 percent
Elm Lake and similar soils—23 percent
Ludington and similar soils—22 percent
Soils of minor extent—27 percent

Minor Soils

• The very poorly drained Citypoint soils, which formed in herbaceous organic material over residuum derived from the underlying interbedded sandstone and shale; in depressions
• The very poorly drained, very deep Dawsil soils, which formed in herbaceous organic material underlain by siliceous sandy alluvium; in depressions and drainageways of pediments and stream terraces
• The moderately well drained, very deep Eauclaire soils, which formed in sandy alluvium underlain by loamy glacial till; on ground moraines
• The somewhat poorly drained Ironrun soils and the poorly drained Ponycreek soils, which are very deep and formed in siliceous sandy alluvium; on pediments and stream terraces
• The very poorly drained, very deep Loxley soils, which formed in herbaceous organic material; in depressions of moraines

Soil Properties and Qualities

Fairchild

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Rapid or very rapid in the siliceous

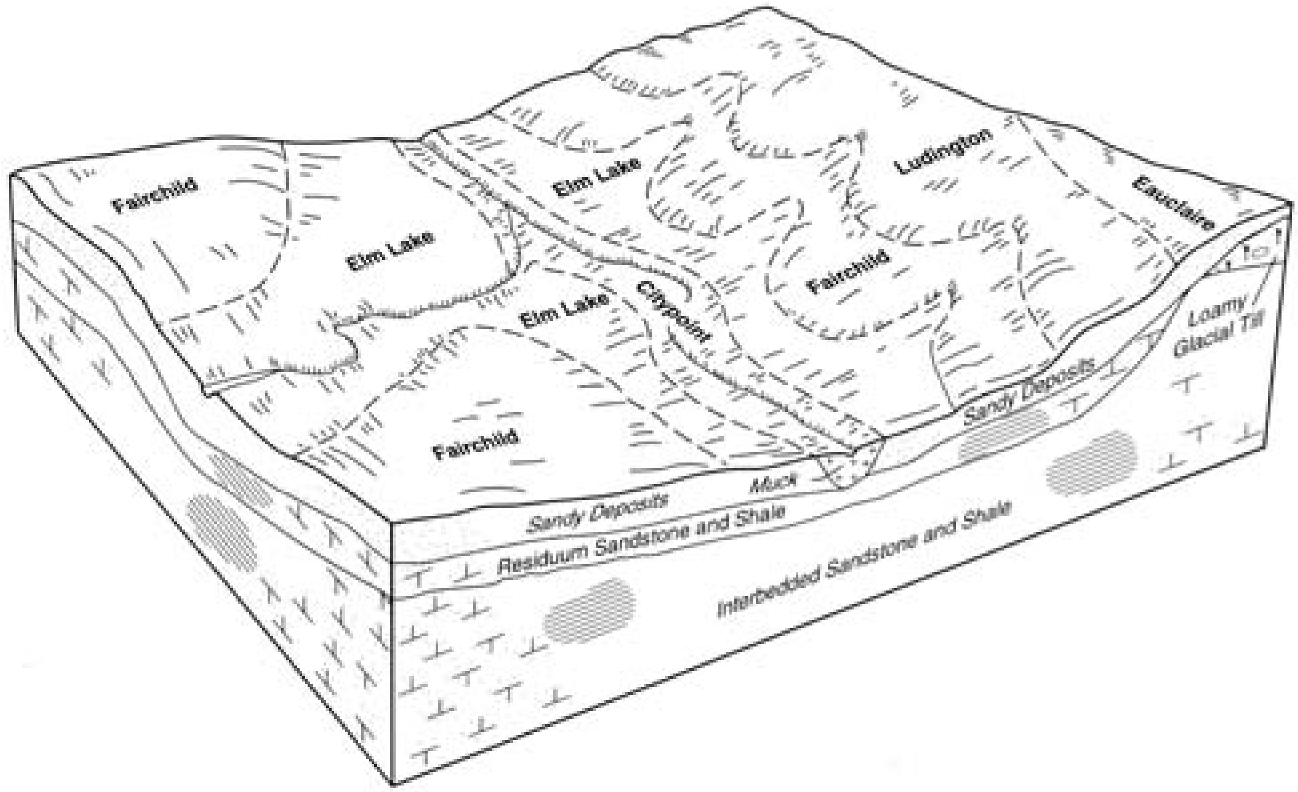

Figure 4.—Pattern of soils and parent material in the Fairchild-Elm Lake-Ludington association.

sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Sand

Elm Lake

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Poorly drained
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Muck

Ludington

Position on the landscape: Nose slopes, summits, shoulders, and backslopes
Slope range: 1 to 20 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Texture of the surface layer: Sand

Use and Management

Dominant land uses: Woodland in most areas of the Fairchild and Ludington soils and wetland wildlife habitat in most areas of the Elm Lake soils
Other uses: Pasture or cropland

Major management concerns affecting woodland: Fairchild and Elm Lake—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Ludington—equipment limitation, erosion hazard, plant competition, and seedling mortality

Major management concerns affecting cropland: Fairchild—soil blowing, droughtiness, nutrient and pesticide loss, and wetness; Elm Lake—generally unsuited because of excessive wetness and ponding; Ludington—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss

Major management concerns affecting pasture: Fairchild—soil blowing and nutrient and pesticide loss; Elm Lake—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength; Ludington—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss

9. Simescreek-Rockdam Association

Very deep, nearly level and gently sloping, moderately well drained and excessively drained, sandy soils on pediments and stream terraces

Composition

Percent of the survey area: 1.5
Extent of the components in the association:
Simescreek and similar soils—35 percent
Rockdam and similar soils—20 percent
Soils of minor extent—45 percent

Minor Soils

- The somewhat poorly drained Ironrun soils and the poorly drained Ponycreek soils
- The moderately well drained Pelkie soils and the somewhat poorly drained Winterfield soils, which formed in sandy alluvium; on flood plains

Soil Properties and Qualities

Simescreek

Position on the landscape: Toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid or very rapid
Available water capacity: Low
Texture of the surface layer: Sand

Rockdam

Position on the landscape: Toeslopes
Slope range: 0 to 3 percent
Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Rapid or very rapid
Available water capacity: Low
Texture of the surface layer: Sand

Use and Management

Dominant land use: Woodland
Other uses: Cropland or pasture in some areas of the Rockdam soils

Major management concerns affecting woodland: Simescreek and Rockdam—equipment limitation and seedling mortality

Major management concerns affecting cropland: Rockdam—soil blowing, droughtiness, and nutrient and pesticide loss

Major management concerns affecting pasture: Rockdam—soil blowing, droughtiness, and nutrient and pesticide loss

10. Boone-Elevasil-Tarr Association

Moderately deep and very deep, nearly level to very steep, well drained and excessively drained, sandy and loamy soils on pediments, hills, and stream terraces

Composition

Percent of the survey area: 1.5
Extent of the components in the association (fig. 5):
Boone and similar soils—23 percent
Elevasil and similar soils—16 percent
Tarr and similar soils—14 percent
Soils of minor extent—47 percent

Minor Soils

- The well drained, very deep Bilson soils, which formed in siliceous loamy alluvium underlain by siliceous sandy alluvium
- The well drained, very deep Council soils, which formed in silty and loamy colluvium
- The moderately well drained Merimod soils and the well drained Merit soils, which are very deep and formed in silty alluvium over loamy alluvium underlain by siliceous sandy alluvium

Soil Properties and Qualities

Boone

Position on the landscape: Nose slopes, summits, shoulders, and backslopes
Slope range: 6 to 50 percent
Depth class: Moderately deep to sandstone
Drainage class: Excessively drained
Permeability: Rapid in the siliceous sandy residuum and moderately slow or moderate in the sandstone
Available water capacity: Very low
Texture of the surface layer: Sand

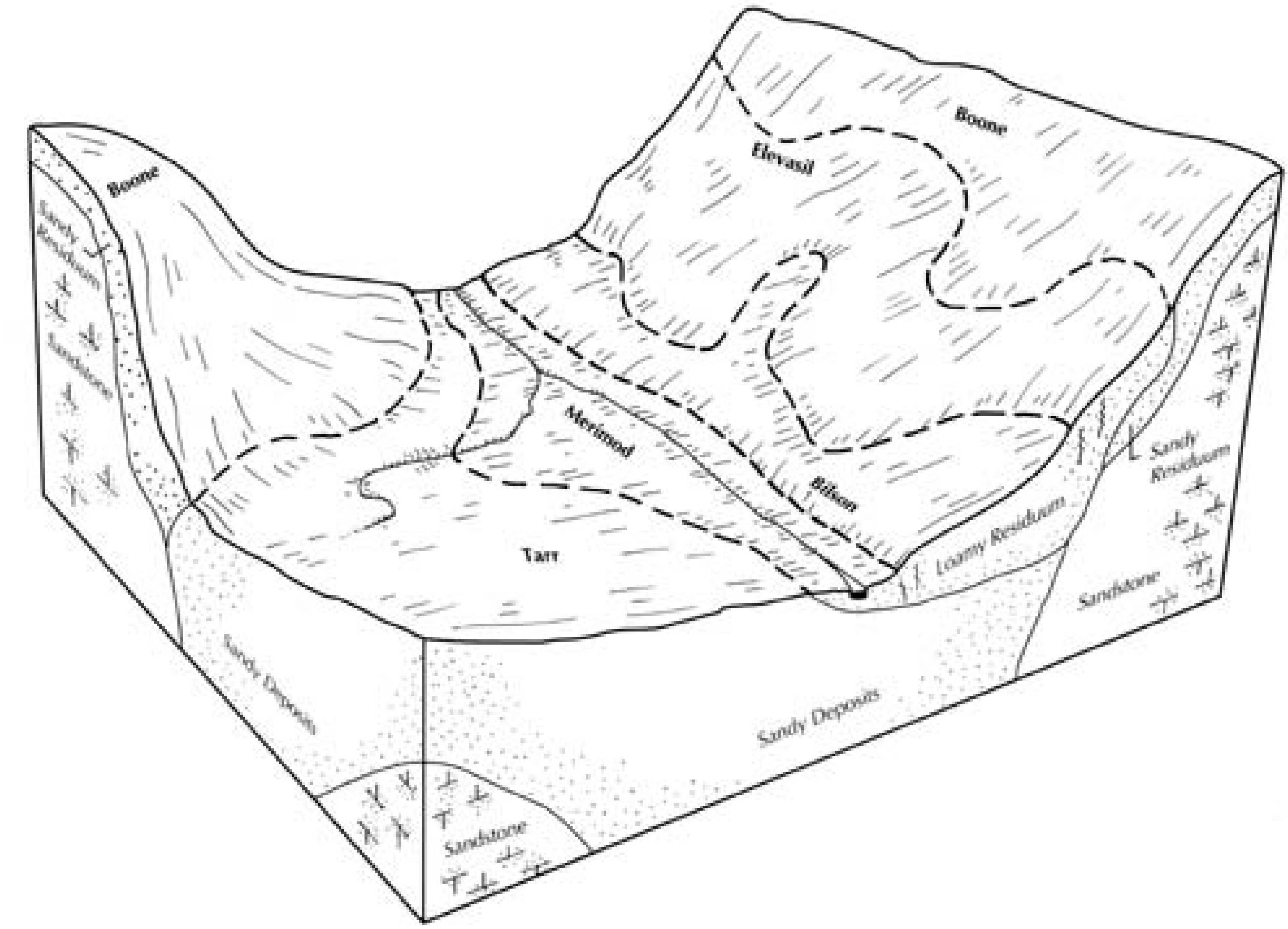

Figure 5.—Pattern of soils and parent material in the Boone-Elevasil-Tarr association.

Elevasil

Position on the landscape: Nose slopes, summits, shoulders, and backslopes
Slope range: 2 to 50 percent
Depth class: Moderately deep to sandstone
Drainage class: Well drained
Permeability: Moderate or moderately rapid in the loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Low
Texture of the surface layer: Sandy loam

Tarr

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 6 percent
Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Available water capacity: Low
Texture of the surface layer: Sand

Use and Management

Dominant land use: Cropland in most areas of the gently sloping and sloping Elevasil soils
Other uses: Woodland or pasture in most areas of the Boone and Tarr soils and in moderately steep or steep areas of the Elevasil soils

Major management concerns affecting cropland: Boone and Elevasil—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss; Tarr—soil blowing, droughtiness, and nutrient and pesticide loss

Major management concerns affecting woodland: Boone—equipment limitation, erosion hazard, and seedling mortality; Elevasil—equipment limitation, erosion hazard, plant competition, and seedling mortality; Tarr—equipment limitation and seedling mortality

Major management concerns affecting pasture: Boone and Elevasil—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss; Tarr—soil blowing, droughtiness, and nutrient and pesticide loss

11. Hiles-Kert-Veedum Association

Moderately deep, nearly level and gently sloping, poorly drained to moderately well drained, silty and mucky soils on pediments

Composition

Percent of the survey area: 5
Extent of the components in the association:
Hiles and similar soils—30 percent
Kert and similar soils—24 percent
Veedum and similar soils—21 percent
Soils of minor extent—25 percent

Minor Soils

• The very poorly drained Citypoint soils, which formed in herbaceous organic material over residuum derived from the underlying interbedded sandstone and shale
• The moderately well drained Loyal soils and the somewhat poorly drained Withee soils, which are very deep and formed in loess or silty alluvium underlain by loamy glacial till; on ground moraines

Soil Properties and Qualities

Hiles

Position on the landscape: Summits and shoulders
Slope range: 1 to 6 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Silt loam

Kert

Position on the landscape: Footslopes and toeslopes
Slope range: 0 to 3 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Silt loam

Veedum

Position on the landscape: Depressions and drainageways
Slope range: 0 to 2 percent
Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Texture of the surface layer: Muck and silt loam

Use and Management

Dominant land uses: Cropland in most areas of the Hiles and Kert soils and wetland wildlife habitat in most areas of the Veedum soils
Other uses: Woodland or pasture

Major management concerns affecting cropland: Hiles—water erosion, droughtiness, and nutrient and pesticide loss; Kert—droughtiness, wetness, and low strength; Veedum (in drained areas)—droughtiness, nutrient and pesticide loss, wetness, ponding, low strength, and frost hazard

Major management concerns affecting wetland wildlife habitat: Hiles and Kert—generally unsuited because of insufficient moisture; Veedum—excessive sedimentation, chemical and nutrient pollution

Major management concerns affecting woodland: Hiles—equipment limitation and plant competition; Kert—equipment limitation, windthrow hazard, and plant competition; Veedum—equipment limitation, windthrow hazard, plant competition, and seedling mortality

Major management concerns affecting pasture: Hiles—water erosion, droughtiness, nutrient and pesticide loss; Kert—low strength; Veedum—soil blowing, wetness, ponding, and low strength

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” areas that belong to other taxonomic classes.

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

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

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

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Flambeau loam, 1 to 6 percent slopes, is a phase of the Flambeau series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes or undifferentiated groups.

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. Fairchild-Elm Lake complex, 0 to 3 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Council and Seaton soils, 12 to 20 percent slopes, eroded, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Pits 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.

AbB—Aftad very fine sandy loam, 2 to 6 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly convex or linear treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 30 acres

Representative Profile

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

Subsurface layer:
7 to 13 inches—pale brown very fine sandy loam

Subsoil:
13 to 22 inches—yellowish brown very fine sandy loam and pale brown fine sandy loam
22 to 27 inches—dark yellowish brown very fine sandy loam
27 to 43 inches—yellowish brown, mottled very fine sandy loam with a few very thin strata of very fine sand

Substratum:
43 to 60 inches—dark yellowish brown, mottled very fine sandy loam with thin strata of fine sand, very fine sand, and silt

Composition

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

Inclusions

Contrasting inclusions:
- Brander soils, which have a sandy substratum
- The somewhat poorly drained Plover soils on slightly concave treads

Similar inclusions:
- Soils that have a surface layer of loamy fine sand, loam, or silt loam
- Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate
Available water capacity: High
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, nutrient and pesticide loss, and poor tilth
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
- Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Pasture

Suitability: Well suited

Major management concerns: Water erosion, soil blowing, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the risk of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Wetness and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Well suited
Major management concerns: Water erosion and soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

AgA—Almena silt loam, 0 to 3 percent slopes

Setting

Landform: Ground moraines
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 150 acres

Representative Profile

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

Subsurface layer:
9 to 19 inches—pale brown and dark brown, mottled silt loam

Subsoil:
19 to 33 inches—yellowish brown and pale brown, mottled silt loam
33 to 45 inches—yellowish brown, mottled silt loam

Substratum:
45 to 60 inches—reddish brown, mottled sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The poorly drained Auburndale soils in depressions and drainageways
• The moderately well drained Spencer soils on summits, shoulders, and backslopes
• The moderately well drained Loyal soils, which have a thinner silty mantle than that of the Almena soil; on summits, shoulders, and backslopes

Similar inclusions:
• Withee soils, which have a thinner silty mantle
• Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet

Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Content of organic matter: Cultivated areas—moderate or high in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concerns: Wetness, poor tilth, and low strength
Management considerations:
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Wetness and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (sugar maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

AnA—Au Gres-Newson complex, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Au Gres—slightly concave treads; Newson—depressions and drainageways
Slope range: Au Gres—0 to 3 percent; Newson—0 to 2 percent
Shape of areas: Irregular
Size of areas: 6 to 60 acres

Representative Profile

Au Gres

Organic mat:
0 to 1 inch—dark grayish brown peat

Mineral surface layer:
1 to 3 inches—black sand

Subsurface layer:
3 to 13 inches—dark grayish brown sand

Subsoil:
13 to 17 inches—dark reddish brown loamy sand
17 to 27 inches—dark reddish brown, mottled sand

Substratum:
27 to 61 inches—strong brown coarse sand

Newson

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 8 inches—black sand

Subsoil:
8 to 21 inches—dark grayish brown, mottled sand

Substratum:
21 to 64 inches—yellowish brown and brown coarse sand

Composition

Au Gres and similar soils: 45 to 55 percent
Newson and similar soils: 35 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Markey soils, which have an organic layer 16 to 51 inches thick; in drainageways

Similar inclusions:
• Soils that have a surface layer of coarse sand or mucky sand

Soil Properties and Qualities

Drainage class: Au Gres—somewhat poorly drained; Newson—poorly drained
Seasonal high water table: Au Gres—at a depth of 0.5 foot to 1.5 feet (apparent); Newson—above or near the surface (apparent)
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Au Gres—very high in the organic layer, moderate or high in the surface layer; Newson—very high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, wetland wildlife habitat

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Au Gres soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• In areas of the Newson soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Au Gres soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.
• In areas of the Newson soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Pasture

Suitability: Au Gres—moderately well suited; Newson—poorly suited
Major management concerns: Au Gres—soil blowing and nutrient and pesticide loss; Newson—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to

control leaching losses and protect the quality of ground water.
• In areas of the Newson soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Newson soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Newson soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Wetland wildlife habitat

Suitability: Au Gres—generally unsuited because of insufficient moisture; Newson—suited in undrained areas
Major management concerns: Newson—excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas of the Newson soil undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the rate of runoff, and help to control sedimentation.
• In areas of the Newson soil, maintaining a saturated condition and controlling sedimentation help to protect the wetlands. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding on the Newson soil

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Au Gres—poor filtering capacity and wetness; Newson—poor filtering capacity, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Au Gres—poorly suited; Newson—generally unsuited because of excessive wetness and ponding
Major management concerns: Au Gres—wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• In areas of the Au Gres soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Au Gres soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In areas of the Au Gres soil, stabilizing or sloping the cutbanks in excavated or cut-and-fill areas helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Au Gres—poorly suited; Newson—generally unsuited because of excessive wetness and ponding
Major management concerns: Au Gres—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• In areas of the Au Gres soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Au Gres soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Au Gres—IVw; Newson—VIw in undrained areas
Woodland ordination symbol: Au Gres—6W (quaking aspen); Newson—6W (jack pine)
Primary forest habitat type: PVRh
Secondary forest habitat type: Not assigned

Au—Auburndale silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Landscape position: Depressions and drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 200 acres

Representative Profile

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

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

Subsoil:
14 to 41 inches—light brownish gray and grayish brown, mottled silt loam
41 to 53 inches—grayish brown, mottled loam

Substratum:
53 to 60 inches—dark brown, mottled sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Almena soils on footslopes and toeslopes
• The very poorly drained Beseman soils, which have an organic layer 16 to 51 inches thick

Similar inclusions:
• Marshfield soils, which have a thinner silty mantle
• Soils that have a surface layer of mucky silt loam
• Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Perched above or near the surface
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Content of organic matter: Uncultivated areas—very high in the organic layer, high or very high in the surface layer; cultivated areas—high or very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the runoff rate, and help to control sedimentation.
• Maintaining a saturated condition, controlling sedimentation, and following recommended nutrient and chemical management practices in adjacent areas help to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Wetness, ponding, and low strength
Management considerations:
• In undrained areas, the number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Poorly suited in drained areas; generally unsuited in other areas
Major management concerns: Nutrient and pesticide loss, wetness, ponding, poor tilth, low strength, and frost hazard
Management considerations:
• Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Reducing rates of chemical application and using split applications of nitrogen fertilizer at recommended rates during the growing season help to control leaching losses and protect the quality of the ground water.
• Undrained areas provide wetland benefits.
• The seasonal high water table usually delays spring planting for 2 to 3 weeks. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage. Some areas do not have a suitable outlet.
• Grading ditchbanks and protecting them with a plant

cover can help to prevent caving in and erosion caused by flowing water.
- Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
- Low soil strength limits the use of farm equipment to periods when the soil is dry.
- In many areas the length of the growing season is severely limited by frost. In these areas, corn can be cut for silage or an early maturing variety of corn can be grown.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and ponding
Management considerations:
- Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas; IIIw in drained areas
Woodland ordination symbol: 2W (red maple)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Ba—Barronett silt loam, 0 to 2 percent slopes

Setting

Landform: Glacial lake plains and stream terraces
Landscape position: Depressions and drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 80 acres

Representative Profile

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

Subsurface layer:
9 to 15 inches—dark gray, mottled silt loam

Subsoil:
15 to 32 inches—dark grayish brown, mottled silt loam

Substratum:
32 to 60 inches—light brownish gray, mottled, stratified silt loam, loam, and very fine sandy loam

Composition

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

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Comstock soils on slightly concave treads
- The very poorly drained Beseman soils, which have an organic layer 16 to 51 inches thick

Similar inclusions:
- Soils that have a surface layer of mucky silt loam
- Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Above or near the surface in undrained areas (apparent)
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the stratified part
Available water capacity: High
Content of organic matter: Uncultivated areas—very high in the organic layer, high or very high in the surface layer; cultivated areas—high or very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
- Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely

spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the runoff rate, and help to control sedimentation.
• Maintaining a saturated condition, controlling sedimentation, and following recommended nutrient and chemical management practices in adjacent areas help to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Wetness, ponding, and low strength
Management considerations:
• In undrained areas, the number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Poorly suited in undrained areas; generally unsuited in other areas
Major management concerns: Nutrient and pesticide loss, wetness, ponding, poor tilth, low strength, and frost hazard
Management considerations:
• Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to control leaching losses and protect the quality of the ground water.
• Undrained areas provide wetland benefits.
• The seasonal high water table usually delays spring planting for 2 to 3 weeks. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage. Some areas do not have a suitable outlet.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.
• In many areas the length of the growing season is severely limited by frost. In these areas, corn can be cut for silage or an early maturing variety of corn can be grown.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas; IIIw in drained areas
Woodland ordination symbol: 2W (tamarack)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

BlB—Bilson sandy loam, 0 to 6 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Toeslopes
Shape of areas: Irregular
Size of areas: 4 to 100 acres

Representative Profile

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

Subsoil:
8 to 12 inches—dark yellowish brown sandy loam
12 to 18 inches—dark brown sandy loam

18 to 32 inches—dark brown and strong brown sandy loam

Substratum:
32 to 60 inches—brownish yellow sand with a few thin strata of loamy sand

Composition

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

Inclusions

Contrasting inclusions:
• Merit soils and the moderately well drained Merimod soils, which have more silt and clay in the surface layer and subsoil than the Bilson soil
• The excessively drained Tarr soils, which are sandy throughout

Similar inclusions:
• Soils that have a surface layer of loamy sand, fine sandy loam, or loam

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate or moderately rapid in the siliceous loamy alluvium and rapid in the siliceous sandy alluvium
Available water capacity: Low or moderate
Content of organic matter in the surface layer: Moderately low

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas where the soil has a low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, and cutbanks caving

Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concerns: Water erosion and soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: 4A (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: PVCr

BoC—Boone sand, 6 to 15 percent slopes

Setting

Landform: Hills
Landscape position: Summits, shoulders, and backslopes
Shape of areas: Irregular or elongated
Size of areas: 4 to 50 acres

Representative Profile

Organic mat:
0 to 1 inch—dark grayish brown mucky peat

Mineral surface layer:
1 to 5 inches—very dark grayish brown sand

Subsoil:
5 to 17 inches—yellowish brown sand

Substratum:
17 to 31 inches—brownish yellow sand
31 to 37 inches—very pale brown sand

Bedrock:
37 to 60 inches—yellow, weakly cemented sandstone

Composition

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

Inclusions

Contrasting inclusions:
• Areas of Boone soils that have slopes of less than 6 percent or more than 15 percent
• The very deep Tarr soils, which are sandy throughout; on the lower backslopes

Similar inclusions:
• Soils that have a surface layer of coarse sand or loamy sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Moderately deep to sandstone
Permeability: Rapid in the siliceous sandy residuum and moderately slow or moderate in the sandstone
Available water capacity: Very low
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.

• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited by the very low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited by the very low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Properly scheduling irrigation, reducing chemical application rates, and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 2S (black oak)
Primary forest habitat type: PVGy
Secondary forest habitat type: PVCr

BoF—Boone sand, 15 to 50 percent slopes

Setting

Landform: Hills
Landscape position: Nose slopes, summits, shoulders, and backslopes
Shape of areas: Irregular or elongated
Size of areas: 4 to 50 acres

Representative Profile

Organic mat:
0 to 1 inch—dark grayish brown mucky peat

Mineral surface layer:
1 to 2 inches—very dark grayish brown sand

Subsurface layer:
2 to 7 inches—brown sand

Subsoil:
7 to 20 inches—dark yellowish brown sand

Substratum:
20 to 31 inches—yellowish brown sand

Bedrock:
31 to 60 inches—yellow, weakly cemented sandstone

Composition

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

Inclusions

Contrasting inclusions:
- Areas of Boone soils that have slopes of less than 15 percent or more than 50 percent
- The very deep Tarr soils, which are sandy throughout; on the lower backslopes

Similar inclusions:
- Soils that have a surface layer of coarse sand or loamy sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Moderately deep to sandstone
Permeability: Rapid in the siliceous sandy residuum and moderately slow or moderate in the sandstone
Available water capacity: Very low
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, erosion hazard, and seedling mortality
Management considerations:
- The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
- Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.
- Carefully locating skid trails and building haul roads on the contour reduce the hazard of erosion and help to overcome equipment limitations.
- The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
- Seeding and mulching exposed areas after logging, removing runoff water by sloping the road surfaces, and installing water bars, culverts, and drop structures help to control erosion.
- Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
- The steeper slopes are generally limited to pasture of existing forage species. Maintaining a high-quality cover of pasture plants helps to control water erosion and soil blowing.
- Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
- Forage yields are limited by the very low available water capacity. Drought-tolerant species should be selected for planting.
- Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
- Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
- Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Cropland

Suitability: Generally unsuited because of extreme droughtiness, the slope, and the very severe hazard of water erosion

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, slope, and depth to rock
Management considerations:
- Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited in the less sloping areas; generally unsuited in other areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
- Onsite investigation is needed.
- In the less sloping areas, buildings can be designed

so that they conform to the natural slope of the land. The slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: VIIs
Woodland ordination symbol: 2R (black oak)
Primary forest habitat type: PVGy
Secondary forest habitat type: Not assigned

BpF—Boone-Elevasil complex, 15 to 50 percent slopes

Setting

Landform: Hills
Landscape position: Boone—nose slopes, summits, shoulders, and backslopes; Elevasil—summits, shoulders, and backslopes
Shape of areas: Irregular or elongated
Size of areas: 10 to 500 acres

Representative Profile

Boone

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—very dark grayish brown sand

Subsurface layer:
3 to 8 inches—brown sand

Subsoil:
8 to 21 inches—dark yellowish brown sand

Substratum:
21 to 35 inches—brownish yellow sand

Bedrock:
35 to 60 inches—white, weakly cemented sandstone

Elevasil

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—very dark brown sandy loam

Subsoil:
3 to 9 inches—dark yellowish brown sandy loam
9 to 27 inches—strong brown sandy loam
27 to 31 inches—strong brown loamy sand

Substratum:
31 to 39 inches—reddish yellow sand

Bedrock:
39 to 60 inches—very pale brown, weakly cemented sandstone

Composition

Boone and similar soils: 40 to 60 percent
Elevasil and similar soils: 30 to 50 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• Areas of Boone and Elevasil soils that have slopes of less than 15 percent or more than 50 percent
• The very deep, well drained Council soils, which are loamy throughout; on head slopes and backslopes
• The very deep, excessively drained Tarr soils, which are sandy throughout; on backslopes

Similar inclusions:
• Soils that have a surface layer of coarse sand or loamy sand

Soil Properties and Qualities

Drainage class: Boone—excessively drained; Elevasil—well drained
Depth class: Moderately deep to sandstone
Permeability: Boone—rapid in the siliceous sandy residuum and moderately slow or moderate in the sandstone; Elevasil—moderate or moderately rapid in the siliceous loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Boone—very low; Elevasil—low
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Boone—equipment limitation, erosion hazard, and seedling mortality; Elevasil—equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:
• The slope limits the selection of sites for log

landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.
• Carefully locating skid trails and building haul roads on the contour help to control erosion and help to overcome equipment limitations.
• In areas of the Boone soil, the sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seeding and mulching exposed areas after logging, removing runoff water by sloping the road surfaces, and installing water bars, culverts, and drop structures help to control erosion.
• In areas of the Elevasil soil, plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Boone soil and in areas of the Elevasil soil on the steeper south- and west-facing slopes, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soils are moist.

Pasture

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• The steeper slopes are generally limited to pasture of existing forage species. Maintaining a high-quality cover of pasture plants helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• In areas of the Boone soil, forage yields are limited by the very low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Elevasil soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• In areas of the Boone soil, reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Cropland

Suitability: Generally unsuited because of extreme droughtiness, the slope, and the very severe hazard of water erosion

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited in the less sloping areas; generally unsuited in other areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• In the less sloping areas, buildings can be designed so that they conform to the natural slope of the land. The slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: Boone—VIIs; Elevasil—VIIe
Woodland ordination symbol: Boone—2R (black oak); Elevasil—2R (black oak)
Primary forest habitat type: PVCr or PVGy
Secondary forest habitat type: Not assigned

BrA—Brander silt loam, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly convex or linear treads

Shape of areas: Irregular or long and narrow
Size of areas: 4 to 50 acres

Representative Profile

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

Subsurface layer:
10 to 17 inches—brown and yellowish brown silt loam

Subsoil:
17 to 22 inches—yellowish brown and brown silt loam
22 to 32 inches—dark yellowish brown and yellowish brown, mottled silt loam
32 to 35 inches—dark brown, mottled gravelly loam

Substratum:
35 to 60 inches—yellowish brown, mottled, stratified gravelly coarse sand and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Poskin soils on slightly concave treads
• The well drained Rosholt soils, which do not have a silty mantle

Similar inclusions:
• Soils that have a thicker silty mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: At a depth of 2.5 to 3.5 feet (apparent)
Depth class: Very deep
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Moderate
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Droughtiness and poor tilth
Management considerations:
• Crop yields are somewhat limited during dry years by the moderate available water capacity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited

Major management concern: The shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIs
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: AH-Ci

Ca—Capitola-Marshfield-Veedum complex, 0 to 2 percent slopes

Setting

Landform: Capitola and Marshfield—ground moraines; Veedum—pediments
Landscape position: Drainageways
Shape of areas: Long and narrow
Size of areas: 10 to 300 acres

Representative Profile

Capitola

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 6 inches—black loam
6 to 12 inches—grayish brown, mottled loam

Subsoil:
12 to 21 inches—grayish brown, mottled sandy loam
21 to 35 inches—gray, mottled loam
35 to 39 inches—dark brown, mottled sandy loam

Substratum:
39 to 64 inches—brown sandy loam

Marshfield

Surface layer:
0 to 3 inches—black silt loam

Subsurface layer:
3 to 10 inches—grayish brown, mottled silt loam

Subsoil:
10 to 26 inches—grayish brown, mottled silt loam
26 to 34 inches—grayish brown, mottled loam

Substratum:
34 to 46 inches—dark brown, mottled loam
46 to 60 inches—dark brown, mottled sandy loam

Veedum

Surface layer:
0 to 3 inches—black muck

Subsurface layer:
3 to 7 inches—black silt loam
7 to 18 inches—gray, mottled silt loam

Subsoil:
18 to 32 inches—dark gray, mottled loam
32 to 37 inches—light olive gray and yellowish brown, mottled clay loam

Bedrock:
37 to 60 inches—interbedded light gray sandstone and light brownish gray shale

Composition

Capitola and similar soils: 25 to 40 percent
Marshfield and similar soils: 25 to 40 percent
Veedum and similar soils: 25 to 40 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The moderately deep Elm Lake soils, which have a sandy mantle

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

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Perched above or near the surface
Depth class: Capitola and Marshfield—very deep; Veedum—moderately deep to interbedded sandstone and shale
Permeability: Capitola—moderately slow or moderate in the loamy alluvium and moderately slow in the loamy till; Marshfield—moderate in the silty part and moderately slow in the loamy till; Veedum—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Capitola and Marshfield—high; Veedum—low or moderate
Content of organic matter: Capitola and Veedum—very high in the surface layer; Marshfield—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the runoff rate, and minimize sedimentation.
• Maintaining a saturated condition, controlling sedimentation, and following recommended nutrient and chemical management practices in adjacent areas help to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Capitola and Veedum—soil blowing, wetness, ponding, and low strength; Marshfield—wetness, ponding, and low strength
Management considerations:
• In areas of the Capitola and Veedum soils, establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• In areas of the Capitola and Veedum soils, overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• The number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Marshfield soil, low strength restricts the use of machinery.
• In areas of the Capitola and Veedum soils, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Capitola and Marshfield—restricted permeability, wetness, and ponding; Veedum—restricted permeability, wetness, ponding, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas
Woodland ordination symbol: Capitola—7W (balsam fir); Marshfield—3W (white ash); Veedum—1W (white ash)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Cd—Citypoint mucky peat, 0 to 1 percent slopes

Setting

Landform: Pediments
Landscape position: Depressions
Shape of areas: Irregular, round, or oblong
Size of areas: 4 to 150 acres

Representative Profile

Organic layer:
0 to 8 inches—very dark grayish brown mucky peat
8 to 28 inches—black muck

Substratum:
28 to 33 inches—light brownish gray sand

Bedrock:
33 to 60 inches—pale olive, brownish yellow, gray, and light yellowish brown, interbedded sandstone and shale

Composition

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

Inclusions

Contrasting inclusions:
• The moderately deep, poorly drained Elm Lake soils, which have a sandy mantle
• The very deep Loxley soils, which have organic material throughout
• The moderately deep, poorly drained Veedum soils, which have a silty mantle

Similar inclusions:
• Soils that have a surface layer of muck or peat

Soil Properties and Qualities

Drainage class: Very poorly drained
Seasonal high water table: Perched above or near the surface
Depth class: Moderately deep or deep to interbedded sandstone and shale
Permeability: Moderately slow to moderately rapid in the organic material, slow to rapid in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Very high
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat (fig. 6)

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the runoff rate, and minimize sedimentation.
• Maintaining a saturated condition, controlling sedimentation, and limiting herbicide use in adjacent areas help to protect the habitat.

Cropland and pasture

Suitability: Generally unsuited
Major restrictive features: Excessive wetness, ponding, a scarcity of suitable drainage outlets, extreme acidity, a severe frost hazard, and subsidence
Management considerations:
• With intensive management, some areas are suited to cranberries and other specialty crops.

Woodland

Suitability: Generally unsuited
Major restrictive features: Excessive wetness and ponding
Management considerations:
• This soil does not support trees of merchantable size or quality.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, subsidence, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness, ponding, and subsidence

Interpretive Groups

Land capability classification: VIIw in undrained areas
Woodland ordination symbol: 2W (black spruce)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

CmA—Comstock silt loam, 0 to 3 percent slopes

Setting

Landform: Glacial lake plains and stream terraces
Landscape position: Slightly concave treads
Shape of areas: Irregular, round, or oblong
Size of areas: 4 to 40 acres

Representative Profile

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

Subsurface layer:
9 to 12 inches—grayish brown, mottled silt loam

Figure 6.—A bog in an area of Citypoint mucky peat, 0 to 1 percent slopes.

Subsoil:
12 to 20 inches—reddish brown and brown, mottled silt loam
20 to 36 inches—reddish brown, mottled silty clay loam
36 to 41 inches—brown, mottled silt loam

Substratum:
41 to 51 inches—brown, mottled silt loam with a few thin strata of very fine sandy loam
51 to 60 inches—grayish brown and strong brown silt loam with thin strata of very fine sandy loam and very fine sand

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Aftad soils, which are loamy throughout; on slightly convex or linear treads
• The moderately well drained Crystal Lake soils on slightly convex or linear treads
• The poorly drained Barronett soils in depressions and drainageways

Similar inclusions:
• Soils that have a surface layer of very fine sandy loam or loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the stratified part
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Well suited
Major management concerns: Wetness, poor tilth, and low strength
Management considerations:
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Wetness and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (red maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

CoC2—Council loam, 6 to 12 percent slopes, eroded

Setting

Landform: Hills
Landscape position: Footslopes
Shape of areas: Irregular
Size of areas: 6 to 40 acres

Representative Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable loam mixed with some dark yellowish brown subsoil material

Subsoil:
8 to 16 inches—dark yellowish brown loam
16 to 42 inches—dark brown sandy loam

Substratum:
42 to 60 inches—brownish yellow, mottled silt loam

Composition

Council and similar soils: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Bilson soils, which have a sandy substratum; on the lower footslopes
• Gently sloping or moderately steep areas of Council soils
• The moderately deep Elevasil soils, which are underlain by sand and sandstone; in convex areas on footslopes

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

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate
Available water capacity: High
Content of organic matter in the surface layer: Moderately low

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Moderate
Major restrictive features: Slope and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope and water erosion
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A (northern red oak)
Primary forest habitat type: ArCi
Secondary forest habitat type: ArDe-V

CsD2—Council and Seaton soils, 12 to 20 percent slopes, eroded

Setting

Landform: Hills
Landscape position: Head slopes and backslopes
Shape of areas: Irregular
Size of areas: 6 to 150 acres

Representative Profile

Council

Surface layer:
0 to 7 inches—dark brown, friable loam mixed with some dark yellowish brown subsoil material

Subsoil:
7 to 35 inches—dark yellowish brown loam
35 to 45 inches—dark yellowish brown sandy loam

Substratum:
45 to 60 inches—light yellowish brown and dark yellowish brown, mottled silt loam with pockets or layers of loam

Seaton

Surface layer:
0 to 9 inches—dark brown, friable silt loam mixed with some dark brown subsoil material

Subsoil:
9 to 34 inches—dark brown and dark yellowish brown silt loam
34 to 46 inches—dark yellowish brown, mottled silt loam

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

Composition

• Each mapped area consists of one or both of these soils in varying proportions. Contrasting inclusions make up 5 to 10 percent of the delineations.

Inclusions

Contrasting inclusions:
• Sloping or steep areas of Council and Seaton soils
• The moderately deep Elevasil soils, which are underlain by sand and sandstone; in convex areas on footslopes and backslopes

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

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate
Available water capacity: Council—high; Seaton—very high
Content of organic matter: Council—moderately low in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas; Seaton—moderately low or moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.

• Carefully locating skid trails and building haul roads on the contour can reduce the hazard of erosion and help to overcome equipment limitations.
• In areas of the Seaton soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Seeding and mulching exposed areas after logging, removing runoff water by sloping the road surfaces, and installing water bars, culverts, and drop structures help to control erosion.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality on the steeper south- and west-facing slopes can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soils are moist.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Slope and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Moderately well suited in the less sloping areas; poorly suited in the more sloping areas
Major management concerns: Council—slope and water erosion; Seaton—slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• In areas of the Seaton soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: Council—4R (northern red oak); Seaton—5R (northern red oak)
Primary forest habitat type: ArCi
Secondary forest habitat type: Not assigned

CuB—Crystal Lake silt loam, 2 to 6 percent slopes

Setting

Landform: Glacial lake plains and stream terraces
Landscape position: Slightly convex or linear treads
Shape of areas: Irregular, round, or oblong
Size of areas: 4 to 40 acres

Representative Profile

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

Subsurface layer:
9 to 15 inches—pale brown silt loam
15 to 23 inches—pale brown and yellowish brown, mottled silt loam

Subsoil:
23 to 31 inches—yellowish brown and pale brown, mottled silt loam
31 to 42 inches—yellowish brown, mottled silt loam

Substratum:
42 to 60 inches—light yellowish brown, mottled silt loam with thin strata of very fine sand

Composition

Crystal Lake and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Aftad soils, which are loamy throughout
• The somewhat poorly drained Comstock soils on slightly concave treads

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the stratified part
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, poor tilth, and low strength
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Wetness and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: The shrink-swell potential and water erosion
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: AH-Ci

Da—Dawsil mucky peat, 0 to 1 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Depressions and drainageways
Shape of areas: Irregular, round, or oblong
Size of areas: 4 to 80 acres

Representative Profile

Organic layer:
0 to 7 inches—dark reddish brown mucky peat
7 to 31 inches—black muck

Substratum:
31 to 60 inches—pale brown sand

Composition

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

Inclusions

Contrasting inclusions:
• Loxley soils, which have organic material throughout
• The poorly drained Ponycreek soils, which are sandy throughout

Similar inclusions:
• Soils that have a surface layer of muck or peat

Soil Properties and Qualities

Drainage class: Very poorly drained
Seasonal high water table: Above or near the surface (apparent)
Depth class: Very deep
Permeability: Moderately slow to moderately rapid in the organic material and rapid or very rapid in the siliceous sandy alluvium
Available water capacity: Very high
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, improve water quality and ground-water recharge, reduce the runoff rate, and minimize sedimentation.
• Maintaining a saturated condition, controlling sedimentation, and limiting herbicide use in adjacent areas help to protect the habitat.

Cropland and pasture

Suitability: Generally unsuited
Major restrictive features: Excessive wetness, ponding, a scarcity of suitable drainage outlets, extreme acidity, a severe frost hazard, and subsidence
Management considerations:
• With intensive management, some areas are suited to cranberries and other specialty crops.

Woodland

Suitability: Generally unsuited
Major restrictive features: Excessive wetness and ponding
Management considerations:
• This soil does not support trees of merchantable size or quality.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, and subsidence
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness, ponding, and subsidence

Interpretive Groups

Land capability classification: VIIw in undrained areas
Woodland ordination symbol: 2W (black spruce)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

EaB—Eauclaire loamy sand, 1 to 6 percent slopes

Setting

Landform: Disintegration moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 50 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 2 inches—black loamy sand

Subsurface layer:
2 to 4 inches—grayish brown sand

Subsoil:
4 to 12 inches—dark brown loamy sand
12 to 24 inches—yellowish brown sand
24 to 34 inches—light yellowish brown, mottled sand
34 to 39 inches—strong brown, mottled gravelly sandy loam
39 to 66 inches—yellowish red, mottled sandy loam

Substratum:
66 to 80 inches—yellowish red sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• Areas of Eauclaire soils that have slopes of more than 6 percent
• The somewhat poorly drained Fallcreek soils, which are loamy throughout; in small concave areas on summits
• Flambeau soils, which are loamy throughout

Similar inclusions:
• Soils that have a surface layer of coarse sand or sand
• Soils that have a thinner or thicker sandy mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Rapid in the sandy alluvium and moderately slow or moderate in the loamy till
Available water capacity: Moderate or high
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—low or moderately low in the surface layer

Use and Management

Dominant land uses: Woodland, cropland
Other use: Pasture

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Cropland

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are somewhat limited during dry years in areas where the soil has only a moderate available water capacity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.

Pasture

Suitability: Well suited
Major management concerns: Soil blowing and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited

Major management concerns: Wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: 5A (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: AQVb-V

ElB—Elevasil sandy loam, 2 to 6 percent slopes

Setting

Landform: Hills
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 30 acres

Representative Profile

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

Subsoil:
8 to 18 inches—brown sandy loam
18 to 26 inches—strong brown sandy loam
26 to 30 inches—strong brown loamy sand

Substratum:
30 to 38 inches—yellow sand

Bedrock:
38 to 60 inches—yellow, weakly cemented sandstone

Composition

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

Inclusions

Contrasting inclusions:
• The very deep Bilson soils, which are underlain by sand; in slightly concave areas on summits
• The excessively drained Boone soils, which formed in siliceous sandy residuum; in the more sloping areas on the summits
• Areas of Elevasil soils that have slopes of more than 6 percent

Similar inclusions:
• Soils that have a surface layer of loamy sand or loam
• Soils that have gravel on the surface

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Moderately deep to sandstone
Permeability: Moderate or moderately rapid in the siliceous loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Low
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.

• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concerns: Water erosion and soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: 2A (black oak)
Primary forest habitat type: PVCr
Secondary forest habitat type: ArDe-V

ElC2—Elevasil sandy loam, 6 to 12 percent slopes, eroded

Setting

Landform: Hills
Landscape position: Summits, shoulders, and backslopes
Shape of areas: Irregular
Size of areas: 4 to 40 acres

Representative Profile

Surface layer:
0 to 9 inches—dark brown sandy loam mixed with some dark brown and dark yellowish brown subsoil material

Subsoil:
9 to 24 inches—dark brown and dark yellowish brown sandy loam
24 to 28 inches—yellowish brown loamy sand

Substratum:
28 to 39 inches—very pale brown sand

Bedrock:
39 to 60 inches—very pale brown and yellow, weakly cemented sandstone

Composition

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

Inclusions

Contrasting inclusions:
• The very deep Bilson soils, which are underlain by sand
• The excessively drained Boone soils, which formed in siliceous sandy residuum; in the more sloping and/or convex areas on the summits and shoulders
• The very deep Council soils, which are loamy throughout; in the more concave areas on backslopes
• Gently sloping or moderately steep areas of Elevasil soils

Similar inclusions:
• Soils that have a surface layer of loamy sand or loam
• Soils that have gravel on the surface

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Moderately deep to sandstone
Permeability: Moderate or moderately rapid in the siliceous loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Low
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of

absorption fields should meet local and State guidelines.

Dwellings

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 2A (black oak)
Primary forest habitat type: PVCr
Secondary forest habitat type: ArDe-V

ElD2—Elevasil sandy loam, 12 to 20 percent slopes, eroded

Setting

Landform: Hills
Landscape position: Nose slopes, summits, shoulders, and backslopes
Shape of areas: Irregular
Size of areas: 4 to 40 acres

Representative Profile

Surface layer:
0 to 9 inches—dark brown, friable sandy loam mixed with some dark yellowish brown subsoil material

Subsoil:
9 to 18 inches—dark yellowish brown sandy loam
18 to 26 inches—dark yellowish brown loamy sand

Substratum:
26 to 36 inches—very pale brown sand

Bedrock:
36 to 60 inches—yellow, weakly cemented sandstone

Composition

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

Inclusions

Contrasting inclusions:
• The excessively drained Boone soils, which formed in siliceous sandy residuum; in the more sloping and/or convex areas on summits, shoulders, and nose slopes
• The very deep Council soils, which are loamy throughout; on the more concave footslopes
• Areas of Elevasil soils that have slopes of less than 12 percent or more than 20 percent

Similar inclusions:
• Soils that have a surface layer of loamy sand or loam
• Areas that have gravel on the surface

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Moderately deep to sandstone
Permeability: Moderate or moderately rapid in the siliceous loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Low
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil

blowing and prevent plant damage caused by windblown sand.

• Crop yields are limited during most years by the low available water capacity.

• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.

• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:

• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.

• Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.

• Carefully locating skid trails and building haul roads on the contour can reduce the hazard of erosion and help to overcome equipment limitations.

• Seeding and mulching exposed areas after logging, sloping road surfaces to remove runoff water, and installing water bars, culverts, and drop structures help to control erosion.

• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

• Seedling mortality on the steeper south- and west-facing slopes can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:

• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.

• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.

• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.

• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.

• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, slope, and depth to rock
Management considerations:

• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Moderately well suited in the less sloping areas; poorly suited in the more sloping areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:

• Onsite investigation is needed.

• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.

• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 2R (black oak)
Primary forest habitat type: PVCr
Secondary forest habitat type: ArDe-V

FeA—Fairchild-Elm Lake complex, 0 to 3 percent slopes

Setting

Landform: Pediments
Landscape position: Fairchild—footslopes and toeslopes; Elm Lake—depressions and drainageways

Slope range: Fairchild—0 to 3 percent; Elm Lake—0 to 2 percent
Shape of areas: Irregular
Size of areas: 6 to 1,500 acres

Representative Profile

Fairchild

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black sand

Subsurface layer:
4 to 12 inches—grayish brown sand

Subsoil:
12 to 14 inches—dusky red sand
14 to 19 inches—dark brown, mottled sand
19 to 27 inches—brown, mottled sand
27 to 33 inches—light olive gray, mottled sandy clay loam

Bedrock:
33 to 60 inches—light gray, interbedded sandstone and shale

Elm Lake

Surface layer:
0 to 3 inches—black muck

Subsurface layer:
3 to 4 inches—black mucky sand

Subsoil:
4 to 16 inches—dark grayish brown sand

Substratum:
16 to 24 inches—light gray sand
24 to 36 inches—light olive gray, mottled silty clay loam

Bedrock:
36 to 60 inches—interbedded very pale brown sandstone and red and light brownish gray shale

Composition

Fairchild and similar soils: 40 to 60 percent
Elm Lake and similar soils: 30 to 50 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Citypoint soils, which have an organic layer 16 to 51 inches thick
• The very deep, somewhat poorly drained Ironrun and poorly drained Ponycreek soils, which are sandy throughout
• The moderately well drained Ludington soils on summits and shoulders

Similar inclusions:
• Soils that have a surface layer of coarse sand or mucky sand
• Soils that have a thinner or thicker sandy mantle

Soil Properties and Qualities

Drainage class: Fairchild—somewhat poorly drained; Elm Lake—poorly drained
Seasonal high water table: Fairchild—perched at a depth of 1 to 2 feet; Elm Lake—perched above or near the surface
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Fairchild—very high in the organic layer, moderate or high in the surface layer; Elm Lake—very high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, wetland wildlife habitat

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Elm Lake soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Fairchild soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• The sandy layer near the surface can interfere with the traction of wheeled equipment, especially during dry periods.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely

spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Fairchild soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.
• In areas of the Elm Lake soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Pasture

Suitability: Fairchild—well suited; Elm Lake—poorly suited
Major management concerns: Fairchild—soil blowing and nutrient and pesticide loss; Elm Lake—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and help to protect the quality of the ground water.
• In areas of the Elm Lake soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Elm Lake soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Elm Lake soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Wetland wildlife habitat

Suitability: Fairchild—generally unsuited because of insufficient moisture; Elm Lake—suited in undrained areas
Major management concerns: Elm Lake—excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas of the Elm Lake soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• In areas of the Elm Lake soil, maintaining a saturated condition and controlling sedimentation help to protect the wetland habitat. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding on the Elm Lake soil

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Fairchild—poor filtering capacity, restricted permeability, wetness, and depth to rock; Elm Lake—restricted permeability, wetness, ponding, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Fairchild—poorly suited; Elm Lake—generally unsuited because of excessive wetness and ponding
Major management concerns: Fairchild—wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• In areas of the Fairchild soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Fairchild soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas of the Fairchild soil, stabilizing or sloping the cutbanks can minimize the safety hazard and helps to prevent the damage caused by caving.

Dwellings without basements

Suitability: Fairchild—poorly suited; Elm Lake—generally unsuited because of excessive wetness and ponding
Major management concerns: Fairchild—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• In areas of the Fairchild soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas of the Fairchild soil can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Fairchild—IIIw; Elm Lake—VIw in undrained areas
Woodland ordination symbol: Fairchild—5W (jack pine); Elm Lake—3W (red maple)
Primary forest habitat type: PVHa
Secondary forest habitat type: PVRh

FfA—Fallcreek loam, 0 to 3 percent slopes

Setting

Landform: Ground moraines
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 300 acres

Representative Profile

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

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

Subsoil:
16 to 22 inches—dark brown and grayish brown, mottled loam
22 to 68 inches—dark brown and brown, mottled loam
68 to 80 inches—yellowish brown, brown, and strong brown, mottled loam

Composition

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

Inclusions

Contrasting inclusions:
- The poorly drained Capitola soils in depressions and drainageways
- The moderately well drained Flambeau soils on summits and shoulders

Similar inclusions:
- Soils that have a surface layer of sandy loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet
Depth class: Very deep
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Wetness, poor tilth, and low strength
Management considerations:
- The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
- Open ditches and tile drains remove excess surface water and improve internal drainage.
- Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
- Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
- Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
- Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength

Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

FgA—Fallcreek-Merrillan complex, 0 to 3 percent slopes

Setting

Landform: Fallcreek—ground moraines; Merrillan—pediments
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 6 to 250 acres

Representative Profile

Fallcreek

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

Subsurface layer:
7 to 13 inches—pinkish gray and dark brown, mottled loam

Subsoil:
13 to 21 inches—dark brown and pinkish gray, mottled sandy loam
21 to 47 inches—dark brown and brown, mottled loam

Substratum:
47 to 60 inches—brown loam

Merrillan

Surface layer:
0 to 3 inches—very dark gray sandy loam

Subsurface layer:
3 to 5 inches—grayish brown sandy loam

Subsoil:
5 to 12 inches—dark brown, mottled sandy loam
12 to 19 inches—light yellowish brown, mottled sandy loam
19 to 28 inches—light olive gray, mottled clay loam

Bedrock:
28 to 60 inches—interbedded brown sandstone and dark grayish brown shale

Composition

Fallcreek and similar soils: 40 to 55 percent
Merrillan and similar soils: 35 to 50 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very deep, poorly drained Capitola soils, which are loamy throughout; in depressions and drainageways
• The very deep, moderately well drained Flambeau soils, which are loamy throughout; on summits and shoulders
• The moderately deep, moderately well drained Humbird soils, which are loamy over clayey and are underlain by interbedded sandstone and shale; on summits and shoulders
• The moderately deep, poorly drained Veedum soils, which are silty over clayey and are underlain by interbedded sandstone and shale; in depressions and drainageways

Similar inclusions:
• Soils that have a surface layer of loamy sand

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Fallcreek—perched at a depth of 1 to 3 feet; Merrillan—perched at a depth of 1 to 2 feet
Depth class: Fallcreek—very deep; Merrillan—moderately deep to interbedded sandstone and shale

Permeability: Fallcreek—moderate in the upper part and moderately slow in the lower part; Merrillan—moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Fallcreek—high; Merrillan—low
Content of organic matter: Fallcreek—moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas; Merrillan—moderately low or moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Fallcreek—well suited; Merrillan—moderately well suited
Major management concerns: Fallcreek—wetness, poor tilth, and low strength; Merrillan—soil blowing, droughtiness, wetness, and low strength
Management considerations:
• In areas of the Merrillan soil, field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• If the water table is lowered in areas of the Merrillan soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• In areas of the Merrillan soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• In areas of the Fallcreek soil, open ditches and tile drains remove excess surface water and improve internal drainage.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• In areas of the Merrillan soil, a surface drainage system can remove excess surface water and minimize soil wetness. The underlying bedrock limits the depth of open ditches.
• In areas of the Fallcreek soil, leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Fallcreek—low strength; Merrillan—soil blowing and low strength
Management considerations:
• In areas of the Merrillan soil, establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• In areas of the Merrillan soil, overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Fallcreek—restricted permeability and wetness; Merrillan—restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Fallcreek—wetness and the shrink-swell potential; Merrillan—wetness and soil blowing

Management considerations:
- Onsite investigation is needed.
- Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
- In areas of the Fallcreek soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
- In areas of the Merrillan soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Fallcreek—IIw; Merrillan—IIIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: AVb or PVHa
Secondary forest habitat type: Not assigned

FhB—Flambeau loam, 1 to 6 percent slopes

Setting

Landform: Ground moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 300 acres

Representative Profile

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

Subsurface layer:
10 to 16 inches—pale brown and dark brown, mottled sandy loam

Subsoil:
16 to 25 inches—dark brown, mottled sandy clay loam and pinkish gray, mottled sandy loam
25 to 34 inches—reddish brown, mottled sandy loam
34 to 42 inches—reddish brown sandy loam
42 to 50 inches—dark brown sandy loam

Substratum:
50 to 60 inches—strong brown fine sandy loam

Composition

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

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Fallcreek soils on footslopes and toeslopes
- Sloping areas of Flambeau soils
- Loyal soils, which have a silty mantle

Similar inclusions:
- Soils that have a surface layer of sandy loam, fine sandy loam, or silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- Ruts form easily on unsurfaced roads during wet

periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

FhC—Flambeau loam, 6 to 12 percent slopes

Setting

Landform: Ground moraines
Landscape position: Backslopes and shoulders
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 80 acres

Representative Profile

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

Subsurface layer:
9 to 14 inches—brown sandy loam
14 to 24 inches—brown, mottled loam

Subsoil:
24 to 36 inches—reddish brown, mottled loam
36 to 42 inches—brown, mottled loam

Substratum:
42 to 60 inches—yellowish red sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• Gently sloping or moderately steep areas of Flambeau soils
• The moderately deep Humbird soils, which are underlain by interbedded sandstone and shale; on the lower part of backslopes

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

FhD—Flambeau loam, 12 to 20 percent slopes

Setting

Landform: Ground moraines
Landscape position: Backslopes
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 50 acres

Representative Profile

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

Subsurface layer:
7 to 12 inches—brown sandy loam

Subsoil:
12 to 21 inches—reddish brown and brown, mottled loam
21 to 40 inches—reddish brown, mottled loam
40 to 46 inches—brown loam

Substratum:
46 to 60 inches—yellowish red sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• Sloping or steep areas of Flambeau soils
• The moderately deep Humbird soils, which are underlain by interbedded sandstone and shale; on the lower part of backslopes

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.
• Carefully locating skid trails and building haul roads on the contour can reduce the hazard of erosion and help to overcome equipment limitations.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Seeding and mulching exposed areas after logging, sloping road surfaces to remove runoff water, and installing water bars, culverts, and drop structures help to control erosion.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality on the steeper, south- and west-facing slopes can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements in the less sloping areas and poorly suited in the more sloping areas
Major management concerns: Wetness, slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4R (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

FkB—Flambeau sandy loam, 1 to 6 percent slopes

Setting

Landform: Ground moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 300 acres

Representative Profile

Surface layer:
0 to 10 inches—very dark grayish brown, friable sandy loam

Subsurface layer:
10 to 20 inches—brown and reddish brown, mottled loam

Subsoil:
20 to 31 inches—reddish brown, mottled loam
31 to 44 inches—reddish brown, mottled clay loam
44 to 50 inches—reddish brown, mottled loam

Substratum:
50 to 60 inches—reddish brown loam

Composition

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

Inclusions

Contrasting inclusions:
• Eauclaire soils, which have a sandy mantle
• The somewhat poorly drained Fallcreek soils on footslopes and toeslopes
• The moderately deep Humbird soils, which are underlain by interbedded sandstone and shale

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the upper part and moderately slow in the lower part
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at

recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, the shrink-swell potential, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

FlB—Flambeau-Humbird complex, 1 to 6 percent slopes

Setting

Landform: Flambeau—ground moraines; Humbird—pediments
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 6 to 100 acres

Representative Profile

Flambeau

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

Subsurface layer:
9 to 11 inches—grayish brown loam
11 to 18 inches—grayish brown and brown, mottled sandy loam

Subsoil:
18 to 28 inches—reddish brown, mottled loam
28 to 42 inches—reddish brown clay loam

Substratum:
42 to 60 inches—reddish brown, mottled loam

Humbird

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

Subsurface layer:
7 to 9 inches—pinkish gray sandy loam

Subsoil:
9 to 14 inches—dark brown sandy loam
14 to 25 inches—yellowish brown, mottled silty clay

Bedrock:
25 to 60 inches—interbedded very pale brown sandstone and light brownish gray and reddish brown shale

Composition

Flambeau and similar soils: 35 to 55 percent
Humbird and similar soils: 35 to 55 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fallcreek soils, which are loamy throughout; on footslopes and toeslopes
• The somewhat poorly drained Merrillan soils, which are underlain by interbedded sandstone and shale; on footslopes and toeslopes

Similar inclusions:
• Soils that have a surface layer of fine sandy loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Flambeau—perched at a depth of 1.5 to 3.5 feet; Humbird—perched at a depth of 1.5 to 3.0 feet
Depth class: Flambeau—very deep; Humbird—moderately deep to interbedded sandstone and shale
Permeability: Flambeau—moderate in the upper part and moderately slow in the lower part; Humbird—moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Flambeau—high; Humbird—low
Content of organic matter: Flambeau—moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas; Humbird—moderately low or moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Flambeau—well suited; Humbird—moderately well suited
Major management concerns: Flambeau—water erosion and nutrient and pesticide loss; Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• In areas of the Humbird soil, field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• In areas of the Humbird soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• In areas of the Humbird soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Flambeau—water erosion and nutrient and pesticide loss; Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion. It also reduces the hazard of soil blowing in areas of the Humbird soil.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• In areas of the Humbird soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Humbird soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.

• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Flambeau—restricted permeability and wetness; Humbird—restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Flambeau—wetness, the shrink-swell potential, and water erosion; Humbird—wetness, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Flambeau soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: Flambeau—IIe; Humbird—IIIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: AQVb-V or AVb
Secondary forest habitat type: Not assigned

FlC—Flambeau-Humbird sandy loams, 6 to 12 percent slopes

Setting

Landform: Flambeau—ground moraines; Humbird—pediments
Landscape position: Backslopes and shoulders
Shape of areas: Irregular or long and narrow
Size of areas: 6 to 80 acres

Representative Profile

Flambeau

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

Subsurface layer:
8 to 18 inches—pale brown and brown, mottled sandy loam

Subsoil:
18 to 48 inches—reddish brown, mottled loam

Substratum:
48 to 60 inches—reddish brown loam

Humbird

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

Subsurface layer:
7 to 9 inches—pinkish gray sandy loam

Subsoil:
9 to 15 inches—dark brown sandy loam
15 to 25 inches—yellowish brown, mottled clay loam

Bedrock:
25 to 60 inches—interbedded very pale brown sandstone and light brownish gray shale

Composition

Flambeau and similar soils: 35 to 55 percent
Humbird and similar soils: 35 to 55 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• Gently sloping or moderately steep areas of Flambeau and Humbird soils

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Flambeau—perched at a depth of 1.5 to 3.5 feet; Humbird—perched at a depth of 1.5 to 3.0 feet
Depth class: Flambeau—very deep; Humbird—moderately deep to interbedded sandstone and shale

Permeability: Flambeau—moderate in the upper part and moderately slow in the lower part; Humbird—moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Flambeau—high; Humbird—low
Content of organic matter: Flambeau—moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas; Humbird—moderately low or moderate in the surface layer in cultivated areas, very high in the organic layer and moderate or high in the surface layer in uncultivated areas

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Flambeau—moderately well suited; Humbird—poorly suited
Major management concerns: Flambeau—water erosion, soil blowing, and nutrient and pesticide loss; Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• In areas of the Humbird soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• In areas of the Humbird soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Flambeau—well suited; Humbird—moderately well suited
Major management concerns: Flambeau—water erosion, soil blowing, and nutrient and pesticide loss; Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• In areas of the Humbird soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Humbird soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Flambeau—restricted permeability, wetness, and slope; Humbird—restricted permeability, wetness, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements;

moderately well suited to dwellings without basements

Major management concerns: Flambeau—wetness, slope, the shrink-swell potential, water erosion, and soil blowing; Humbird—wetness, slope, water erosion, and soil blowing

Management considerations:

- Onsite investigation is needed.
- Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
- Buildings can be designed so that they conform to the natural slope of the land. The slope can be modified by cutting and filling.
- In areas of the Flambeau soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
- Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: Flambeau—IIIe; Humbird—IVe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: AQVb-V or AVb
Secondary forest habitat type: Not assigned

Fm—Fordum silt loam, 0 to 2 percent slopes

Setting

Landform: Flood plains
Shape of areas: Long and narrow
Size of areas: 20 to 100 acres

Representative Profile

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

Substratum:
9 to 18 inches—grayish brown, mottled silt loam
18 to 36 inches—grayish brown, mottled loam
36 to 60 inches—dark grayish brown, stratified gravelly coarse sand and coarse sand

Composition

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

Inclusions

Contrasting inclusions:

- The very poorly drained Markey soils, which have an organic layer 16 to 51 inches thick
- The moderately well drained Moppet soils

Similar inclusions:

- Soils that have a surface layer of sandy loam or loam
- Soils in which the loamy alluvium is thinner or thicker

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy alluvium
Available water capacity: Moderate
Content of organic matter: Very high in the organic layer, high or very high in the surface layer
Frequency of flooding: Frequent
Duration of flooding: Brief

Use and Management

Dominant land use: Wetland wildlife habitat
Other uses: Woodland, pasture

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:

- Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
- Maintaining a saturated condition, controlling sedimentation, and following recommended nutrient and chemical management practices in adjacent areas help to protect wetland areas.
- In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:

- Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.

Reforestation is generally limited to natural regeneration or hand planting.
• Planting and harvesting are limited during periods of flooding. The seedling mortality rate may be high unless protection from flooding is provided.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Pasture

Suitability: Poorly suited
Major management concerns: Nutrient and pesticide loss, wetness, ponding, flooding, and low strength
Management considerations:
• Flood-control measures help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and applying phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• The number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding and the flooding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Generally unsuited because of excessive wetness, ponding, and frequent flooding

Dwellings

Suitability: Generally unsuited because of excessive wetness, ponding, and frequent flooding

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, wetness, ponding, and flooding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: VIw
Woodland ordination symbol: 2W (silver maple)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

FnB—Freeon silt loam, 2 to 6 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 300 acres

Representative Profile

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

Subsurface layer:
10 to 14 inches—brown silt loam
14 to 23 inches—brown, mottled silt loam

Subsoil:
23 to 30 inches—dark brown and brown, mottled gravelly sandy loam
30 to 44 inches—dark brown gravelly sandy loam
44 to 52 inches—reddish brown sandy loam

Substratum:
52 to 60 inches—reddish brown, dense and compact sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• Sloping areas of Freeon soils
• Newood soils, which do not have a silty mantle
• The somewhat poorly drained Magnor soils on footslopes and toeslopes

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.0 to 3.5 feet
Depth class: Deep to dense loamy glacial till
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate or high
Content of organic matter in the surface layer: Moderately low or moderate

Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited in areas where surface stones have been removed; poorly suited in other areas
Major management concerns: Water erosion, droughtiness, nutrient and pesticide loss, poor tilth, and rock fragments
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Crop yields are somewhat limited during dry years in areas where the available water capacity is moderate.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• The stones on the surface in some areas interfere with tillage, unless they are removed.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Water erosion, nutrient and pesticide loss, and rock fragments
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface may interfere with the use of machinery.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IVs in very stony areas; IIe in areas where surface stones have been removed
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

FnC—Freeon silt loam, 6 to 15 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Backslopes and shoulders

Shape of areas: Irregular
Size of areas: 4 to 70 acres

Representative Profile

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

Subsurface layer:
9 to 13 inches—brown silt loam
13 to 20 inches—brown and dark yellowish brown, mottled silt loam

Subsoil:
20 to 35 inches—dark brown and brown, mottled gravelly sandy loam
35 to 50 inches—reddish brown sandy loam

Substratum:
50 to 60 inches—reddish brown, dense and compact sandy loam

Composition

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

Inclusions

Contrasting inclusions:
- Gently sloping areas of Freeon soils
- Newood soils, which do not have a silty mantle

Similar inclusions:
- Soils that have a surface layer of loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.0 to 3.5 feet
Depth class: Deep to dense loamy glacial till
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate or high
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Moderately well suited in areas where surface stones have been removed; generally unsuited in other areas
Major management concerns: Water erosion, droughtiness, nutrient and pesticide loss, poor tilth, and rock fragments
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Crop yields are somewhat limited during dry years in areas where the available water capacity is moderate.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
- Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
- The stones on the surface in some areas interfere with tillage, unless they are removed.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- The slope and the stones on the surface limit the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
- The stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Water erosion, nutrient and pesticide loss, and rock fragments

Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface may interfere with the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, slope, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: VIs in very stony areas; IIIe in areas where surface stones have been removed
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

HeB—Hiles silt loam, 1 to 6 percent slopes

Setting

Landform: Pediments
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 200 acres

Representative Profile

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

Subsoil:
9 to 19 inches—dark yellowish brown and brown silt loam
19 to 23 inches—dark brown, mottled loam
23 to 29 inches—light olive brown, mottled clay loam

Bedrock:
29 to 60 inches—interbedded light gray sandstone and olive gray shale

Composition

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

Inclusions

Contrasting inclusions:
• The gently sloping and sloping Humbird soils, which do not have a silty mantle
• The somewhat poorly drained Kert soils on footslopes and toeslopes

Similar inclusions:
• Soils that have a thinner or thicker silty mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.0 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and

crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas where the available water capacity is low. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: ArCi
Secondary forest habitat type: Not assigned

HuB—Humbird fine sandy loam, 1 to 6 percent slopes

Setting

Landform: Pediments
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 100 acres

Representative Profile

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

Subsurface layer:
8 to 11 inches—brown fine sandy loam

Subsoil:
11 to 22 inches—reddish brown fine sandy loam
22 to 28 inches—dark reddish brown clay loam
28 to 32 inches—light olive gray and reddish brown, mottled clay loam

Bedrock:
32 to 60 inches—interbedded pink sandstone and pinkish gray shale

Composition

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

Inclusions

Contrasting inclusions:
• The very deep Flambeau soils, which have a loamy substratum; on ground moraines
• Sloping areas of Humbird soils
• Ludington soils, which have a sandy mantle
• The somewhat poorly drained Merrillan soils on footslopes and toeslopes

Similar inclusions:
• Soils that have a surface layer of loamy sand or sandy loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.0 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the

low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: PVHa

HuC—Humbird fine sandy loam, 6 to 12 percent slopes

Setting

Landform: Pediments
Landscape position: Backslopes and shoulders
Shape of areas: Irregular
Size of areas: 4 to 50 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Surface layer:
1 to 3 inches—very dark grayish brown fine sandy loam

Subsurface layer:
3 to 6 inches—pale brown sandy loam

Subsoil:
6 to 12 inches—dark brown sandy loam
12 to 16 inches—dark yellowish brown sandy loam
16 to 24 inches—reddish brown, mottled silty clay

Bedrock:
24 to 60 inches—interbedded yellowish brown sandstone and reddish brown shale

Composition

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

Inclusions

Contrasting inclusions:
• The very deep Flambeau soils, which have a loamy substratum; on ground moraines
• The gently sloping Hiles soils, which have a silty mantle
• Gently sloping or moderately steep areas of Humbird soils
• Ludington soils, which have a sandy mantle

Similar inclusions:
• Soils that have a surface layer of loamy sand or sandy loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.0 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and poor tilth

Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, slope, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4L (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: PVHa

HxB—Humbird-Merrillan fine sandy loams, 0 to 6 percent slopes

Setting

Landform: Pediments
Landscape position: Humbird—summits and shoulders; Merrillan—footslopes and toeslopes
Slope range: Humbird—1 to 6 percent; Merrillan—0 to 3 percent

Shape of areas: Irregular
Size of areas: 6 to 200 acres

Representative Profile

Humbird

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 2 inches—black fine sandy loam

Subsurface layer:
2 to 9 inches—pinkish gray fine sandy loam

Subsoil:
9 to 14 inches—dark brown sandy loam
14 to 21 inches—yellowish brown sandy loam
21 to 27 inches—light olive gray, mottled clay loam

Bedrock:
27 to 60 inches—interbedded very pale brown sandstone and light gray shale

Merrillan

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—dark reddish brown fine sandy loam

Subsurface layer:
3 to 10 inches—brown fine sandy loam

Subsoil:
10 to 12 inches—dark brown sandy loam
12 to 15 inches—dark brown, mottled sandy loam
15 to 22 inches—yellowish brown, mottled sandy loam
22 to 33 inches—red and greenish gray, mottled silty clay loam

Bedrock:
33 to 60 inches—interbedded very pale brown sandstone and light gray shale

Composition

Humbird and similar soils: 35 to 55 percent
Merrillan and similar soils: 35 to 55 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fairchild and moderately well drained Ludington soils, which have a sandy mantle
• The poorly drained Veedum soils, which have a silty mantle; in depressions and drainageways

Similar inclusions:
• Soils that have a surface layer of sandy loam or loamy sand

Soil Properties and Qualities

Drainage class: Humbird—moderately well drained; Merrillan—somewhat poorly drained
Seasonal high water table: Humbird—perched at a depth of 1.5 to 3.0 feet; Merrillan—perched at a depth of 1 to 2 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Humbird—equipment limitation and plant competition; Merrillan—equipment limitation, windthrow hazard, and plant competition
Management considerations:
• In areas of the Merrillan soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Merrillan soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Cropland

Suitability: Moderately well suited
Major management concerns: Humbird—water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and poor tilth; Merrillan—soil blowing, droughtiness, wetness, poor tilth, and low strength
Management considerations:
• In the more sloping areas of the Humbird soil, a

conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• In areas of the Humbird soil, grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• In areas of the Humbird soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• If the water table is lowered in areas of the Merrillan soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• In areas of the Humbird soil, measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• In areas of the Merrillan soil, the seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• In areas of the Merrillan soil, a surface drainage system can help remove excess surface water and minimize soil wetness. The underlying bedrock limits the depth of open ditches.
• In areas of the Merrillan soil, grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• In areas of the Merrillan soil, low soil strength limits the use of farm equipment to periods when the soil is dry.

Pasture

Suitability: Well suited
Major management concerns: Humbird—water erosion, soil blowing, droughtiness, and nutrient and pesticide loss; Merrillan—soil blowing and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing and water erosion.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• In areas of the Humbird soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Humbird soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• In areas of the Humbird soil, reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• In areas of the Merrillan soil, low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Humbird—wetness, water erosion, and soil blowing; Merrillan—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Humbird—moderately well suited; Merrillan—poorly suited
Major management concerns: Humbird—wetness, water erosion, and soil blowing; Merrillan—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding

fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: Humbird—IIIe; Merrillan—IIIw
Woodland ordination symbol: Humbird—4L (northern red oak); Merrillan—4W (northern red oak)
Primary forest habitat type: PVHa
Secondary forest habitat type: Not assigned

IxA—Ironrun-Ponycreek complex, 0 to 3 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Ironrun—toeslopes; Ponycreek—depressions and drainageways
Slope range: Ironrun—0 to 3 percent; Ponycreek—0 to 2 percent
Shape of areas: Irregular
Size of areas: 6 to 60 acres

Representative Profile

Ironrun

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—black sand

Subsurface layer:
3 to 12 inches—brown sand

Subsoil:
12 to 19 inches—dark reddish brown sand
19 to 29 inches—dark brown, mottled sand

Substratum:
29 to 61 inches—light yellowish brown, mottled sand

Ponycreek

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 6 inches—black mucky sand

Subsoil:
6 to 28 inches—light brownish gray, mottled sand

Substratum:
28 to 60 inches—dark brown sand

Composition

Ironrun and similar soils: 45 to 60 percent
Ponycreek and similar soils: 30 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Dawsil soils, which have an organic layer 16 to 51 inches thick; in depressions and drainageways
• The moderately well drained Rockdam soils

Similar inclusions:
• Soils that have a surface layer of coarse sand

Soil Properties and Qualities

Drainage class: Ironrun—somewhat poorly drained; Ponycreek—poorly drained
Seasonal high water table: Ironrun—1 to 2 feet below the surface; Ponycreek—above or near the surface
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Ironrun—very high in the organic layer, moderate or high in the surface layer; Ponycreek—very high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, wetland wildlife habitat

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Ponycreek soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Ironrun soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• The sandy layer near the surface can interfere with

the traction of wheeled equipment, especially during dry periods.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Ponycreek soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.
• In areas of the Ironrun soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Ironrun—moderately well suited; Ponycreek—poorly suited
Major management concerns: Ironrun—soil blowing and nutrient and pesticide loss; Ponycreek—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• In areas of the Ponycreek soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Ponycreek soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Ponycreek soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Wetland wildlife habitat

Suitability: Ironrun—generally unsuited because of insufficient moisture; Ponycreek—suited in undrained areas
Major management concerns: Ponycreek—excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas of the Ponycreek soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• In areas of the Ponycreek soil, maintaining a saturated condition and controlling sedimentation help to protect wetland areas. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding on the Ponycreek soil

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Ironrun—poor filtering capacity and wetness; Ponycreek—poor filtering capacity, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Ironrun—poorly suited; Ponycreek—generally unsuited because of excessive wetness and ponding
Major management concerns: Ironrun—wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• In areas of the Ironrun soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Ironrun soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas of the Ironrun soil, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Ironrun—poorly suited; Ponycreek—generally unsuited because of excessive wetness and ponding
Major management concerns: Ironrun—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• In areas of the Ironrun soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Ironrun soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Ironrun—IVw; Ponycreek—VIw in undrained areas
Woodland ordination symbol: Ironrun—6W (quaking aspen); Ponycreek—6W (jack pine)
Primary forest habitat type: PVHa
Secondary forest habitat type: PVRh

IzB—Ironrun-Ponycreek-Arbutus complex, 0 to 6 percent slopes

Setting

Landform: Ironrun and Ponycreek—stream terraces; Arbutus—strath terraces
Landscape position: Ironrun—slightly concave treads; Ponycreek—depressions and drainageways; Arbutus—slight rises
Slope range: Ironrun—0 to 3 percent; Ponycreek—0 to 2 percent; Arbutus—2 to 6 percent
Shape of areas: Irregular or long and narrow
Size of areas: 6 to 200 acres

Representative Profile

Ironrun

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—black sand

Subsurface layer:
3 to 8 inches—pinkish gray sand

Subsoil:
8 to 12 inches—dark reddish brown sand
12 to 22 inches—strong brown, mottled sand

Substratum:
22 to 39 inches—yellow, mottled sand
39 to 61 inches—very pale brown, mottled sand

Ponycreek

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 6 inches—black mucky sand

Subsoil:
6 to 22 inches—grayish brown sand

Substratum:
22 to 64 inches—light yellowish brown, mottled sand

Arbutus

Surface layer:
0 to 2 inches—very dark grayish brown loamy sand

Subsurface layer:
2 to 5 inches—dark brown loamy sand

Subsoil:
5 to 17 inches—dark brown and brown loamy sand
17 to 25 inches—strong brown sand

Bedrock:
25 inches—igneous bedrock

Composition

Ironrun and similar soils: 30 to 40 percent
Ponycreek and similar soils: 25 to 35 percent
Arbutus and similar soils: 15 to 25 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
- The very poorly drained Dawsil soils, which have an organic layer 16 to 51 inches thick; in depressions and drainageways
- The moderately well drained Rockdam soils

Similar inclusions:
- Soils that have a surface layer of coarse sand
- Areas that have stones and boulders on the surface
- Areas of rock outcrop

Soil Properties and Qualities

Drainage class: Ironrun—somewhat poorly drained; Ponycreek—poorly drained; Arbutus—excessively drained
Seasonal high water table: Ironrun—1 to 2 feet below the surface; Ponycreek—above or near the surface; Arbutus—at a depth of more than 6 feet
Depth class: Ironrun and Ponycreek—very deep; Arbutus—moderately deep to hard igneous bedrock
Permeability: Ironrun and Ponycreek—rapid or very rapid; Arbutus—rapid in the siliceous sandy alluvium and slow to rapid in the bedrock
Available water capacity: Low
Content of organic matter: Ironrun and Arbutus—very high in the organic layer, moderate or high in the surface layer; Ponycreek—very high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, wetland wildlife habitat

Woodland

Suitability: Suited
Major management concerns: Ironrun and Ponycreek—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Arbutus—equipment limitation, windthrow hazard, and seedling mortality
Management considerations:
• In areas of the Ponycreek soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Ironrun soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• In areas of the Arbutus soil, hard bedrock limits the depth of cuts and interferes with the construction of haul roads and log landings.
• In areas of the Ironrun and Ponycreek soils, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Ironrun and Ponycreek soils, the sandy layer near the surface can interfere with the traction of wheeled equipment, especially during dry periods.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• In areas of the Ironrun and Ponycreek soils, plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Ponycreek soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.
• In areas of the Arbutus and Ironrun soils, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Ironrun and Arbutus—moderately well suited; Ponycreek—poorly suited
Major management concerns: Ironrun—soil blowing and nutrient and pesticide loss; Ponycreek—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength; Arbutus—soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• In areas of the Arbutus soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Arbutus soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• In areas of the Ponycreek soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Ponycreek soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Ponycreek soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Wetland wildlife habitat

Suitability: Ironrun and Arbutus—generally unsuited because of insufficient moisture; Ponycreek—suited in undrained areas
Major management concerns: Ponycreek—excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas of the Ponycreek soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• In areas of the Ponycreek soil, maintaining a saturated condition and controlling sedimentation help to protect wetland areas. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding on the Ponycreek soil

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Ironrun—poor filtering capacity and wetness; Ponycreek—poor filtering

capacity, wetness, and ponding; Arbutus—depth to rock and poor filtering capacity

Management considerations:

• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Ironrun and Arbutus—poorly suited; Ponycreek—generally unsuited because of excessive wetness and ponding

Major management concerns: Ironrun—wetness, soil blowing, and cutbanks caving; Arbutus—depth to rock and soil blowing

Management considerations:

• Onsite investigation is needed.

• In areas of the Ironrun soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

• In areas of the Arbutus soil, the underlying hard bedrock limits the depth of cuts. The bedrock can be excavated by blasting or by using suitable power equipment. Constructing dwellings with partially exposed basements minimizes the necessity of excavating the bedrock.

• In areas of the Arbutus and Ironrun soils, seeding and mulching exposed areas can help to control soil blowing during and after construction.

• In excavated or cut-and-fill areas of the Ironrun soil, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Ironrun—poorly suited; Ponycreek—generally unsuited because of excessive wetness and ponding; Arbutus—moderately well suited

Major management concerns: Ironrun—wetness and soil blowing; Arbutus—depth to rock and soil blowing

Management considerations:

• Onsite investigation is needed.

• In areas of the Ironrun soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

• In areas of the Arbutus soil, the underlying hard bedrock limits the depth of cuts. The bedrock can be excavated by blasting or by using suitable power equipment. Coarse textured fill material can be added to raise the foundation above the bedrock.

• Seeding and mulching exposed areas of the Ironrun and Arbutus soils can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Ironrun—IVw; Ponycreek—VIw in undrained areas; Arbutus—IVs

Woodland ordination symbol: Ironrun—6W (quaking aspen); Ponycreek—6W (jack pine); Arbutus—2S (red maple)

Primary forest habitat type: PVGy or PVRh

Secondary forest habitat type: Not assigned

KeA—Kert silt loam, 0 to 3 percent slopes

Setting

Landform: Pediments

Landscape position: Footslopes and toeslopes

Shape of areas: Irregular

Size of areas: 4 to 300 acres

Representative Profile

Surface layer:

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

Subsoil:

9 to 22 inches—yellowish brown and brown, mottled silt loam

22 to 26 inches—dark brown, mottled loam

26 to 34 inches—light yellowish brown, mottled silty clay loam

Bedrock:

34 to 60 inches—interbedded pale brown sandstone and gray shale

Composition

Kert and similar soils: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:

• The moderately well drained Hiles soils on summits and shoulders

• Merrillan soils, which do not have a silty mantle

• The poorly drained Veedum soils in depressions and drainageways

Similar inclusions:

• Soils that have a thinner or thicker silty mantle

Soil Properties and Qualities

Drainage class: Somewhat poorly drained

Seasonal high water table: Perched at a depth of 1 to 3 feet

Depth class: Moderately deep to interbedded sandstone and shale

Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Droughtiness, wetness, and low strength
Management considerations:
• If the water table is lowered, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• A surface drainage system can help remove excess surface water and minimize soil wetness. The underlying bedrock limits the depth of open ditches.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: ArCi
Secondary forest habitat type: PVHa

Lk—Loxley peat, 0 to 1 percent slopes

Setting

Landform: Moraines
Landscape position: Depressions
Shape of areas: Round or oblong

Size of areas: 10 to 400 acres

Representative Profile

Organic layer:
0 to 6 inches—dark brown, extremely acid peat
6 to 60 inches—black, extremely acid muck

Composition

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

Inclusions

Contrasting inclusions:
• Beseman, Citypoint, Dawsil, and Dawson soils, which have an organic layer 16 to 51 inches thick

Similar inclusions:
• Soils that have a surface layer of mucky peat

Soil Properties and Qualities

Drainage class: Very poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Moderately slow to moderately rapid
Available water capacity: Very high
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation help to protect wetland areas. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Cropland and pasture

Suitability: Generally unsuited because of excessive wetness, ponding, a scarcity of suitable drainage outlets, extreme acidity, a severe frost hazard, and subsidence

Woodland

Suitability: Generally unsuited because of excessive wetness and ponding; this soil does not support trees of merchantable size or quality.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, and subsidence
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness, ponding, and subsidence

Interpretive Groups

Land capability classification: VIIw in undrained areas
Woodland ordination symbol: 2W (black spruce)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Lm—Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes

Setting

Landform: Moraines
Landscape position: Depressions and drainageways
Shape of areas: Irregular, round, or oblong
Size of areas: 4 to 100 acres

Representative Profile

Loxley

Organic layer:
0 to 10 inches—dark yellowish brown, extremely acid peat
10 to 19 inches—very dark grayish brown, extremely acid mucky peat
19 to 60 inches—very dark brown, extremely acid muck

Beseman

Organic layer:
0 to 10 inches—dark reddish brown peat
10 to 21 inches—dark reddish brown muck
21 to 29 inches—black muck

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

Dawson

Organic layer:
0 to 10 inches—dark reddish brown peat
10 to 18 inches—dark reddish brown muck
18 to 42 inches—black muck

Substratum:
42 to 60 inches—dark gray, stratified gravelly coarse sand and coarse sand

Composition

• Each mapped area consists of one or more of these soils in varying proportions; contrasting inclusions generally make up 5 to 10 percent of the areas.

Inclusions

Contrasting inclusions:
• The poorly drained Rib soils, which do not have organic layers

Similar inclusions:
• Soils that have a surface layer of mucky peat

Soil Properties and Qualities

Drainage class: Very poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Loxley—moderately slow to moderately rapid; Beseman—moderate or moderately rapid in the organic material and moderately slow in the loamy alluvium; Dawson—moderately slow to moderately rapid in the organic material and rapid in the sandy deposits
Available water capacity: Very high
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas of these soils undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Cropland and pasture

Suitability: Generally unsuited because of excessive wetness, ponding, a scarcity of suitable drainage outlets, extreme acidity, a severe frost hazard, and subsidence

Woodland

Suitability: Generally unsuited because of excessive wetness and ponding; this unit does not support trees of merchantable size or quality.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, and subsidence
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness, ponding, and subsidence

Interpretive Groups

Land capability classification: VIIw in undrained areas
Woodland ordination symbol: Loxley and Dawson—2W (black spruce); Beseman—3W (black spruce)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

LoB—Loyal silt loam, 1 to 6 percent slopes

Setting

Landform: Ground moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 1,000 acres

Representative Profile

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

Subsurface layer:
9 to 20 inches—brown, mottled silt loam

Subsoil:
20 to 24 inches—reddish brown and brown, mottled loam
24 to 36 inches—reddish brown, mottled loam
36 to 45 inches—yellowish red, mottled loam

Substratum:
45 to 60 inches—brown, mottled sandy loam

Composition

Loyal and similar soils: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Sloping areas of Flambeau soils, which do not have a silty mantle
• Sloping areas of Loyal soils
• The somewhat poorly drained Withee soils on footslopes and toeslopes

Similar inclusions:
• Soils that have a darker surface layer

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: Not assigned

LoC—Loyal silt loam, 6 to 12 percent slopes

Setting

Landform: Ground moraines
Landscape position: Backslopes and shoulders
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 200 acres

Representative Profile

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

Subsurface layer:
9 to 12 inches—pale brown silt loam
12 to 18 inches—pale brown and yellowish brown, mottled silt loam

Subsoil:
18 to 24 inches—pale brown and dark brown, mottled sandy loam
24 to 39 inches—dark reddish brown, mottled loam
39 to 42 inches—yellowish red loam

Substratum:
42 to 60 inches—brown loam

Composition

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

Inclusions

Contrasting inclusions:
• The moderately eroded Flambeau soils, which do not have a silty mantle; on the moderately steep parts of shoulders
• Gently sloping or moderately steep areas of Loyal soils

Similar inclusions:
• Soils that have a thinner silty mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe

Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited to dwellings with basements; moderately well suited to dwellings without basements
Major management concerns: Wetness, slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: Not assigned

LsB—Loyal-Hiles silt loams, 1 to 6 percent slopes

Setting

Landform: Loyal—ground moraines; Hiles—pediments
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 6 to 80 acres

Representative Profile

Loyal

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

Subsurface layer:
9 to 13 inches—pale brown, mottled silt loam
13 to 25 inches—pale brown and strong brown, mottled silt loam

Subsoil:
25 to 33 inches—strong brown and brown, mottled loam
33 to 50 inches—reddish brown, mottled loam

Substratum:
50 to 60 inches—strong brown sandy loam

Hiles

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

Subsurface layer:
8 to 13 inches—pale brown silt loam
13 to 17 inches—brown and light yellowish brown, mottled silt loam

Subsoil:
17 to 23 inches—reddish brown and very pale brown, mottled silty clay loam

Bedrock:
23 to 60 inches—interbedded very pale brown sandstone and reddish brown shale

Composition

Loyal and similar soils: 50 to 65 percent
Hiles and similar soils: 30 to 40 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Kert soils, which are underlain by interbedded sandstone and shale; on footslopes and toeslopes
• The somewhat poorly drained Withee soils, which consist of silty material over loamy material; on footslopes and toeslopes

Similar inclusions:
• Soils that have a thinner silty mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Loyal—perched at a depth of 1.5 to 3.5 feet; Hiles—perched at a depth of 1.5 to 3.0 feet
Depth class: Loyal—very deep; Hiles—moderately deep to interbedded sandstone and shale
Permeability: Loyal—moderate in the silty part and moderately slow in the loamy till; Hiles—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Loyal—high; Hiles—low or moderate

Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Loyal—water erosion, nutrient and pesticide loss, and poor tilth; Hiles—water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• In areas of the Hiles soil, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• In areas of the Hiles soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• In areas of the Loyal soil, leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Loyal—water erosion and nutrient and pesticide loss; Hiles—water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas of the Hiles soil where the available water capacity is low. Drought-tolerant species should be selected for planting.
• In areas of the Hiles soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Loyal—restricted permeability and wetness; Hiles—restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Loyal—wetness, the shrink-swell potential, and water erosion; Hiles—wetness and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Loyal soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.

• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: Loyal—3L (sugar maple); Hiles—4L (northern red oak)
Primary forest habitat type: AH or AVb
Secondary forest habitat type: Not assigned

LsC—Loyal-Hiles silt loams, 6 to 12 percent slopes

Setting

Landform: Loyal—ground moraines; Hiles—pediments
Landscape position: Backslopes and shoulders
Shape of areas: Irregular or long and narrow
Size of areas: 6 to 60 acres

Representative Profile

Loyal

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

Subsurface layer:
7 to 10 inches—pale brown silt loam
10 to 17 inches—pale brown and yellowish brown, mottled silt loam

Subsoil:
17 to 25 inches—brown and pale brown, mottled loam
25 to 43 inches—brown, mottled loam

Substratum:
43 to 60 inches—brown, mottled loam

Hiles

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

Subsurface layer:
9 to 17 inches—grayish brown and dark yellowish brown, mottled silt loam

Subsoil:
17 to 22 inches—dark brown and grayish brown, mottled silt loam
22 to 28 inches—light yellowish brown, mottled silty clay loam

Bedrock:
28 to 60 inches—interbedded brownish yellow sandstone and reddish brown shale

Composition

Loyal and similar soils: 50 to 65 percent
Hiles and similar soils: 30 to 40 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The moderately eroded Flambeau soils, which are loamy throughout; on the steep parts of shoulders
• Gently sloping areas of Hiles and Loyal soils

Similar inclusions:
• Soils that have a thinner silty mantle

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Loyal—perched at a depth of 1.5 to 3.5 feet; Hiles—perched at a depth of 1.5 to 3.0 feet
Depth class: Loyal—very deep; Hiles—moderately deep to interbedded sandstone and shale
Permeability: Loyal—moderate in the silty part and moderately slow in the loamy till; Hiles—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Loyal—high; Hiles—low or moderate
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Loyal—water erosion, nutrient and pesticide loss, and poor tilth; Hiles—water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and

crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• In areas of the Hiles soil, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• In areas of the Hiles soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• In areas of the Loyal soil, leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Loyal—water erosion and nutrient and pesticide loss; Hiles—water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas of the Hiles soil where the available water capacity is low. Drought-tolerant species should be selected for planting.
• In areas of the Hiles soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Loyal—restricted permeability, wetness, and slope; Hiles—restricted permeability, wetness, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Loyal—wetness, slope, the shrink-swell potential, and water erosion; Hiles—wetness, slope, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• In areas of the Loyal soil, adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness, slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: Loyal—3L (sugar maple); Hiles—4L (northern red oak)
Primary forest habitat type: AH or AVb
Secondary forest habitat type: Not assigned

LuB—Ludington sand, 1 to 6 percent slopes

Setting

Landform: Pediments
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 80 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black sand

Subsurface layer:
4 to 12 inches—grayish brown sand

Subsoil:
12 to 15 inches—reddish brown sand
15 to 18 inches—dark brown sand
18 to 25 inches—light yellowish brown sand
25 to 31 inches—brownish yellow, mottled sand
31 to 37 inches—yellowish brown, mottled loam

Bedrock:
37 to 60 inches—interbedded light gray sandstone and reddish brown shale

Composition

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

Inclusions

Contrasting inclusions:
• Eauclaire soils, which have a loamy substratum; on summits and shoulders of disintegration moraines
• The somewhat poorly drained Fairchild soils on footslopes and toeslopes
• Humbird soils, which have a loamy mantle
• Sloping areas of Ludington soils

Similar inclusions:
• Soils that have a surface layer of coarse sand
• Soils in which the siliceous sandy alluvium is thinner or thicker

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—low or moderately low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, plant competition, and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks

increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Proper scheduling of irrigation applications helps to minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 5S (jack pine)
Primary forest habitat type: PVHa or PVCr
Secondary forest habitat type: Not assigned

LuC—Ludington sand, 6 to 12 percent slopes

Setting

Landform: Pediments
Landscape position: Backslopes and shoulders
Shape of areas: Irregular
Size of areas: 4 to 80 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—black sand

Subsurface layer:
3 to 8 inches—brown sand

Subsoil:
8 to 14 inches—dark brown sand
14 to 27 inches—yellowish brown and yellow sand
27 to 33 inches—light gray, mottled loam

Bedrock:
33 to 60 inches—interbedded light gray sandstone and light gray shale

Composition

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

Inclusions

Contrasting inclusions:
• Humbird soils, which have a loamy mantle

• Gently sloping or moderately steep areas of Ludington soils

Similar inclusions:
• Soils that have a surface layer of coarse sand
• Soils in which the siliceous sandy alluvium is thinner or thicker

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 1.5 to 3.5 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—low or moderately low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, plant competition, and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Properly scheduling irrigation applications, reducing chemical application rates, and using split applications of nitrogen fertilizer at recommended rates during the

growing season help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, wetness, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness, slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Wetness, slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 5S (jack pine)
Primary forest habitat type: PVHa or PVCr
Secondary forest habitat type: Not assigned

LxB—Ludington-Fairchild sands, 0 to 6 percent slopes

Setting

Landform: Pediments
Landscape position: Ludington—summits and shoulders; Fairchild—footslopes and toeslopes
Slope range: Ludington—1 to 6 percent; Fairchild—0 to 3 percent
Shape of areas: Irregular
Size of areas: 6 to 100 acres

Representative Profile

Ludington

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black sand

Subsurface layer:
4 to 11 inches—grayish brown sand

Subsoil:
11 to 16 inches—dark brown sand
16 to 26 inches—yellowish brown sand
26 to 33 inches—very pale brown, mottled sand
33 to 39 inches—light gray, mottled sandy clay loam

Bedrock:
39 to 60 inches—interbedded light gray sandstone and light olive gray shale

Fairchild

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black sand

Subsurface layer:
4 to 10 inches—grayish brown sand

Subsoil:
10 to 12 inches—dark reddish brown sand
12 to 18 inches—dark brown, mottled sand
18 to 29 inches—yellowish brown, mottled sand
29 to 34 inches—light brownish gray, mottled clay loam

Bedrock:
34 to 60 inches—interbedded light gray sandstone and light gray shale

Composition

Ludington and similar soils: 40 to 55 percent
Fairchild and similar soils: 35 to 50 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The poorly drained Elm Lake soils in depressions and drainageways
• The somewhat poorly drained Merrillan soils, which do not have a sandy mantle

Similar inclusions:
• Soils that have a surface layer of coarse sand
• Soils in which the siliceous sandy alluvium is thinner or thicker

Soil Properties and Qualities

Drainage class: Ludington—moderately well drained; Fairchild—somewhat poorly drained
Seasonal high water table: Ludington—perched at a depth of 1.5 to 3.5 feet; Fairchild—perched at a depth of 1 to 2 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Ludington—equipment limitation, plant competition, and seedling mortality; Fairchild—equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Fairchild soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• In areas of the Fairchild soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• In areas of the Fairchild soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Ludington—moderately well suited; Fairchild—well suited
Major management concerns: Ludington—soil blowing, droughtiness, and nutrient and pesticide loss; Fairchild—soil blowing and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• In areas of the Ludington soil, forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• In areas of the Ludington soil, restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Cropland

Suitability: Ludington—poorly suited; Fairchild—moderately well suited
Major management concerns: Ludington—soil blowing, droughtiness, and nutrient and pesticide loss; Fairchild—soil blowing, droughtiness, nutrient and pesticide loss, and wetness
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• In areas of the Ludington soil, crop yields are limited

during most years by the low available water capacity. Irrigation can improve productivity.
- If the water table is lowered in areas of the Fairchild soil, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
- Proper scheduling of irrigation applications helps to minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.
- In areas of the Fairchild soil, the seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
- In areas of the Fairchild soil, open ditches and tile drains remove excess surface water and improve internal drainage, but the underlying bedrock limits the depth of cuts.
- In areas of the Fairchild soil, loose sand enters the tile lines unless a suitable filter covers the tile.
- In areas of the Fairchild soil, grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, wetness, and depth to rock
Management considerations:
- Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness, soil blowing, and cutbanks caving
Management considerations:
- Onsite investigation is needed.
- Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
- Seeding and mulching exposed areas can help to control soil blowing during and after construction.
- In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Ludington—moderately well suited; Fairchild—poorly suited
Major management concerns: Wetness and soil blowing
Management considerations:
- Onsite investigation is needed.
- Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
- Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Ludington—IVs; Fairchild—IIIw
Woodland ordination symbol: Ludington—5S (jack pine); Fairchild—5W (jack pine)
Primary forest habitat type: PVHa or PVRh
Secondary forest habitat type: Not assigned

LyD—Ludington-Humbird complex, 12 to 20 percent slopes

Setting

Landform: Pediments
Landscape position: Nose slopes, summits, shoulders, and backslopes
Shape of areas: Irregular
Size of areas: 4 to 40 acres

Representative Profile

Ludington

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—very dark gray sand

Subsurface layer:
4 to 12 inches—pinkish gray sand

Subsoil:
12 to 17 inches—dark brown loamy sand
17 to 22 inches—yellowish brown sand
22 to 28 inches—pale brown, mottled sand
28 to 35 inches—olive, mottled clay loam

Bedrock:
35 to 60 inches—interbedded light gray sandstone and light olive gray shale

Humbird

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—very dark gray fine sandy loam

Subsurface layer:
3 to 5 inches—grayish brown fine sandy loam

Subsoil:
5 to 10 inches—brown sandy loam
10 to 19 inches—pale brown sandy loam
19 to 25 inches—reddish brown, mottled clay loam

Bedrock:
25 to 60 inches—interbedded light gray sandstone and light olive gray shale

Composition

Ludington and similar soils: 35 to 55 percent
Humbird and similar soils: 35 to 55 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• Sloping or steep areas of Ludington and Humbird soils

Similar inclusions:
• Soils that have a surface layer of coarse sand, loamy sand, or sandy loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Ludington—perched at a depth of 1.5 to 3.5 feet; Humbird—perched at a depth of 1.5 to 3.0 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Ludington—rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale; Humbird—moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Because the slope limits the use of conventional logging equipment, special logging methods, such as yarding the logs by cable, may be necessary.
• Carefully locating skid trails and building haul roads on the contour reduce the hazard of erosion and help to overcome the equipment limitation.
• In areas of the Humbird soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Ludington soil, the sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seeding and mulching exposed areas after logging, sloping road surfaces to remove runoff water, and installing water bars, culverts, and drop structures help to control erosion.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Humbird soil, seedling mortality on the steeper, south- and west-facing slopes can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.
• In areas of the Ludington soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the

low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• In areas of the Humbird soil, reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Cropland

Suitability: Generally unsuited because of the very severe hazard of water erosion, extreme droughtiness, and the steep slope

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Ludington—poor filtering capacity, restricted permeability, wetness, slope, and depth to rock; Humbird—restricted permeability, wetness, slope, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Ludington—wetness, slope, water erosion, soil blowing, and cutbanks caving; Humbird—wetness, slope, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas of the Ludington soil, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited in the less sloping areas; poorly suited in the more sloping areas
Major management concerns: Ludington—wetness, slope, water erosion, soil blowing, and cutbanks caving; Humbird—wetness, slope, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas of the Ludington soil, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: Ludington—VIs; Humbird—VIe
Woodland ordination symbol: Ludington—5R (jack pine); Humbird—4R (northern red oak)
Primary forest habitat type: ArDe-V or PVHa
Secondary forest habitat type: Not assigned

MaB—Magnor silt loam, 0 to 4 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 60 acres

Representative Profile

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

Subsurface layer:
9 to 15 inches—pale brown, mottled silt loam

Subsoil:
15 to 21 inches—dark yellowish brown and pale brown, mottled silt loam
21 to 45 inches—reddish brown, mottled gravelly sandy loam

Substratum:
45 to 60 inches—reddish brown, mottled, dense and compact sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The very deep, poorly drained Capitola soils, which do not have a dense loamy substratum; in depressions and drainageways
• The moderately well drained Freeon soils on summits and shoulders
• The moderately well drained Newood soils, which do not have a silty mantle; on summits and shoulders

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

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet
Depth class: Deep to dense loamy glacial till
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate or high
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Well suited in areas where surface stones have been removed; poorly suited in other areas
Major management concerns: Droughtiness, wetness, poor tilth, rock fragments, and low strength
Management considerations:
• If the water table is lowered, crop yields are somewhat limited during dry years in areas where the available water capacity is moderate.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage, but the underlying bedrock limits the depth of cuts.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• The stones on the surface in some areas interfere with tillage, unless they are removed.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• The stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Rock fragments and low strength
Management considerations:
• The stones on the surface may interfere with the use of machinery.
• Low strength also restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness

Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Interpretive Groups

Land capability classification: IVs in very stony areas; IIw in areas where surface stones have been removed
Woodland ordination symbol: 3W (sugar maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

MbB—Mahtomedi loamy sand, 0 to 6 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly convex or linear treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 100 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black loamy sand

Subsoil:
4 to 15 inches—dark brown coarse sand
15 to 20 inches—dark brown gravelly coarse sand

Substratum:
20 to 61 inches—strong brown, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The well drained Rosholt soils, which have a loamy mantle

Similar inclusions:
• Menahga soils, which have more sand and less gravel
• Soils that have a surface layer of coarse sand, sand, or loamy coarse sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Very high in the organic mat, moderately low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Proper scheduling of irrigation applications helps to

minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Soil blowing and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 8S (red pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: PVCr

MbC—Mahtomedi loamy sand, 6 to 12 percent slopes

Setting

Landform: Stream terraces
Landscape position: Risers
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 50 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black loamy sand

Subsurface layer:
4 to 6 inches—brown sand

Subsoil:
6 to 21 inches—reddish brown coarse sand
21 to 33 inches—reddish brown gravelly coarse sand

Substratum:
33 to 61 inches—brown, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The well drained Rosholt soils, which have a loamy mantle
• Gently sloping areas of Mahtomedi soils

Similar inclusions:
• Menahga soils, which have more sand and less gravel
• Soils that have a surface layer of coarse sand, sand, or loamy coarse sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Very high in the organic mat, moderately low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Properly scheduling irrigation, reducing chemical application rates, and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land. The slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 8S (red pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: PVCr

McA—Maplehurst silt loam, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly concave treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 40 acres

Representative Profile

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

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

Subsoil:
16 to 25 inches—yellowish brown and pale brown, mottled silt loam
25 to 44 inches—dark yellowish brown, mottled silt loam
44 to 47 inches—dark brown, mottled sandy loam

Substratum:
47 to 60 inches—yellowish brown, mottled, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Brander soils, which have a thinner silty mantle than the Maplehurst soil; on slightly convex or linear treads
• The poorly drained Rib soils, which have a thinner silty mantle than the Maplehurst soil; in depressions and drainageways

Similar inclusions:
• Poskin soils, which have a thinner silty mantle
• Soils that have a thicker silty mantle

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1 to 3 feet below the surface
Depth class: Very deep
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: High
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land uses: Cropland, woodland
Other use: Pasture

Cropland

Suitability: Well suited
Major management concerns: Wetness, poor tilth, and low strength
Management considerations:
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Loose sand enters the tile lines unless a suitable filter covers the tile.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.

• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (red maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

Me—Markey-Newson mucks, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Landscape position: Drainageways
Slope range: Markey—0 to 1 percent; Newson—0 to 2 percent
Shape of areas: Long and narrow
Size of areas: 6 to 60 acres

Representative Profile

Markey

Organic layer:
0 to 27 inches—black muck

Substratum:
27 to 60 inches—dark gray, stratified coarse sand and gravelly coarse sand

Newson

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 8 inches—black mucky sand

Subsoil:
8 to 25 inches—dark gray sand

Substratum:
25 to 36 inches—dark brown coarse sand
36 to 64 inches—yellowish brown, stratified coarse sand and gravelly coarse sand

Composition

Markey and similar soils: 40 to 55 percent
Newson and similar soils: 35 to 50 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Au Gres soils on slightly concave treads

Similar inclusions:
• Soils that have a surface layer of sand, mucky sand, or mucky peat

Soil Properties and Qualities

Drainage class: Markey—very poorly drained; Newson—poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Markey—moderately slow to moderately rapid in the organic material and rapid or very rapid in the sandy outwash; Newson—rapid or very rapid
Available water capacity: Markey—very high; Newson—low
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat
Other use: Woodland

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical pollution

Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Woodland

Suitability: Markey—generally unsuited because of excessive wetness and ponding (the Markey soil does not support trees of merchantable size or quality); Newson—suited
Major management concerns: Newson—equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Newson soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Newson soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Newson soil, the sandy layer near the surface can interfere with the traction of wheeled equipment, especially during dry periods.
• In areas of the Newson soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• In areas of the Newson soil, plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Newson soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Markey—poor filtering capacity, wetness, ponding, and subsidence; Newson—poor filtering capacity, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Cropland

Suitability: Markey—generally unsuited because of excessive wetness, ponding, and subsidence; Newson—generally unsuited because of excessive wetness and ponding

Dwellings

Suitability: Markey—generally unsuited because of excessive wetness, ponding, and subsidence; Newson—generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: Markey—Vw in undrained areas; Newson—VIw in undrained areas
Woodland ordination symbol: Markey—2W (quaking aspen); Newson—6W (jack pine)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Mf—Marshfield silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Landscape position: Depressions and drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 10 to 800 acres

Representative Profile

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

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

Subsoil:
14 to 30 inches—dark grayish brown, mottled silt loam
30 to 36 inches—grayish brown, mottled loam

Substratum:
36 to 60 inches—brown, mottled loam

Composition

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

Inclusions

Contrasting inclusions:
• The very poorly drained Beseman soils, which have an organic layer 16 to 51 inches thick

• The somewhat poorly drained Withee soils on footslopes and toeslopes

Similar inclusions:
• Auburndale soils, which have a thicker silty mantle
• Soils that have a surface layer of mucky silt loam
• Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Perched above or near the surface in undrained areas
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Content of organic matter: Uncultivated areas—very high in the organic layer, high or very high in the surface layer; cultivated areas—moderate to very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Wetness, ponding, and low strength
Management considerations:
• In undrained areas, the number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Poorly suited in drained areas; generally unsuited in other areas
Major management concerns: Nutrient and pesticide loss, wetness, ponding, poor tilth, low strength, and frost hazard
Management considerations:
• Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Leaving areas undrained provides habitat for wetland wildlife.
• The seasonal high water table usually delays spring planting for 2 to 3 weeks. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage. Some areas do not have a suitable outlet.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping

sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.
• In many areas the length of the growing season is severely limited by frost. In these areas, corn can be cut for silage or an early maturing variety of corn can be grown.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas; IIIw in drained areas
Woodland ordination symbol: 3W (white ash)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

MgB—Menahga loamy sand, 0 to 6 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly convex or linear treads
Shape of areas: Irregular
Size of areas: 4 to 40 acres

Representative Profile

Organic mat:
0 to 1 inch—dark grayish brown peat

Mineral surface layer:
1 to 4 inches—black loamy sand

Subsoil:
4 to 11 inches—dark brown loamy coarse sand
11 to 24 inches—dark brown and strong brown coarse sand

Substratum:
24 to 61 inches—strong brown coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The well drained Rosholt soils, which have a loamy mantle

Similar inclusions:
• Mahtomedi soils, which have more gravel and less sand
• Soils that have a surface layer of coarse sand, sand, or loamy coarse sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Very high in the organic layer, moderately low or moderate in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks

increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Proper scheduling of irrigation applications helps to minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive feature: Poor filtering capacity
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Soil blowing and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 8S (red pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: Not assigned

MmA—Merimod silt loam, 0 to 3 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Toeslopes
Shape of areas: Irregular
Size of areas: 4 to 70 acres

Representative Profile

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

Subsoil:
9 to 17 inches—dark yellowish brown and dark brown silt loam
17 to 29 inches—dark brown loam
29 to 32 inches—dark yellowish brown sandy loam

Substratum:
32 to 52 inches—yellowish brown sand that has thin strata of loamy sand
52 to 60 inches—brownish yellow, mottled sand

Composition

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

Inclusions

Contrasting inclusions:
• The well drained Merit soils
• The well drained Bilson soils, which have more sand in the surface layer and subsoil than the Merimod soil

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 3.5 to 6.0 feet below the surface

Depth class: Very deep
Permeability: Moderate in the silty and loamy alluvium and rapid in the siliceous sandy alluvium
Available water capacity: Moderate
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concern: Droughtiness
Management considerations:
• Crop yields are somewhat limited during dry years by the moderate available water capacity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.

Pasture

Suitability: Well suited
Major management concerns: None

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concern: The shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIs
Woodland ordination symbol: 4A (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: Not assigned

MnB—Merit silt loam, 0 to 6 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Toeslopes
Shape of areas: Irregular
Size of areas: 4 to 100 acres

Representative Profile

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

Subsoil:
8 to 20 inches—dark yellowish brown silt loam
20 to 30 inches—dark brown loam

Substratum:
30 to 60 inches—light yellowish brown sand

Composition

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

Inclusions

Contrasting inclusions:
• Bilson soils, which have more sand in the surface layer and subsoil than the Merit soil
• The moderately well drained Merimod soils

Similar inclusions:
• Soils that have a surface layer of loam
• Soils in which the sandy substratum has thin strata of loamy sand or sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth class: Very deep
Permeability: Moderate in the silty and loamy alluvium and rapid in the siliceous sandy alluvium
Available water capacity: Moderate
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concerns: Water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Crop yields are somewhat limited during dry years by the moderate available water capacity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
- Establishing a high-quality cover of grasses and legumes helps to control water erosion.
- Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
- Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and restricted permeability
Management considerations:
- Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Water erosion and cutbanks caving
Management considerations:
- Onsite investigation is needed.
- Seeding and mulching exposed areas can help to control water erosion during and after construction.
- In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: The shrink-swell potential and water erosion
Management considerations:
- Onsite investigation is needed.
- Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
- Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: Not assigned

MoB—Merit-Gardenvale silt loams, 1 to 6 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 10 to 200 acres

Representative Profile

Merit

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

Subsoil:
9 to 12 inches—dark yellowish brown silt loam
12 to 30 inches—dark brown loam

Substratum:
30 to 60 inches—strong brown sand

Gardenvale

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

Subsoil:
8 to 26 inches—dark brown silt loam
26 to 30 inches—brown sandy loam

Substratum:
30 to 50 inches—reddish yellow fine sand

Bedrock:
50 to 60 inches—reddish yellow, weakly cemented sandstone

Composition

Merit and similar soils: 45 to 55 percent
Gardenvale and similar soils: 35 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
- The very deep Bilson soils, which have more sand in the surface layer and subsoil than the major soils
- The moderately deep Elevasil soils, which have more sand in the surface layer and subsurface layer than the major soils; in the more convex areas

Similar inclusions:
- Soils that have a surface layer of loam

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Merit—very deep; Gardenvale—deep to soft sandstone
Permeability: Merit—moderate in the silty and loamy alluvium and rapid in the siliceous sandy alluvium; Gardenvale—moderate in the silty and loamy alluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Available water capacity: Moderate
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, droughtiness, and nutrient and pesticide loss
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion in the more sloping areas.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Crop yields are somewhat limited during dry years by the moderate available water capacity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concern: Plant competition
Management considerations:
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
- Establishing a high-quality cover of grasses and legumes helps to control water erosion.
- Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
- Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Merit—poor filtering capacity and restricted permeability; Gardenvale—poor filtering capacity, restricted permeability, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Water erosion and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: The shrink-swell potential and water erosion
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A (northern red oak)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: Not assigned

MpA—Merrillan fine sandy loam, 0 to 3 percent slopes

Setting

Landform: Pediments
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 100 acres

Representative Profile

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

Subsurface layer:
9 to 11 inches—brown sandy loam

Subsoil:
11 to 15 inches—dark brown sandy loam
15 to 22 inches—dark brown, mottled sandy loam
22 to 30 inches—light brownish gray, mottled clay loam
30 to 36 inches—pale red and reddish brown, mottled clay loam

Bedrock:
36 to 60 inches—interbedded light gray sandstone and pale red shale

Composition

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

Inclusions

Contrasting inclusions:
• Fairchild soils, which have a sandy mantle
• The moderately well drained Humbird soils on summits and shoulders
• Kert soils, which have a silty mantle
• The poorly drained Veedum soils, which have a silty mantle; in depressions and drainageways

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

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 2 feet
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low
Content of organic matter: Cultivated areas—moderately low or moderate in the surface layer; uncultivated areas—very high in the organic layer, moderate or high in the surface layer

Use and Management

Dominant land use: Cropland

Other uses: Pasture, woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, wetness, and poor tilth
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• If the water table is lowered, crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• A surface drainage system can help remove excess surface water and minimize soil wetness. The underlying bedrock limits the depth of open ditches.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Pasture

Suitability: Well suited
Major management concerns: Soil blowing and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Low strength restricts the use of machinery.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: PVHa
Secondary forest habitat type: PVRh

MrA—Merrillan-Veedum complex, 0 to 3 percent slopes

Setting

Landform: Pediments
Landscape position: Merrillan—footslopes and toeslopes; Veedum—depressions and drainageways
Slope range: Merrillan—0 to 3 percent; Veedum—0 to 2 percent
Shape of areas: Irregular
Size of areas: 6 to 1,500 acres

Representative Profile

Merrillan

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 3 inches—black fine sandy loam

Subsurface layer:
3 to 6 inches—grayish brown fine sandy loam

Subsoil:
6 to 11 inches—dark brown sandy loam
11 to 13 inches—dark brown, mottled sandy loam
13 to 21 inches—yellowish brown, mottled sandy loam
21 to 30 inches—pinkish gray, mottled clay loam

Bedrock:
30 to 60 inches—interbedded very pale brown sandstone and light gray shale

Veedum

Surface layer:
0 to 5 inches—black muck

Subsurface layer:
5 to 7 inches—black silt loam

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

Subsoil:
9 to 20 inches—gray, mottled silt loam
20 to 26 inches—grayish brown, mottled clay loam

Bedrock:
26 to 60 inches—interbedded gray sandstone and dark red shale

Composition

Merrillan and similar soils: 45 to 60 percent
Veedum and similar soils: 30 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Citypoint soils, which have an organic layer 16 to 51 inches thick
• The poorly drained Elm Lake soils, which have a sandy mantle
• The moderately well drained Humbird soils on summits and shoulders
• The somewhat poorly drained Kert soils, which have a silty mantle

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

Soil Properties and Qualities

Drainage class: Merrillan—somewhat poorly drained; Veedum—poorly drained
Seasonal high water table: Merrillan—perched at a depth of 1 to 2 feet; Veedum—perched above or near the surface
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Merrillan—moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale; Veedum—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Merrillan—low; Veedum—low or moderate
Content of organic matter: Merrillan—very high in the organic layer, moderate or high in the surface layer; Veedum—very high in the surface layer

Use and Management

Dominant land uses: Woodland, pasture
Other uses: Wetland wildlife habitat, cropland

Woodland

Suitability: Suited
Major management concerns: Merrillan—equipment limitation, windthrow hazard, and plant competition; Veedum—equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. In areas of the Veedum soil, reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Veedum soil, seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Pasture

Suitability: Merrillan—well suited; Veedum—poorly suited
Major management concerns: Merrillan—soil blowing and low strength; Veedum—soil blowing, wetness, ponding, and low strength

Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• In areas of the Veedum soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Veedum soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Veedum soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.
• In areas of the Merrillan soil, low strength restricts the use of machinery.

Wetland wildlife habitat

Suitability: Merrillan—generally unsuited because of insufficient moisture; Veedum—suited in undrained areas
Major management concerns: Veedum—excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas of the Veedum soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• In areas of the Veedum soil, maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas of the Veedum soil, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Cropland

Suitability: Merrillan—moderately well suited; Veedum—poorly suited in drained areas and generally unsuited in other areas
Major management concerns: Merrillan—soil blowing, droughtiness, wetness, poor tilth, and low strength; Veedum—droughtiness, nutrient and pesticide loss, wetness, ponding, low strength, and frost hazard
Management considerations:
• In areas of the Merrillan soil, field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• If the water table is lowered in areas of these soils, crop yields are limited during most years by the limited available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• In areas of the Veedum soil, reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Leaving areas of the Veedum soil undrained provides habitat for wetland wildlife.
• In areas of the Veedum soil, the seasonal high water table usually delays spring planting for 2 to 3 weeks. Adequate drainage is needed for dependable crop production.
• In areas of the Veedum soil, a surface drainage system can help remove excess surface water and minimize the soil wetness and crop damage caused by seasonal ponding. The underlying bedrock limits the depth of open ditches.
• In areas of the Merrillan soil, the seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• In areas of the Merrillan soil, a surface drainage system can help remove excess surface water and minimize soil wetness. The underlying bedrock limits the depth of open ditches.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• In areas of the Merrillan soil, leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.
• In many areas of the Veedum soil, the length of the growing season is severely limited by frost.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Merrillan—restricted permeability, wetness, and depth to rock; Veedum—restricted permeability, wetness, ponding, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Merrillan—poorly suited; Veedum—

generally unsuited because of excessive wetness and ponding
Major management concerns: Merrillan—wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• In areas of the Merrillan soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In areas of the Merrillan soil, seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: Merrillan—IIIw; Veedum—VIw in undrained areas and IIIw in drained areas
Woodland ordination symbol: Merrillan—4W (northern red oak); Veedum—1W (white ash)
Primary forest habitat type: PVHa
Secondary forest habitat type: PVRh

MxA—Moppet-Fordum complex, 0 to 3 percent slopes

Setting

Landform: Flood plains
Slope range: Moppet—0 to 3 percent; Fordum—0 to 2 percent
Shape of areas: Long and narrow
Size of areas: 20 to 200 acres

Representative Profile

Moppet

Surface layer:
0 to 5 inches—dark brown fine sandy loam

Subsoil:
5 to 30 inches—dark brown fine sandy loam
30 to 35 inches—dark yellowish brown, mottled sandy loam
35 to 39 inches—yellowish brown, mottled loamy sand

Substratum:
39 to 60 inches—yellowish brown, mottled sand with thin strata of fine sand

Fordum

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

Substratum:
9 to 23 inches—grayish brown, mottled loam
23 to 28 inches—very dark gray, mottled sandy loam with thin strata of loam
28 to 60 inches—dark grayish brown, stratified gravelly coarse sand and coarse sand

Composition

Moppet and similar soils: 45 to 60 percent
Fordum and similar soils: 30 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Markey soils, which have an organic layer 16 to 51 inches thick

Similar inclusions:
• Soils that have a surface layer of loamy sand, sandy loam, or loam

Soil Properties and Qualities

Drainage class: Moppet—moderately well drained; Fordum—poorly drained
Seasonal high water table: Moppet—2.5 to 3.5 feet below the surface; Fordum—above or near the surface
Depth class: Very deep
Permeability: Moppet—moderate in the loamy alluvium and rapid in the sandy alluvium; Fordum—moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy alluvium
Available water capacity: Moderate
Content of organic matter: Moppet—very high in the organic layer, moderate in the surface layer; Fordum—very high in the organic layer, high or very high in the surface layer
Frequency of flooding: Moppet—occasional; Fordum—frequent
Duration of flooding: Moppet—very brief; Fordum—brief

Use and Management

Dominant land use: Woodland
Other uses: Pasture, wetland wildlife habitat

Woodland

Suitability: Suited
Major management concerns: Moppet—equipment limitation and plant competition; Fordum—equipment limitation, windthrow hazard, plant competition, and seedling mortality

Management considerations:
• In areas of the Fordum soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Fordum soil, planting and harvesting are limited during periods of flooding. The seedling mortality rate may be high unless protection from flooding is provided.
• In areas of the Moppet soil, planting and harvesting are limited during periods of flooding.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Fordum soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Fordum soil, seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Pasture

Suitability: Moppet—well suited; Fordum—poorly suited
Major management concerns: Moppet—soil blowing and nutrient and pesticide loss; Fordum—nutrient and pesticide loss, wetness, ponding, flooding, and low strength
Management considerations:
• In areas of the Moppet soil, establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• In areas of the Moppet soil, overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Flood-control measures help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and applying phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• In areas of the Fordum soil, the number of suitable forage plants is limited by the seasonal high water table.
• In areas of the Fordum soil, establishing or maintaining an improved pasture is difficult because of the ponding and the flooding.
• In areas of the Fordum soil, low strength restricts the use of machinery.

Wetland wildlife habitat

Suitability: Moppet—generally unsuited because of insufficient moisture; Fordum—suited in undrained areas
Major management concerns: Fordum—excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas of the Fordum soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• In areas of the Fordum soil, maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas of the Fordum soil, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Cropland

Suitability: Generally unsuited because of excessive wetness, ponding, and flooding

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Moppet—poor filtering capacity, restricted permeability, wetness, and flooding; Fordum—poor filtering capacity, restricted permeability, wetness, ponding, and flooding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Moppet—generally unsuited because of flooding; Fordum—generally unsuited because of excessive wetness, ponding, and frequent flooding

Interpretive Groups

Land capability classification: Moppet—IIIw; Fordum—VIw
Woodland ordination symbol: Moppet—3L (red maple); Fordum—2W (silver maple)
Primary forest habitat type: ArDe-V
Secondary forest habitat type: PVCr

NeB—Newood sandy loam, 2 to 6 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 80 acres

Representative Profile

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

Subsoil (upper part):
9 to 16 inches—dark brown sandy loam

Next layer:
16 to 39 inches—brown and dark brown sandy loam

Subsoil (lower part):
39 to 50 inches—reddish brown, mottled gravelly sandy loam
50 to 62 inches—reddish brown sandy loam

Substratum:
62 to 65 inches—reddish brown, dense and compact sandy loam

Composition

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

Inclusions

Contrasting inclusions:
- Freeon soils, which have a silty mantle
- Sloping areas of Newood soils
- The somewhat poorly drained Magnor soils on footslopes and toeslopes

Similar inclusions:
- Soils that have a surface layer of fine sandy loam, loam, or silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet
Depth class: Deep or very deep to dense loamy glacial till
Permeability: Moderate in the upper part of the loamy till, slow in the middle part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate
Content of organic matter in the surface layer: Moderately low or moderate
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited in areas where surface stones have been removed; poorly suited in other areas
Major management concerns: Water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and rock fragments
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
- Crop yields are somewhat limited during dry years by the moderate available water capacity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
- The stones on the surface in some areas interfere with tillage, unless they are removed.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- The stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.

• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Water erosion, soil blowing, nutrient and pesticide loss, and rock fragments
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface may interfere with the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Well suited
Major management concerns: Water erosion and soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs in very stony areas; IIe in areas where surface stones have been removed
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

NeC—Newood sandy loam, 6 to 15 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Backslopes and shoulders
Shape of areas: Irregular
Size of areas: 4 to 60 acres

Representative Profile

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

Subsoil (upper part):
8 to 15 inches—dark brown sandy loam

Next layer:
15 to 38 inches—brown and dark brown sandy loam

Subsoil (lower part):
38 to 50 inches—reddish brown, mottled gravelly sandy loam
50 to 61 inches—reddish brown sandy loam

Substratum:
61 to 65 inches—reddish brown, dense and compact sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• Freeon soils, which have a silty mantle
• Gently sloping areas of Newood soils

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet

Depth class: Deep or very deep to dense loamy glacial till
Permeability: Moderate in the upper part of the loamy till, slow in the middle part of the loamy till, and very slow in the lower part of the loamy till
Available water capacity: Moderate
Content of organic matter in the surface layer: Moderately low or moderate
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited in areas where surface stones have been removed; generally unsuited in other areas
Major management concerns: Water erosion, soil blowing, droughtiness, nutrient and pesticide loss, and rock fragments
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are somewhat limited during dry years by the moderate available water capacity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• The stones on the surface in some areas interfere with tillage, unless they are removed.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope and the stones on the surface limit the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• The stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Water erosion, soil blowing, nutrient and pesticide loss, and rock fragments
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface may interfere with the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, slope, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to

control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: VIs in very stony areas; IIIe in areas where surface stones have been removed
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

NmC—Newood-Magnor-Cathro complex, 0 to 15 percent slopes, very stony

Setting

Landform: Moraines
Landscape position: Newood—summits, shoulders, and backslopes; Magnor—footslopes and toeslopes; Cathro—shallow depressions
Slope range: Newood—2 to 15 percent; Magnor—0 to 4 percent; Cathro—0 to 1 percent
Shape of areas: Irregular
Size of areas: 10 to 500 acres

Representative Profile

Newood

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black sandy loam

Subsurface layer:
4 to 5 inches—grayish brown sandy loam

Subsoil (upper part):
5 to 15 inches—dark brown sandy loam

Next layer:
15 to 38 inches—brown and dark brown sandy loam

Subsoil (lower part):
38 to 46 inches—reddish brown, mottled gravelly sandy loam
46 to 63 inches—reddish brown sandy loam

Substratum:
63 to 65 inches—reddish brown sandy loam

Magnor

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black silt loam

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

Subsoil:
9 to 26 inches—yellowish brown and brown, mottled silt loam
26 to 60 inches—reddish brown, mottled gravelly sandy loam

Substratum:
60 to 65 inches—reddish brown sandy loam

Cathro

Organic layer:
0 to 4 inches—dark brown mucky peat
4 to 24 inches—black muck
24 to 30 inches—black muck with 30 percent mineral content

Substratum:
30 to 60 inches—dark gray, mottled silt loam with thin strata of fine sandy loam and loam

Composition

Newood and similar soils: 35 to 45 percent
Magnor and similar soils: 25 to 35 percent
Cathro and similar soils: 15 to 25 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The poorly drained Capitola soils, which do not have a dense loamy substratum
• The moderately well drained Freeon soils, which have a silty mantle

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

Soil Properties and Qualities

Drainage class: Newood—moderately well drained;

Magnor—somewhat poorly drained; Cathro—very poorly drained

Seasonal high water table: Newood—perched at a depth of 2.5 to 3.5 feet; Magnor—perched at a depth of 1 to 3 feet; Cathro—above or near the surface

Depth class: Newood—deep or very deep to dense loamy glacial till; Magnor—deep to dense loamy glacial till; Cathro—very deep

Permeability: Newood—moderate in the upper part of the loamy till, slow in the middle part of the loamy till, and very slow in the lower part of the loamy till; Magnor—moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till; Cathro—moderately slow to moderately rapid in the organic material and moderately slow or moderate in the loamy deposits

Available water capacity: Newood—moderate; Magnor—moderate or high; Cathro—very high

Content of organic matter: Newood and Magnor—very high in the organic layer, moderate or high in the surface layer; Cathro—very high in the surface layer

Content of stones on the surface: Newood and Magnor—about 2 to 3 percent

Use and Management

Dominant land uses: Woodland, pasture
Other use: Wetland wildlife habitat

Woodland

Suitability: Newood and Magnor—suited; Cathro—generally unsuited because of excessive wetness and ponding (the Cathro soil does not support trees of merchantable size or quality)

Major management concerns: Newood—equipment limitation and plant competition; Magnor—equipment limitation, windthrow hazard, and plant competition

Management considerations:

• In areas of the Newood soil, the slope and the stones on the surface limit the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.

• In areas of the Magnor soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.

• In areas of the Newood and Magnor soils, the stones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.

• In areas of the Newood and Magnor soils, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.

• In areas of the Magnor soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.

• In areas of the Newood and Magnor soils, plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Newood and Magnor—well suited in areas where surface stones have been removed and moderately well suited in other areas; Cathro—generally unsuited because of excessive wetness, ponding, and the severe frost hazard

Major management concerns: Newood—water erosion, soil blowing, nutrient and pesticide loss, and rock fragments; Magnor—rock fragments and low strength

Management considerations:

• In areas of the Newood soil, establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.

• In areas of the Newood soil, overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.

• In areas of the Newood soil, reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

• In areas of the Newood and Magnor soils, the stones on the surface may interfere with the use of machinery.

• In areas of the Magnor soil, low strength restricts the use of machinery.

Cropland

Suitability: Generally unsuited because of excessive wetness, ponding, a scarcity of suitable drainage outlets, the severe frost hazard, and subsidence on the Cathro soil; a few small areas that consist mainly of Newood and Magnor soils may be cropped if the stones on the surface are removed.

Wetland wildlife habitat

Suitability: Newood and Magnor—generally unsuited because of insufficient moisture; Cathro—suited in undrained areas

Major management concerns: Cathro—excessive sedimentation, chemical and nutrient pollution

Management considerations:

• Leaving areas of the Cathro soil undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.

• In areas of the Cathro soil, maintaining a saturated condition and controlling sedimentation can help to protect wetlands. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.

• In cultivated areas of the Cathro soil, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Septic tank absorption fields

Severity of limitations: Severe

Major restrictive features: Newood—restricted permeability, wetness, and slope; Magnor—restricted permeability and wetness; Cathro—restricted permeability, wetness, ponding, and subsidence

Management considerations:

• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Newood—moderately well suited; Magnor—poorly suited; Cathro—generally unsuited because of excessive wetness, ponding, and subsidence

Major management concerns: Newood—wetness, slope, water erosion, and soil blowing; Magnor—wetness

Management considerations:

• Onsite investigation is needed.

• In areas of the Newood and Magnor soils, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

• In areas of the Newood soil, buildings can be designed so that they conform to the natural slope of the land or the slope can be modified by cutting and filling.

• In areas of the Newood soil, seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Newood—well suited in the less sloping areas and moderately well suited in the more sloping areas; Magnor—poorly suited; Cathro—generally unsuited because of excessive wetness, ponding, and subsidence

Major management concerns: Newood—slope, water erosion, and soil blowing; Magnor—wetness

Management considerations:

• Onsite investigation is needed.

• In areas of the Magnor soil, installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

• In areas of the Newood soil, buildings can be designed so that they conform to the natural slope of the land or the slope can be modified by cutting and filling.

• In areas of the Newood soil, seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: Newood—VIs in very stony areas and IIIe in areas where surface stones have been removed; Magnor—IVs in very stony areas and IIw in areas where surface stones have been removed; Cathro—VIw in undrained areas

Woodland ordination symbol: Newood—3L (sugar maple); Magnor—3W (red maple); Cathro—5W (balsam fir)

Primary forest habitat type: AH-Ci or AVb

Secondary forest habitat type: Not assigned

NoC—Northmound flaggy silt loam, 6 to 15 percent slopes, very stony

Setting

Landform: Monadnocks

Landscape position: Summits, shoulders, and backslopes

Shape of areas: Elongated

Size of areas: 6 to 40 acres

Representative Profile

Organic mat:

0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:

1 to 4 inches—very dark grayish brown flaggy silt loam

Subsoil:

4 to 8 inches—dark brown flaggy silt loam

8 to 24 inches—brown and dark yellowish brown very flaggy silt loam

24 to 30 inches—yellowish brown very flaggy loam

Bedrock:

30 inches—slightly fractured, light gray sandstone

Composition

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

Inclusions

Contrasting inclusions:
• Gently sloping areas of Northmound soils

Similar inclusions:
• Soils that have a surface layer of sandy loam, loam, flaggy sandy loam, or flaggy loam
• Soils that are more than 40 inches deep to bedrock

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Moderately deep to hard sandstone bedrock
Permeability: Moderate in the silty and loamy part and moderately slow or moderate in the bedrock
Available water capacity: Low or moderate
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land use: Woodland
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, plant competition, and seedling mortality
Management considerations:
• The slope, the stones on the surface, and the flagstones limit the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Hard bedrock limits the depth of cuts and interferes with the construction of haul roads and log landings.
• The stones and flagstones on the surface limit the use of equipment. Planting seedlings by hand or yarding the logs by cable may be necessary in some areas.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Well suited in areas where surface stones have been removed; moderately well suited in other areas
Major management concerns: Water erosion, droughtiness, nutrient and pesticide loss, and rock fragments
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas where the available water capacity is low. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface and the flagstones may interfere with the use of machinery.

Cropland

Suitability: Moderately well suited in areas where surface stones have been removed; generally unsuited in other areas
Major restrictive features: Water erosion, droughtiness, nutrient and pesticide loss, poor tilth, and rock fragments
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• In some areas the stones on the surface and the flagstones interfere with tillage, unless they are removed.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, slope, depth to rock, and rock fragments
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Slope, depth to rock, rock fragments, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling. The underlying hard bedrock, however, limits the depth of cuts. It can be excavated by blasting or using suitable power equipment.
• The stones and flagstones interfere with construction. They can be removed by mechanical means and replaced with coarse textured fill material.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Slope, depth to rock, rock fragments, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling. The underlying hard bedrock, however, limits the depth of cuts. The bedrock can be excavated by blasting or using suitable power equipment.
• The stones and flagstones interfere with construction. They can be removed by mechanical means, or, in the less sloping areas, coarse textured fill material can be added to raise the foundation.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: VIs in very stony areas; IIIe in areas where surface stones have been removed
Woodland ordination symbol: 3X (sugar maple)
Primary forest habitat type: AQVb-V
Secondary forest habitat type: Not assigned

NrF—Northmound-Rock outcrop complex, 15 to 50 percent slopes, very stony

Setting

Landform: Monadnocks (fig. 7)
Landscape position: Summits and side slopes
Shape of areas: Elongated
Size of areas: 10 to 100 acres

Representative Profile

Northmound

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 5 inches—black flaggy silt loam

Subsoil:
5 to 11 inches—dark yellowish brown flaggy silt loam
11 to 24 inches—dark yellowish brown and brown very flaggy silt loam
24 to 30 inches—dark yellowish brown very flaggy loam
Bedrock:
30 inches—slightly fractured, light gray sandstone

Composition

Northmound and similar soils: 60 to 75 percent
Rock outcrop: 15 to 30 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• Areas of Northmound soils that have slopes of less than 15 percent or more than 50 percent

Similar inclusions:
• Soils that have a surface layer of sandy loam, loam, flaggy sandy loam, or flaggy loam
• Soils that are more than 40 inches deep to bedrock

Properties and Qualities of the Northmound Soil

Drainage class: Well drained

Figure 7.—A wooded area of Northmound-Rock outcrop complex, 15 to 50 percent slopes, very stony, surrounded by gently sloping areas of Loyal silt loam.

Depth class: Moderately deep to hard sandstone
Permeability: Moderate in the silty and loamy part and moderately slow or moderate in the bedrock
Available water capacity: Low or moderate
Content of organic matter: Very high in the organic layer, moderate or high in the surface layer
Content of stones on the surface: About 2 to 3 percent

Use and Management

Dominant land use: Woodland
Other use: Pasture

Woodland

Suitability: Northmound—suited; Rock outcrop—generally unsuited
Major management concerns: Northmound—equipment limitation, erosion hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Northmound soil, the slope, the stones on the surface, and the flagstones limit the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• In areas of the Northmound soil, the slope, the stones on the surface, and the flagstones limit the use of conventional equipment. Special harvesting and planting methods, such as yarding the logs by cable and planting seedlings by hand, may be necessary.
• In areas of the Northmound soil, carefully locating

skid trails and building haul roads on the contour reduce the hazard of erosion and help to overcome equipment limitations.
• In areas of the Northmound soil, the hard bedrock limits the depth of cuts and interferes with the construction of haul roads and log landings.
• Bedrock outcrops and escarpments severely restrict the movement of logging equipment. Logging roads should be established in areas where these restrictions are not a concern.
• In areas of the Northmound soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Seeding and mulching exposed areas of the Northmound soil after logging, sloping road surfaces to remove runoff water, and installing water bars, culverts, and drop structures help to control erosion.
• In areas of the Northmound soil, plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Northmound soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Northmound—generally unsuited because of surface stones, the very steep slope, and the very severe hazard of water erosion; Rock outcrop—generally unsuited

Pasture

Suitability: Northmound—poorly suited; Rock outcrop—generally unsuited
Major management concerns: Northmound—water erosion, droughtiness, nutrient and pesticide loss, and rock fragments
Management considerations:
• The steeper slopes are generally limited to pasture of existing forage species. Maintaining a high-quality cover of pasture plants helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas where the available water capacity is low. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• The stones on the surface and the flagstones may interfere with the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Northmound—restricted permeability, slope, depth to rock, and rock fragments
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Northmound—poorly suited in the less sloping areas, generally unsuited in other areas; Rock outcrop—generally unsuited
Major management concerns: Northmound—slope, depth to rock, rock fragments, water erosion, and soil blowing
Management considerations:
• Onsite investigation is needed.
• In the less sloping areas of the Northmound soil, buildings can be designed so that they conform to the natural slope of the land. Also, the slope can be modified by cutting and filling. The underlying hard bedrock, however, limits the depth of cuts. The bedrock can be excavated by blasting or using suitable power equipment.
• In areas of the Northmound soil, the stones and flagstones interfere with construction. They can be removed by mechanical means and replaced with coarse textured fill material.
• In areas of the Northmound soil, seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: Northmound—VIIe; Rock outcrop—VIIIs
Woodland ordination symbol: Northmound—3R (sugar maple)
Primary forest habitat type: AQVb-V
Secondary forest habitat type: Not assigned

OeA—Oesterle loam, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly concave treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 30 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 6 inches—very dark brown loam

Subsoil:
6 to 12 inches—dark yellowish brown and brown, mottled loam
12 to 18 inches—brown, mottled loam
18 to 27 inches—brown, mottled sandy loam
27 to 37 inches—dark brown loamy coarse sand

Substratum:
37 to 61 inches—pale brown, stratified gravelly coarse sand and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• Poskin soils, which have a silty mantle
• The poorly drained Rib soils in depressions and drainageways
• The well drained Rosholt soils on slightly convex or linear treads

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

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1 to 3 feet below the surface
Depth class: Very deep
Permeability: Moderate in the loamy alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Low or moderate
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—moderate in the surface layer

Use and Management

Dominant land uses: Woodland, cropland
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Cropland

Suitability: Well suited
Major management concerns: Droughtiness, wetness, poor tilth, and low strength
Management considerations:
• If the water table is lowered, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Loose sand enters the tile lines unless a suitable filter covers the tile.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (red maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

PeA—Pelkie-Winterfield loamy fine sands, 0 to 3 percent slopes

Setting

Landform: Flood plains
Shape of areas: Long and narrow
Size of areas: 6 to 300 acres

Representative Profile

Pelkie

Surface layer:
0 to 4 inches—very dark grayish brown loamy fine sand

Substratum:
4 to 26 inches—dark brown and yellowish brown fine sand
26 to 38 inches—light yellowish brown sand
38 to 60 inches—light yellowish brown, mottled sand

Winterfield

Surface layer:
0 to 7 inches—dark brown loamy fine sand

Substratum:
7 to 31 inches—dark yellowish brown, mottled fine sand
31 to 60 inches—yellowish brown, mottled sand

Composition

Pelkie and similar soils: 35 to 55 percent
Winterfield and similar soils: 35 to 55 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The poorly drained Fordum soils, which formed in loamy alluvium underlain by sandy alluvium
• The excessively drained Menahga soils on slightly convex or linear treads of stream terraces

Similar inclusions:
• Soils that have a surface layer of fine sand, loamy sand, sandy loam, or fine sandy loam

Soil Properties and Qualities

Drainage class: Pelkie—moderately well drained; Winterfield—somewhat poorly drained
Seasonal high water table: Pelkie—2.5 to 3.5 feet below the surface; Winterfield—0.5 foot to 3.0 feet below the surface
Depth class: Very deep
Permeability: Rapid
Available water capacity: Low
Content of organic matter: Pelkie—very high in the organic layer, moderately low in the surface layer; Winterfield—very high in the organic layer, moderate in the surface layer
Frequency of flooding: Occasional
Duration of flooding: Pelkie—very brief; Winterfield—brief

Use and Management

Dominant land use: Woodland

Woodland

Suitability: Suited
Major management concerns: Pelkie—plant competition and seedling mortality; Winterfield—equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Winterfield soil, wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Planting and harvesting are limited during periods of flooding.

• In areas of the Winterfield soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Winterfield soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, wetness, and flooding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of flooding

Interpretive Groups

Land capability classification: Pelkie—IVs; Winterfield—IVw
Woodland ordination symbol: Pelkie—3A (sugar maple); Winterfield—6W (quaking aspen)
Primary forest habitat type: PVGy or PVHa
Secondary forest habitat type: Not assigned

Pg—Pits

Setting

Landform: Stream terraces and kames
Shape of areas: Irregular
Size of areas: 4 to 120 acres

Representative Area

• This map unit consists of pits from which sand and gravel or weathered bedrock has been removed to a depth of at least several feet and includes adjacent areas where sand, gravel, or other soil material has been stockpiled. Typically, the actively mined pits are not vegetated. Abandoned pits are covered with trees, brush, and weeds. The material remaining on the bottom and sidewalls is sand and gravel; weathered, soft sandstone; or gravelly and sandy material weathered from coarse grained granite, which is locally known as “rotten granite.”

Composition

Pits: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Areas of water
• Piles of discarded nonsoil material, such as old machinery or stones and boulders that are too large to be crushed
• Access roads and buildings

Use and Management

Dominant land use: Actively excavated gravel pits
Other use: Some pits have been abandoned and are covered with trees, brush, and weeds, which provide good wildlife habitat (fig. 8).
Note: Because of the variable nature of this map unit, onsite investigation is necessary to determine suitability for any proposed use. Land shaping and the addition of suitable topsoil generally are required to establish a plant cover.

Interpretive Groups

Land capability classification: VIIIs
Woodland ordination symbol: Not assigned
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

PoA—Plover very fine sandy loam, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly concave treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 40 acres

Representative Profile

Surface layer:
0 to 10 inches—very dark grayish brown, very friable very fine sandy loam

Subsurface layer:
10 to 17 inches—brown, mottled very fine sandy loam

Subsoil:
17 to 33 inches—yellowish brown and brown, mottled very fine sandy loam

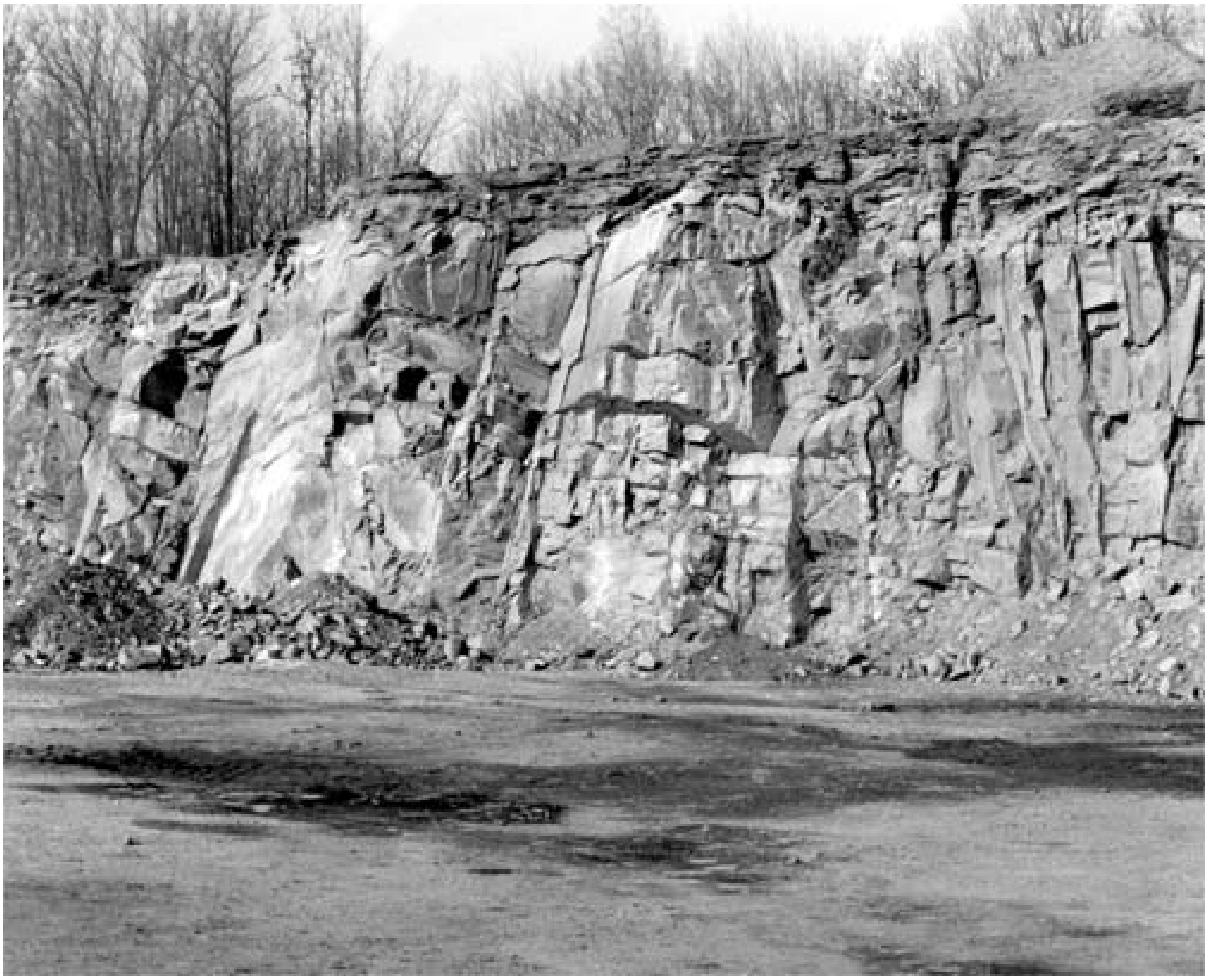

Figure 8.—An area of Pits from which granite and other igneous and metamorphic rocks are quarried.

Substratum:

33 to 60 inches—yellowish brown, mottled, stratified very fine sandy loam, very fine sand, and silt

Composition

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

Inclusions

Contrasting inclusions:

- The moderately well drained Aftad soils on slightly convex or linear treads
- Comstock soils, which are silty throughout
- The poorly drained Rib soils, which have a sandy substratum; in depressions and drainageways

Similar inclusions:

- Soils that have a surface layer of sandy loam, fine sandy loam, or loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1 to 3 feet below the surface
Depth class: Very deep
Permeability: Moderate
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Soil blowing, wetness, poor tilth, and low strength
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Poorly suited
Major management concerns: Wetness and soil blowing
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (red maple)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

Pv—Ponycreek-Dawsil complex, 0 to 2 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Depressions and drainageways
Slope range: Ponycreek—0 to 2 percent; Dawsil—0 to 1 percent
Shape of areas: Long and narrow
Size of areas: 10 to 60 acres

Representative Profile

Ponycreek

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 6 inches—black mucky sand

Subsoil:
6 to 26 inches—grayish brown sand

Substratum:
26 to 64 inches—brown sand

Dawsil

Organic layer:
0 to 4 inches—dark reddish brown mucky peat
4 to 30 inches—black muck

Substratum:
30 to 60 inches—dark brown sand

Composition

Ponycreek and similar soils: 45 to 60 percent
Dawsil and similar soils: 30 to 45 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Ironrun soils on toeslopes

Similar inclusions:
• Soils that have a surface layer of sand or mucky sand

Soil Properties and Qualities

Drainage class: Ponycreek—poorly drained; Dawsil—very poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Ponycreek—rapid or very rapid; Dawsil—moderately slow to moderately rapid in the organic material and rapid or very rapid in the siliceous sandy alluvium
Available water capacity: Ponycreek—low; Dawsil—very high
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land use: Wetland wildlife habitat
Other use: Woodland

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Limiting herbicide use in adjacent areas also helps to protect the habitat.

Woodland

Suitability: Ponycreek—suited; Dawsil—generally unsuited because of excessive wetness and ponding (the Dawsil soil does not support trees of merchantable size or quality)
Major management concerns: Ponycreek—equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• In areas of the Ponycreek soil, wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• In areas of the Ponycreek soil, ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• In areas of the Ponycreek soil, the sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• In areas of the Ponycreek soil, windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• In areas of the Ponycreek soil, plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Ponycreek soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Cropland

Suitability: Generally unsuited because of excessive wetness, ponding, extreme acidity, and the severe frost hazard

Pasture

Suitability: Ponycreek—poorly suited; Dawsil—generally unsuited because of excessive wetness, ponding, and the severe frost hazard
Major management concerns: Ponycreek—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength
Management considerations:
• In areas of the Ponycreek soil, establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• In areas of the Ponycreek soil, overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• In areas of the Ponycreek soil, reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• In areas of the Ponycreek soil, the number of suitable forage plants is limited by the seasonal high water table.

• In areas of the Ponycreek soil, establishing or maintaining an improved pasture is difficult because of the ponding.
• In areas of the Ponycreek soil, low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Ponycreek—poor filtering capacity, wetness, and ponding; Dawsil—poor filtering capacity, restricted permeability, wetness, ponding, and subsidence
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: Ponycreek—VIw in undrained areas; Dawsil—VIIw in undrained areas
Woodland ordination symbol: Ponycreek—6W (jack pine); Dawsil—2W (black spruce)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

PxA—Poskin silt loam, 0 to 3 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly concave treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 30 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—black silt loam

Subsurface layer:
4 to 6 inches—dark brown, mottled silt loam
6 to 14 inches—brown and yellowish brown, mottled silt loam

Subsoil:
14 to 28 inches—yellowish brown and light brownish gray, mottled silt loam
28 to 31 inches—yellowish brown, mottled sandy loam

Substratum:
31 to 61 inches—brown, mottled, stratified coarse sand and gravelly coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Brander soils on slightly convex or linear treads
• Oesterle soils, which have more sand in the surface layer and subsoil than the Poskin soil
• The poorly drained Rib soils in depressions and drainageways

Similar inclusions:
• Soils that have a thicker silty mantle
• Soils that have a surface layer of loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1 to 3 feet below the surface
Depth class: Very deep
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Moderate
Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—moderate in the surface layer

Use and Management

Dominant land uses: Woodland, cropland
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, and plant competition
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely

spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Cropland

Suitability: Well suited
Major management concerns: Droughtiness, wetness, and low strength
Management considerations:
• If the water table is lowered, crop yields are somewhat limited during dry years by the moderate available water capacity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Loose sand enters the tile lines unless a suitable filter covers the tile.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concerns: Wetness and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 3W (red maple)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

Py—Psammaquents, nearly level

Setting

Landform: Pediments
Landscape position: Depressions
Slope range: 0 to 1 percent
Shape of areas: Rectangular
Size of areas: 80 to 100 acres

Representative Profile

• Typically, Psammaquents are sandy. They have a wide range in color and in thickness of the individual layers. Generally, they consist of the lower part of sandy soils or the lower part of moderately deep organic soils from which the upper 20 to 40 inches has been removed to form cranberry beds.

Composition

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

Inclusions

Contrasting inclusions:
• Areas of dikes, ditches, small borrow pits, and reservoirs
• Access roads and buildings

Similar inclusions:
• Soils that have a surface layer of mucky sand

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Above or near the surface in undrained areas
Depth class: Very deep
Permeability: Rapid
Available water capacity: Low
Content of organic matter in the surface layer: Variable
Flooding: Frequently flooded on a controlled basis for brief periods

Use and Management

Dominant land use: Cranberry beds
Other use: Wetland wildlife habitat

Cropland

Suitability: Well suited to cranberries; not used for any other crops because of excessive wetness and frequent flooding
Major management concerns: Frost hazard

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture and woodland

Suitability: Generally unsuited because of excessive wetness and frequent flooding

Septic tank absorption fields and dwellings

Suitability: Generally unsuited because of excessive wetness and frequent flooding

Interpretive Groups

Land capability classification: VIw
Woodland ordination symbol: Not assigned
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Rb—Rib silt loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Landscape position: Depressions and drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 10 to 70 acres

Representative Profile

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

Subsoil:
7 to 27 inches—grayish brown, mottled silt loam
27 to 31 inches—brown, mottled loam

Substratum:
31 to 60 inches—dark brown, stratified gravelly coarse sand and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Poskin soils on slightly concave treads

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

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Above or near the surface
Depth class: Very deep
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Moderate
Content of organic matter: Very high in the organic mat, moderate to very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality

Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Wetness, ponding, and low strength
Management considerations:
• The number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity, restricted permeability, wetness, and ponding
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas
Woodland ordination symbol: 2W (red maple)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

RkA—Rockdam sand, 0 to 3 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Toeslopes
Shape of areas: Irregular
Size of areas: 4 to 40 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—very dark grayish brown sand

Subsurface layer:
4 to 9 inches—grayish brown sand

Subsoil:
9 to 13 inches—dark brown sand
13 to 21 inches—strong brown sand
21 to 35 inches—light yellowish brown sand

Substratum:
35 to 45 inches—brownish yellow sand
45 to 61 inches—brownish yellow, mottled sand

Composition

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

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Ironrun and excessively drained Simescreek and Tarr soils

Similar inclusions:
• Soils that have a surface layer of coarse sand

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 3.5 to 6.0 feet below the surface
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Very high in the organic mat, moderate or high in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Proper scheduling of irrigation applications helps to minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 6S (jack pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: PVCr

RoA—Rosholt sandy loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Landscape position: Slightly convex or linear treads
Shape of areas: Irregular or long and narrow
Size of areas: 4 to 80 acres

Representative Profile

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

Subsurface layer:
8 to 16 inches—brown and dark yellowish brown sandy loam

Subsoil:
16 to 24 inches—dark brown sandy loam
24 to 31 inches—dark brown gravelly sandy loam

Substratum:
31 to 60 inches—light yellowish brown, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
- The moderately well drained Brander soils, which have a silty mantle
- The excessively drained Mahtomedi and Menahga soils, which are sandy throughout

Similar inclusions:
- Soils that have a surface layer of loamy sand or loam
- Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Low or moderate
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concerns: Soil blowing and droughtiness
Management considerations:
- Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
- Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.

Pasture

Suitability: Well suited
Major management concerns: Soil blowing and droughtiness
Management considerations:
- Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
- Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
- Forage yields are limited during most years in areas where the available water capacity of the soil is low. Drought-tolerant species should be selected for planting.
- Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Soil blowing and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIs
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AQVb-V
Secondary forest habitat type: Not assigned

RoB—Rosholt sandy loam, 2 to 6 percent slopes

Setting

Landform: Kames and stream terraces
Landscape position: Convex treads
Shape of areas: Irregular
Size of areas: 4 to 80 acres

Representative Profile

Surface layer:
0 to 9 inches—dark brown sandy loam

Subsoil:
9 to 15 inches—dark yellowish brown and brown sandy loam
15 to 22 inches—strong brown sandy loam
22 to 30 inches—reddish brown gravelly sandy loam
30 to 34 inches—dark brown gravelly loamy sand

Substratum:
34 to 60 inches—strong brown, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
• The excessively drained Mahtomedi soils, which are sandy throughout
• Sloping areas of Rosholt soils

Similar inclusions:
• Soils that have a surface layer of loamy sand or loam
• Soils that are more than 40 inches deep to sand and gravel

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Low or moderate
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil

blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
• Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years in areas where the available water capacity of the soil is low. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Poor filtering capacity and restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concerns: Water erosion and soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AQVb-V
Secondary forest habitat type: Not assigned

RoC—Rosholt sandy loam, 6 to 12 percent slopes

Setting

Landform: Kames
Shape of areas: Irregular
Size of areas: 4 to 30 acres

Representative Profile

Surface layer:
0 to 8 inches—dark brown sandy loam

Subsoil:
8 to 14 inches—dark yellowish brown and brown sandy loam
14 to 20 inches—dark brown sandy loam
20 to 28 inches—reddish brown gravelly loamy sand

Substratum:
28 to 60 inches—strong brown, stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand

Composition

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

Inclusions

Contrasting inclusions:
- The excessively drained Mahtomedi soils, which are sandy throughout
- Gently sloping areas of Rosholt soils

Similar inclusions:
- Soils that have a surface layer of loamy sand or loam
- Soils that are more than 40 inches deep to sand and gravel

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy outwash
Available water capacity: Low or moderate
Content of organic matter in the surface layer: Moderately low or moderate

Use and Management

Dominant land use: Cropland
Other uses: Pasture, woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
- Crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
- Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
- Establishing a high-quality cover of grasses and legumes helps to control water erosion and soil blowing.
- Overgrazing depletes the plant cover, increases the hazards of water erosion and soil blowing, and increases the extent of undesirable plant species.
- Forage yields are limited during most years in areas where the available water capacity of the soil is low. Drought-tolerant species should be selected for planting.
- Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
- Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Septic tank absorption fields

Severity of limitations: Severe

Major restrictive features: Poor filtering capacity, restricted permeability, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Well suited in the less sloping areas; moderately well suited in the more sloping areas
Major management concerns: Slope, water erosion, soil blowing, and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion and soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AQVb-V
Secondary forest habitat type: Not assigned

RzB—Rozellville silt loam, 2 to 6 percent slopes

Setting

Landform: Ground moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 60 acres

Representative Profile

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

Subsurface layer:
9 to 13 inches—brown silt loam

Subsoil:
13 to 17 inches—dark brown and brown loam
17 to 33 inches—dark brown loam
33 to 38 inches—dark brown sandy loam

Substratum:
38 to 60 inches—brown gravelly sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Aftad soils, which formed in loamy lacustrine deposits; on slightly convex or linear treads of stream terraces
• The moderately well drained Loyal soils, which formed in loess or silty alluvium underlain by loamy glacial till
• Sloping areas of Rozellville soils

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

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Moderate
Major restrictive feature: Restricted permeability
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concern: Water erosion
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: The shrink-swell potential and water erosion
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

RzC—Rozellville silt loam, 6 to 12 percent slopes

Setting

Landform: Ground moraines
Landscape position: Backslopes and shoulders
Shape of areas: Irregular
Size of areas: 4 to 30 acres

Representative Profile

Organic mat:
0 to 1 inch—very dark grayish brown mucky peat

Mineral surface layer:
1 to 4 inches—very dark grayish brown silt loam

Subsoil:
4 to 14 inches—dark brown and brown silt loam
14 to 29 inches—dark brown loam
29 to 34 inches—dark brown sandy loam

Substratum:
34 to 61 inches—brown gravelly sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Loyal soils, which formed in loess or silty alluvium underlain by loamy glacial till
• Gently sloping areas of Rozellville soils

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

Soil Properties and Qualities

Drainage class: Well drained
Depth class: Very deep
Permeability: Moderate
Available water capacity: High

Content of organic matter: Uncultivated areas—very high in the organic layer, moderate or high in the surface layer; cultivated areas—moderate in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and poor tilth
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.

Septic tank absorption fields

Severity of limitations: Moderate
Major restrictive features: Restricted permeability and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Slope and water erosion
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 3L (sugar maple)

Primary forest habitat type: AVb
Secondary forest habitat type: Not assigned

ScA—Simescreek sand, 0 to 3 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Toeslopes
Shape of areas: Irregular
Size of areas: 5 to 600 acres

Representative Profile

Surface layer:
0 to 2 inches—very dark brown sand

Subsoil:
2 to 24 inches—dark yellowish brown sand
24 to 32 inches—yellowish brown sand

Substratum:
32 to 60 inches—yellow sand

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Rockdam soils

Similar inclusions:
• Soils that have a surface layer of coarse sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Very deep
Permeability: Rapid or very rapid
Available water capacity: Low
Content of organic matter: Very high in the organic mat, moderately low or moderate in the surface layer

Use and Management

Dominant land use: Woodland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Septic tank absorption fields

Suitability: Severe
Major management concern: Poor filtering capacity
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Soil blowing and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: 8S (eastern white pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: Not assigned

SrB—Spencer silt loam, 2 to 6 percent slopes

Setting

Landform: Ground moraines
Landscape position: Summits and shoulders
Shape of areas: Irregular
Size of areas: 4 to 250 acres

Representative Profile

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

Subsurface layer:
10 to 20 inches—brown and dark yellowish brown, mottled silt loam

Subsoil:
20 to 43 inches—yellowish brown and brown, mottled silt loam

Substratum:
43 to 60 inches—brown sandy loam

Composition

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

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Almena soils on footslopes and toeslopes
- Loyal soils, which have a thinner silty mantle than the Spencer soil
- Sloping areas of Spencer soils

Similar inclusions:
- Soils that have a thicker and/or darker surface layer

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, poor tilth, and low strength
Management considerations:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
- Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
- Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
- Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
- Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition
Management considerations:
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and low strength
Management considerations:
- Establishing a high-quality cover of grasses and legumes helps to control water erosion.
- Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
- Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
- Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
- Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, the shrink-swell potential, and water erosion
Management considerations:
- Onsite investigation is needed.
- Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
- Adding coarse textured material under and around

the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: The shrink-swell potential and water erosion
Management considerations:
• Onsite investigation is needed.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: Not assigned

SrC—Spencer silt loam, 6 to 12 percent slopes

Setting

Landform: Ground moraines
Landscape position: Backslopes and shoulders
Shape of areas: Irregular
Size of areas: 4 to 80 acres

Representative Profile

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

Subsurface layer:
9 to 11 inches—pale brown silt loam
11 to 19 inches—pale brown and brown, mottled silt loam

Subsoil:
19 to 33 inches—brown and pale brown, mottled silt loam
33 to 42 inches—brown, mottled silt loam

Substratum:
42 to 60 inches—brown, mottled sandy loam

Composition

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

Inclusions

Contrasting inclusions:
• The moderately eroded Loyal soils, which have a thinner silty mantle than the Spencer soil; on shoulders
• Gently sloping areas of Spencer soils

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

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: Perched at a depth of 2.5 to 3.5 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Available water capacity: High
Content of organic matter in the surface layer: Moderate

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Moderately well suited
Major management concerns: Water erosion, nutrient and pesticide loss, poor tilth, and low strength
Management considerations:
• A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and crop rotations that include close-growing crops reduce the hazard of water erosion.
• Grassed waterways, diversions, and grade-stabilization structures help to prevent gully erosion and erosion caused by concentrated flow.
• Measures that control water erosion help to protect the quality of the surface water by minimizing runoff into lakes and streams. Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates also help to protect the quality of the surface water.
• Leaving crop residue on the surface or regularly adding other organic material helps to maintain fertility and tilth and minimizes crusting.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and plant competition

Management considerations:
• The slope limits the selection of sites for log landings. Landings can be established on suitable nearly level or gently sloping adjacent or included soils.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

Pasture

Suitability: Well suited
Major management concerns: Water erosion, nutrient and pesticide loss, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control water erosion.
• Overgrazing depletes the plant cover, increases the hazard of water erosion, and increases the extent of undesirable plant species.
• Reducing chemical application rates and applying phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, and slope
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Moderately well suited
Major management concerns: Wetness, slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Dwellings without basements

Suitability: Moderately well suited
Major management concerns: Slope, the shrink-swell potential, and water erosion
Management considerations:
• Onsite investigation is needed.
• Buildings can be designed so that they conform to the natural slope of the land, or the slope can be modified by cutting and filling.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.
• Seeding and mulching exposed areas can help to control water erosion during and after construction.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 3L (sugar maple)
Primary forest habitat type: AH
Secondary forest habitat type: Not assigned

TrB—Tarr sand, 0 to 6 percent slopes

Setting

Landform: Pediments and stream terraces
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 50 acres

Representative Profile

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

Subsoil:
8 to 18 inches—dark brown sand
18 to 36 inches—brown sand

Substratum:
36 to 60 inches—yellow sand

Composition

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

Inclusions

Contrasting inclusions:
• The moderately deep Boone soils, which are underlain by sandstone; on the sloping summits and shoulders of hills
• The moderately well drained Rockdam soils
• Sloping areas of Tarr soils

Similar inclusions:
• Soils that have a surface layer of coarse sand or loamy sand

Soil Properties and Qualities

Drainage class: Excessively drained
Depth class: Very deep
Permeability: Rapid
Available water capacity: Low
Content of organic matter: Uncultivated areas—very high in the organic layer, moderately low or moderate in the surface layer; cultivated areas—low or moderately low in the surface layer

Use and Management

Dominant land use: Woodland
Other uses: Cropland, pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation and seedling mortality
Management considerations:
• The sandy surface layer can interfere with the traction of wheeled equipment, especially during dry periods.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Cropland

Suitability: Poorly suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop help to control soil blowing and prevent plant damage caused by windblown sand.
• Crop yields are limited during most years by the low available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and using split applications of nitrogen fertilizer at recommended rates during the growing season help to minimize losses caused by leaching and protect the quality of the ground water.
• Proper scheduling of irrigation applications helps to minimize the leaching of plant nutrients and other chemicals out of the root zone and into the underlying ground water.

Pasture

Suitability: Moderately well suited
Major management concerns: Soil blowing, droughtiness, and nutrient and pesticide loss
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• Forage yields are limited during most years by the low available water capacity. Drought-tolerant species should be selected for planting.
• Restricted grazing during dry periods helps to maintain a high-quality cover of pasture plants.
• Reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive feature: Poor filtering capacity
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Well suited
Major management concerns: Soil blowing and cutbanks caving
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.
• In excavated or cut-and-fill areas, stabilizing or sloping the cutbanks helps to minimize the safety hazard and the damage caused by caving.

Dwellings without basements

Suitability: Well suited
Major management concern: Soil blowing
Management considerations:
• Onsite investigation is needed.
• Seeding and mulching exposed areas can help to control soil blowing during and after construction.

Interpretive Groups

Land capability classification: IVs

Woodland ordination symbol: 8S (eastern white pine)
Primary forest habitat type: PVGy
Secondary forest habitat type: PVCr

Ve—Veedum silt loam, 0 to 2 percent slopes

Setting

Landform: Pediments
Landscape position: Depressions and drainageways
Shape of areas: Irregular
Size of areas: 4 to 100 acres

Representative Profile

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

Subsurface layer:
9 to 15 inches—dark grayish brown silt loam

Subsoil:
15 to 28 inches—light brownish gray, mottled loam
28 to 35 inches—gray, mottled silty clay loam

Bedrock:
35 to 60 inches—interbedded very pale brown sandstone and gray shale

Composition

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

Inclusions

Contrasting inclusions:
• The very poorly drained Citypoint soils, which have an organic layer 16 to 51 inches thick
• Elm Lake soils, which have a sandy mantle
• The somewhat poorly drained Kert soils on footslopes and toeslopes
• The somewhat poorly drained Merrillan soils, which do not have a silty mantle; on footslopes and toeslopes

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

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Perched above or near the surface in undrained areas
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Low or moderate
Content of organic matter: Uncultivated areas—very high in the organic layer, high or very high in the surface layer; cultivated areas—high or very high in the surface layer

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other uses: Pasture, cropland

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Wetness, ponding, and low strength
Management considerations:
• In undrained areas, the number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.
• Low strength restricts the use of machinery.

Cropland

Suitability: Poorly suited in drained areas; generally unsuited in other areas
Major management concerns: Droughtiness, nutrient and pesticide loss, wetness, ponding, low strength, and frost hazard
Management considerations:
• If the water table is lowered, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
• Crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
• Reducing chemical application rates and incorporating phosphorus fertilizer at recommended rates help to protect the quality of the surface water.
• Undrained areas provide wetland benefits.
• The seasonal high water table usually delays spring planting for 2 to 3 weeks. Adequate drainage is needed for dependable crop production.
• A surface drainage system can help remove excess surface water and reduce the soil wetness and crop damage caused by seasonal ponding. The underlying bedrock limits the depth of open ditches.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.
• In many areas the length of the growing season is severely limited by frost.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas; IIIw in drained areas
Woodland ordination symbol: 1W (white ash)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

Vs—Veedum-Elm Lake mucks, 0 to 2 percent slopes

Setting

Landform: Pediments
Landscape position: Drainageways
Shape of areas: Irregular or long and narrow
Size of areas: 10 to 200 acres

Representative Profile

Veedum

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 6 inches—black silt loam
6 to 10 inches—dark gray, mottled silt loam

Subsoil:
10 to 20 inches—dark gray, mottled silt loam
20 to 29 inches—dark gray, mottled silty clay loam

Bedrock:
29 to 60 inches—interbedded light brownish gray sandstone and light brownish gray shale

Elm Lake

Surface layer:
0 to 4 inches—black muck

Subsurface layer:
4 to 8 inches—black mucky sand

Subsoil:
8 to 14 inches—grayish brown sand

Substratum:
14 to 30 inches—light gray, mottled sand
30 to 38 inches—grayish brown, mottled loam

Bedrock:
38 to 60 inches—interbedded very pale brown sandstone and yellowish red and light brownish gray shale

Composition

Veedum and similar soils: 50 to 60 percent
Elm Lake and similar soils: 30 to 40 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
• The very poorly drained Citypoint soils, which have an organic layer 16 to 51 inches thick

Similar inclusions:
• Soils that have a surface layer of mucky peat

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Perched above or near the surface
Depth class: Moderately deep to interbedded sandstone and shale
Permeability: Veedum—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale; Elm Lake—rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Veedum—low or moderate; Elm Lake—low
Content of organic matter in the surface layer: Very high

Use and Management

Dominant land uses: Woodland, wetland wildlife habitat
Other use: Pasture

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength generally limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick. Reforestation is generally limited to natural regeneration or hand planting.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• In areas of the Veedum soil, seedling mortality can be minimized by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.
• In areas of the Elm Lake soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock on the crest of cradle-knolls or on prepared ridges.

Wetland wildlife habitat

Suitability: Suited in undrained areas
Major management concerns: Excessive sedimentation, chemical and nutrient pollution
Management considerations:
• Leaving areas undrained can provide wetland wildlife habitat, enhance water quality and ground-water recharge, and reduce the rates of runoff and sedimentation.
• Maintaining a saturated condition and controlling sedimentation can help to protect wetland areas. Following recommended nutrient and chemical management practices in adjacent areas also helps to protect the habitat.
• In cultivated areas, providing adjacent nesting cover can enhance the habitat for wetland wildlife.

Pasture

Suitability: Poorly suited
Major management concerns: Veedum—soil blowing, wetness, ponding, and low strength; Elm Lake—soil blowing, nutrient and pesticide loss, wetness, ponding, and low strength
Management considerations:
• Establishing a high-quality cover of grasses and legumes helps to control soil blowing.
• Overgrazing depletes the plant cover, increases the hazard of soil blowing, and increases the extent of undesirable plant species.
• In areas of the Elm Lake soil, reducing chemical application rates and applying nitrogen fertilizer at recommended rates help to minimize losses caused by leaching and protect the quality of the ground water.
• The number of suitable forage plants is limited by the seasonal high water table.
• Establishing or maintaining an improved pasture is difficult because of the ponding.

• Low strength restricts the use of machinery. Livestock hooves cut the soil and damage the plant cover.

Cropland

Suitability: Generally unsuited because of excessive wetness and ponding

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability, wetness, ponding, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings

Suitability: Generally unsuited because of excessive wetness and ponding

Interpretive Groups

Land capability classification: VIw in undrained areas
Woodland ordination symbol: Veedum—1W (white ash); Elm Lake—3W (red maple)
Primary forest habitat type: Not assigned
Secondary forest habitat type: Not assigned

WeA—Withee silt loam, 0 to 3 percent slopes

Setting

Landform: Ground moraines
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 4 to 1,000 acres

Representative Profile

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

Subsurface layer:
9 to 14 inches—brown, mottled silt loam
14 to 18 inches—pale brown and light yellowish brown, mottled silt loam

Subsoil:
18 to 24 inches—light brown and pale brown, mottled silt loam
24 to 47 inches—reddish brown, mottled loam

Substratum:
47 to 60 inches—reddish brown loam

Composition

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

Inclusions

Contrasting inclusions:
• The moderately well drained Loyal soils on summits and shoulders
• The poorly drained Marshfield soils in depressions and drainageways

Similar inclusions:
• Soils that have a thicker silty mantle
• Soils that have a substratum of sandy loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet
Depth class: Very deep
Permeability: Moderate in the silty part and moderately slow in the loamy till
Available water capacity: High
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Wetness, poor tilth, and low strength
Management considerations:
• The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
• Open ditches and tile drains remove excess surface water and improve internal drainage.
• Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
• Leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
• Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Equipment limitation, windthrow hazard, plant competition, and seedling mortality
Management considerations:
• Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
• Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
• Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
• Plant competition can be controlled by mechanical site preparation or limited use of herbicides.
• Seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Restricted permeability and wetness
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: AH-Ci
Secondary forest habitat type: Not assigned

WkA—Withee-Kert silt loams, 0 to 3 percent slopes

Setting

Landform: Withee—ground moraines; Kert—pediments
Landscape position: Footslopes and toeslopes
Shape of areas: Irregular
Size of areas: 6 to 300 acres

Representative Profile

Withee

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

Subsurface layer:
10 to 17 inches—pale brown, mottled silt loam
17 to 21 inches—pale brown and strong brown, mottled silt loam

Subsoil:
21 to 35 inches—brown and light yellowish brown, mottled silt loam
35 to 44 inches—brown, mottled loam

Substratum:
44 to 60 inches—reddish brown, mottled loam

Kert

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

Subsurface layer:
8 to 13 inches—brown silt loam
13 to 21 inches—brown and yellowish brown, mottled silt loam

Subsoil:
21 to 27 inches—yellowish brown and pale brown, mottled loam
27 to 31 inches—grayish brown, mottled loam

Bedrock:
31 to 60 inches—interbedded yellowish brown sandstone and reddish brown shale

Composition

Withee and similar soils: 50 to 65 percent
Kert and similar soils: 30 to 40 percent
Contrasting inclusions: 5 to 10 percent

Inclusions

Contrasting inclusions:
- The moderately well drained Hiles soils, which have a silty mantle over interbedded sandstone and shale; on summits and shoulders
- The moderately well drained Loyal soils, which have a silty mantle over loamy till; on summits and shoulders
- The poorly drained Marshfield soils, which have a silty mantle over loamy till; in depressions and drainageways
- The poorly drained Veedum soils, which have a silty mantle over interbedded sandstone and shale; in depressions and drainageways

Similar inclusions:
- Soils that have a thicker silty mantle
- Soils that have a substratum of sandy loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: Perched at a depth of 1 to 3 feet
Depth class: Withee—very deep; Kert—moderately deep to interbedded sandstone and shale
Permeability: Withee—moderate in the silty part and moderately slow in the loamy till; Kert—moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Available water capacity: Withee—high; Kert—low or moderate
Content of organic matter: Cultivated areas—moderate in the surface layer; uncultivated areas—very high in the organic layer, high or very high in the surface layer

Use and Management

Dominant land use: Cropland
Other uses: Woodland, pasture

Cropland

Suitability: Well suited
Major management concerns: Withee—wetness, poor tilth, and low strength; Kert—droughtiness, wetness, and low strength
Management considerations:
- If the water table is lowered in areas of the Kert soil, crop yields are limited during most years by the low or moderate available water capacity. Irrigation can improve productivity.
- In areas of the Kert soil, crop residue management, additions of organic material, conservation tillage, and field windbreaks increase the water-holding capacity and conserve moisture.
- The seasonal high water table may delay spring planting in wet years. Adequate drainage is needed for dependable crop production.
- Open ditches and tile drains remove excess surface water and improve internal drainage. In areas of the Kert soil, however, the underlying bedrock limits the depth of cuts.
- Grading ditchbanks and protecting them with a plant cover can help to prevent caving in and erosion caused by flowing water.
- In areas of the Withee soil, leaving crop residue on the surface, adding other organic material to the soil, minimizing tillage, tilling and harvesting at the proper soil moisture content, and including grasses and legumes in the cropping sequence help to prevent excessive compaction, minimize crusting, and maintain tilth.
- Low soil strength limits the use of farm equipment to periods when the soil is dry.

Woodland

Suitability: Suited
Major management concerns: Withee—equipment limitation, windthrow hazard, plant competition, and seedling mortality; Kert—equipment limitation, windthrow hazard, and plant competition
Management considerations:
- Wetness and low soil strength frequently limit access by machinery to the dry summer months or to periods when the soil is frozen or snow cover is thick.
- Ruts form easily on unsurfaced roads during wet periods. Log landings and haul roads can be stabilized with gravel.
- Windthrow can be minimized by using harvest methods that do not leave the remaining trees widely spaced. The periodic salvaging of windthrown trees may be necessary.
- Plant competition can be controlled by mechanical site preparation or limited use of herbicides.

• In areas of the Withee soil, seedling mortality can be minimized by using harvest methods that leave some mature trees to provide shade and protection and by planting vigorous nursery stock in the early spring, when the soil is moist.

Pasture

Suitability: Well suited
Major management concern: Low strength
Management considerations:
• Low strength restricts the use of machinery.

Septic tank absorption fields

Severity of limitations: Severe
Major restrictive features: Withee—restricted permeability and wetness; Kert—restricted permeability, wetness, and depth to rock
Management considerations:
• Onsite investigation is needed. The design of absorption fields should meet local and State guidelines.

Dwellings with basements

Suitability: Poorly suited
Major management concern: Wetness
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.

Dwellings without basements

Suitability: Poorly suited
Major management concerns: Wetness and the shrink-swell potential
Management considerations:
• Onsite investigation is needed.
• Installing a subsurface drainage system and adding fill material to raise the site elevation help to overcome the wetness.
• Adding coarse textured material under and around the foundation and properly reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4W (northern red oak)
Primary forest habitat type: PVHa
Secondary forest habitat type: Not assigned

Use and Management of the Soils

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

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

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

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment. 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

Donald C. Evenson, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

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

In 1989, about 472,000 acres in Clark County was used as farmland. Of this acreage, about 295,000 acres was cropland and the rest was pasture or woodland. About 95,000 acres was used for corn; 40,000 acres for small grain, mainly oats; 1,500 acres for soybeans; 147,000 acres for hay, mainly a mixture of alfalfa and grasses; and 200 acres for fruit and vegetable crops. Most of the farmland is in the northern, central, and eastern parts of the county.

The potential of the soils in Clark County for increased production of food is good. About 13,000 acres of potentially good cropland is used for pasture or is idle land, and about 21,000 acres is used as woodland (USDA, 1970). Food production could be increased considerably by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

The paragraphs that follow describe the main concerns affecting the management of the soils in Clark County for crops and pasture. These concerns include water erosion, wetness, fertility, and tilth.

Water erosion is the major management concern on about 50 percent of the cropland in the county. It generally is a hazard on soils that have slopes of more than about 4 percent.

When part of the surface layer is lost through erosion, several kinds of damage can occur. First, productivity is reduced as the surface layer is lost and part of the subsurface layer or subsoil is incorporated into the plow layer. The surface layer generally contains more organic matter than other parts of the soil. Second, the incorporation of material from the subsurface layer or subsoil can result in poor tilth and in the formation of a crust. This crusting can cause poor seed germination or poor seedling emergence. Third, erosion results in the pollution of streams, lakes, and wetlands by sediment and agricultural nutrients and pesticides. Erosion-control measures help to minimize this pollution and improve the quality of water for farm and municipal uses, for recreational uses, and for fish and wildlife.

Erosion-control measures provide a protective ground cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods can hold soil losses to an amount that does not reduce the productive capacity of the soils. A cropping sequence that includes grasses and legumes is a widely used conservation practice in Clark County. This practice reduces the hazard of erosion, provides nitrogen, and improves tilth.

Conservation tillage systems are very effective in reducing runoff and erosion and increasing the rate of water infiltration. Using a chisel plow, disk, or other type of noninversion tillage equipment can leave 30 to 50 percent of the surface covered by plant residue. A cover of residue helps to prevent surface puddling and crusting and the displacement and movement of soil particles. No-till planting is effective in controlling erosion because only a small slot is opened where the seed is planted and a residue cover of 50 to 90 percent is possible. Conservation tillage systems can be used on most of the soils in the county.

In Clark County, contour farming and contour stripcropping are used to control erosion on soils that have slopes of 4 to 20 percent. Contour stripcropping involves alternating strips of corn, soybeans, or small grain with strips of hay. This practice reduces the runoff rate, helps to control erosion, and increases the rate of water infiltration. Contour farming and contour stripcropping are well suited to moderately well drained and well drained soils used for the feed grain-hay rotations that are common in dairy farming (fig. 9).

Grassed waterways, both natural and constructed, are commonly used to control gully erosion. Constructed waterways are most needed on the broad and weakly dissected ground moraines of the Loyal-Withee-Marshfield association, which is described under the heading “General Soil Map Units.”

Terraces and diversions reduce the hazard of erosion by reducing the length of slopes and directing the runoff to stable outlets or waterways. These measures are not commonly used in Clark County because most erosion can be controlled with a combination of crop rotation, conservation tillage, and grassed waterways.

Soil blowing is not a significant hazard in Clark County. The soils most susceptible to soil blowing are sandy, loamy, and organic soils. In Clark County, these soils are mainly used as forest land or wetlands.

Information about the design of measures that control erosion and soil blowing on each soil in the county is provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service.

Wetness is the major management concern on about 25 percent of the acreage used for crops or pasture in the county. Some soils are naturally so wet that they generally cannot be used for the crops commonly grown in the county unless they are drained. These poorly drained soils include Auburndale, Barronett, Capitola, Marshfield, Rib, and Veedum soils. Unless drained, Almena, Comstock, Fallcreek, Magnor, Merrillan, Withee, and other somewhat poorly drained soils are wet enough that crops are damaged during most years.

The design of both surface and subsurface drainage systems varies, depending on the soil properties and the site conditions. A combination of surface and subsurface drains is needed in most areas of the poorly drained soils that are underlain by interbedded sandstone and shale. The somewhat poorly drained silt loams underlain by glacial till respond well to leveling and surface drains. Diversions are needed in some areas to remove runoff from the adjacent fields. In soils that are underlain by very fine sand or fine sand, a special covering is needed over the drainage tile. This covering helps to keep the sandy material in the lower part of the soil profile from filling and clogging the tile.

If organic soils are used as cropland, special management measures are necessary. These soils oxidize and subside when water is removed from the pores and the pores are filled with air. Drainage systems that control the depth and period of drainage are needed. Keeping the water table at the level required for crop growth during the growing season and raising it to the surface during other parts of the year minimize the oxidation and subsidence of these soils.

Further information about the design of drainage systems is provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service.

The fertility of the soils in Clark County varies, depending on natural fertility and cropping history. Most of the soils are naturally acid. Applications of lime are commonly needed to neutralize the acidity of these soils to the level required by the crop to be grown. Available phosphorus and potassium levels are naturally low or medium in most of the soils. On all

Figure 9.—Contour stripcropping is an important erosion-control measure in Clark County. These alternating strips of alfalfa and corn were planted on the contour. The corn has been harvested for silage.

soils, additions of lime or fertilizer should be based on the results of soil tests, the needs of the crop, and the desired level of yields. Fertilizer needs should be adjusted to accommodate the large quantity of dairy manure returned to the soil on most farms. The contamination of ground water by nitrates from fertilizer applications occurs in many wells in Clark County. Concentrations exceeding the maximum recommended amount of 10 milligrams per liter were detected in about 12 percent of the wells (Kammerer, 1984). The Cooperative Extension Service can help in determining the kinds and amounts of nutrients and lime to be applied.

Soil tilth is an important factor affecting the germination of seeds, the emergence of seedlings, and the infiltration of water into the soils. Soils that have good tilth are granular and porous. Tilling and grazing during wet periods can result in poor tilth in areas where the soils have a surface layer of loam or silt loam. Also, if the surface in these areas is left bare, puddles form during periods of heavy rainfall and a crust may develop as the soil dries out. This crust reduces the rate of water infiltration and increases the runoff rate and the hazard of erosion. It also restricts the germination of seeds of small grain, soybeans, alfalfa, and grasses and hinders seedling emergence. Maintaining tilth is especially difficult in areas of eroded soils. Returning crop residue to the soil, growing green manure crops, and regularly adding manure improve tilth and minimize crusting.

Field crops suited to the climate and to most of the soils in the county include corn, the most commonly grown row crop, and oats, the most commonly grown small grain crop. A limited acreage is used for soybeans, barley, or wheat.

The most commonly grown hay and pasture

species are mixtures of alfalfa and bromegrass or red clover and timothy. Bluegrass is the most common native cool-season pasture species.

Small acreages of specialty crops are grown commercially in the county. These include ginseng, sweet corn, peas, snap beans, strawberries, and apples. Most of the well drained soils are suited to these crops. Soils in low areas, where frost is frequent and air drainage is poor, are poorly suited to early vegetables, small fruits, and orchards. Cranberries are also grown in the county, generally on the wetter soils, such as Psammaquents. The latest information about growing specialty crops can be obtained from local offices of the Cooperative Extension Service.

Yields per Acre

Rodney Littlefield, crops and soils agent, University of Wisconsin Extension, helped prepare this section.

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 map units in the survey area also is shown in the table.

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

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

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

Crops other than those shown in table 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. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

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

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIs. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

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

Prime Farmland

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

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 498,964 acres in Clark County, or nearly 64 percent of the total land area, is prime farmland. Most of this land is in the northern and eastern parts of the county, mainly in associations 2, 3, 5, 6, and 11, which are described under the heading “General Soil Map Units.” Approximately 236,000 acres of this land is used for crops. The crops grown on prime farmland, mainly corn, soybeans, and alfalfa, account for an estimated three-quarters of the county’s total agricultural income each year.

The map units in Clark County that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Woodland Management and Productivity

Don Strieff, forester, Wisconsin Department of Natural Resources, helped prepare this section.

Before it was settled, the survey area consisted mostly of a conifer-hardwood forest (Curtiss, 1959). Logging activities and land clearing for agriculture or for other uses have removed most of the original old-growth forest. About 313,700 acres, or about 40 percent of the county, is currently forested. Most of this land is classified as commercial forest (Hahn, 1985). It is dominated by three forest types—aspen, which makes up about 134,100 acres; maple-birch (northern hardwood and red maple), about 65,500 acres; and oak-hickory (oak and scrub oak), about 61,100 acres. The rest of the forested acreage is elm-ash-soft maple, which makes up about 19,400 acres; paper birch, about 19,000 acres; and conifers (jack pine, red pine, and white pine), about 14,600 acres.

About 42 percent of the forest land is county or municipal forest, 32 percent is farm woodlots, and 23 percent is private forest. The rest is owned by corporations.

The aspen forest type is most common in soil associations 7, 8, and 11, which are described under the heading “General Soil Map Units.” The maple-birch type (northern hardwoods) is common in associations 1, 2, 3, and 5. The oak-hickory (oak-scrub oak) type is common in associations 1, 3, 6, and 10. Marginal oak stands are in associations 8 (fig. 10) and 9. The elm-ash-soft maple type is common in associations 4, 5, 6, 7, and 11. The paper birch type is common in association 6.

Forest fires are controlled by a well organized

Figure 10.—Pulpwood harvested in an area of Ludington-Fairchild sands, 0 to 6 percent slopes.

suppression system. The main management needs are harvesting mature hardwood timber and removing defective trees and trees of less valuable species. After harvest, stand treatment is needed to encourage proper forest reproduction. Also, many pine plantations in areas of sandy soils are now old enough to require pruning and thinning. Improved forest management is needed on the privately owned land.

The management needed for wood crops varies on different soils in the county. Management should be based on the species in the stand, the suitability of the soils for the species, and the objectives of the landowner. The best alternative generally is even-aged management, which in the past has proven acceptable for regenerating all hardwood species, including northern red oak. Even-aged management can also be used to favor white pine, red pine, and jack pine. Selective harvesting may be needed in stands that are converting to northern hardwood species and in certain stands of northern red oak. Management should include controlling erosion, planting trees where natural regeneration is unreliable, controlling plant competition, improving seedling survival, minimizing the windthrow hazard on the wetter sites, harvesting in a timely manner, controlling the damage caused by insects and diseases, removing cull trees and undesirable species, and maintaining an optimum stocking of forest stands through thinning or planting.

Erosion can occur as a result of site preparation and tree harvest if the soil is exposed along logging roads and skid trails and on landings. Burned areas also are subject to erosion. Erosion is accelerated where the runoff is concentrated on skid trails, log landings, and haul roads. Establishing water bars, outsloping or crowning the road surfaces, providing ditches and culverts, and establishing skid trails and haul roads on the contour minimize the hazard of erosion. Erosion also can be controlled by seeding areas where logging activities have exposed the surface soil. In Clark County, the moderately steep, steep, or very steep Boone, Council, Elevasil, Flambeau, Humbird, Ludington, Northmound, and Seaton soils are most susceptible to erosion.

If it is 15 percent or more, the slope may limit the use of forestry equipment. Equipment can be operated effectively if the design of skid trails, log landings, and haul roads conforms with the topography and if grades are kept as low as possible. Also, equipment with flotation tires or with tracks has better traction than standard wheeled equipment. Machine planting on moderately steep slopes is difficult. Reforestation on steep and very steep slopes is generally limited to hand planting or natural regeneration. Special harvesting systems, such as skidding and yarding with cable, are needed on very steep slopes. The slope is a management concern in areas of Boone, Council, Elevasil, Flambeau, Humbird, Ludington, Northmound, and Seaton soils.

Soil wetness is a result of a high water table, flooding, or ponding. It can increase the seedling mortality rate, limit the use of equipment, increase the extent of undesirable plants following harvest, and increase the windthrow hazard by restricting the rooting depth of some trees. Wetness is a problem in forested areas of poorly drained soils, including Auburndale, Barronett, Capitola, Elm Lake, Fordum, Marshfield, Newson, Ponycreek, Rib, and Veedum soils. Wetness is also a problem in forested areas of the somewhat poorly drained Almena, Au Gres, Comstock, Fairchild, Fallcreek, Ironrun, Kert, Magnor, Maplehurst, Merrillan, Oesterle, Plover, Poskin, Winterfield, and Withee soils. In most areas of these soils, trees can be harvested only when the ground is frozen or has an adequate snow cover or during periods of the growing season when the somewhat poorly drained or poorly drained soils are dried out. In areas of these wet soils, the traction of equipment can be improved if flotation tires or tracks are used and if log landings and haul roads are stabilized with gravel or crushed rock (fig. 11). Installing culverts in intermittent and perennial streams also helps to stabilize haul roads. In areas of poorly drained soils, wetness during the tree planting season limits most reforestation to natural regeneration or hand planting on cradle-knolls and in the small, drier included areas. Machine planting on prepared ridges is possible in a few areas. Selecting vigorous nursery stock for planting reduces the seedling mortality rate. Clearcutting or using area-selection or strip-cut harvest methods reduces the windthrow hazard for the remaining trees. Strip-cut harvest also promotes natural regeneration. Maintaining permanent haul roads in areas subject to windthrow facilitates the quick salvage of downed trees after storms. Competing vegetation, which interferes with natural regeneration following harvest, can be controlled by herbicides or by mechanical removal. Skidding can also destroy competing vegetation and expose sufficient mineral soil to allow rapid regeneration.

Soil droughtiness can cause seedling mortality. Seedling survival during dry periods can be improved by planting vigorous nursery stock if natural regeneration is unreliable and by early planting and proper care of nursery stock prior to planting. Reinforcement planting may be needed. Containerized seedlings may be desirable on very dry sites. Steep and very steep south- and west-facing slopes are especially droughty because of high temperatures and a rapid evaporation rate. Proper applications of lime and fertilizer may improve seedling survival but are generally not considered economically feasible. Sandy soils in Clark County that are subject to droughtiness include Arbutus, Boone, Mahtomedi, Menahga, Simescreek, and Tarr soils. Equipment with flotation tires or tracks has better traction in loose sand than standard wheeled equipment.

Some soils in Clark County that have slopes of less than 15 percent have properties that do not significantly limit or restrict their use and management for tree growth. These soils are Aftad, Bilson, Brander, Council, Crystal Lake, Elevasil, Flambeau, Freeon, Gardenvale, Hiles, Humbird, Loyal, Merimod, Merit, Moppet, Newood, Rosholt, Rozellville, and Spencer soils.

Tables 7 and 8 can help woodland owners or forest managers plan the use of soils for wood crops. Only those soils suitable for wood crops are listed. Table 7 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

Figure 11.—Soil wetness and low strength limit the use of harvesting equipment in this area of Merrillan-Veedum complex, 0 to 3 percent slopes.

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

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

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed also are subject to erosion.

Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

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

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

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

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

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

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

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

Table 8 gives information about the operation of forestry equipment in logging areas and on skid trails, log landings, and haul roads and for site preparation and planting, which includes row seeding. Ratings are given for the most limiting season. In Clark County, the most limiting season generally is spring. The ratings can also apply, however, during other excessively wet periods, such as after a heavy rainfall. The preferred operating seasons also are indicated. The preferred operating season is the period when the use of forestry equipment causes the least amount of soil damage. This period generally is when the soil is not too wet or when the ground is frozen.

The equipment limitations in the table reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland harvesting and regeneration activities. The chief characteristics and conditions considered in the ratings are soil wetness, the hazard of flooding, rock outcrops, texture of the surface layer, slope, depth to hard bedrock, traffic-supporting capacity (or soil strength), and the potential for frost action. Soils that have a moderate or high content of silt have low strength in the extended spring thaw period and during extended periods of high rainfall. Ruts can form easily in areas of these soils during these wet periods.

The ratings of *slight, moderate,* or *severe* in the table are based on the use of conventional equipment and procedures. Special procedures or types of equipment can sometimes be utilized to reduce or overcome the site limitations. If wetness is a limitation, for example, the use of high flotation equipment or tracked vehicles may prevent the formation of ruts. Restrictions on the use of equipment indicate the need for accurate timing of operations so that seasonal limitations can be avoided. The cost of operations generally increases as the limitations become more severe. The ratings for log landings and haul roads can be used as a guide for establishing them in the least costly locations.

Logging areas and skid trails include areas where some or all of the trees are being cut. Generally, equipment traffic is least intensive in the logging areas. Skid trails, which generally are within the logging area, are roads or trails over which the logs are dragged or hauled from the stump to a log landing. A rating of slight indicates that the use of conventional equipment is not normally restricted by the physical site conditions. A rating of moderate indicates that the use of equipment or the season of use is restricted because of one or more soil factors. A rating of severe indicates that special equipment or techniques are needed to overcome the limitations or that the time of efficient operation is very limited.

Log landings are areas where logs are assembled for transportation. Wheeled equipment may be used more frequently in these areas than in any other areas affected by logging. Considerable soil compaction can be expected in these areas. Good areas for landings require little or no surface preparation or cutting or filling. A rating of slight indicates that the soil is a good site for landings and the area can readily be returned to forest use. A rating of moderate indicates that the season of use is somewhat limited or that such practices as grading, cutting, filling, or drainage are usually required to make the site suitable for a landing and returning the site to forest use is difficult. A rating of severe indicates that the season of use is very limited or that special or expensive techniques are needed to overcome the limitations. There may also be significant risk of environmental damage that makes returning the area to forest use very difficult or impossible.

Haul roads are access roads leading from log landings to primary or surfaced roads. The haul roads serve as transportation routes for wheeled logging equipment. Generally, they are unpaved roads and are not graveled. The wetter soils and the silty upland soils, which are slippery and easily rutted during wet periods, commonly provide poor locations for haul roads. A rating of slight indicates that no serious limitations affect the location, construction, and maintenance of haul roads or the season of use. A rating of moderate indicates some limitations, but the limitations generally can be overcome with routine construction techniques. A rating of severe indicates that establishing and maintaining haul roads on that soil are difficult and expensive or that the season of use may be severely restricted.

Site preparation and planting are the mechanized operations for establishing planted trees in an area. The ratings are based on limitations that affect the efficient use of equipment and the risk of damage to the site caused by the equipment. Operating techniques should not displace or remove topsoil from the site or create channels that concentrate storm runoff. A rating of slight indicates that no serious limitations affect site preparation and planting. A rating of moderate indicates that the site conditions prevent the efficient use of the equipment or that the site may be damaged by the equipment. A rating of severe indicates that special equipment or techniques, such as hand planting of trees, are needed to overcome the limitations.

Additional information about woodland management and productivity can be obtained from the Wisconsin Department of Natural Resources, the local office of the Natural Resources Conservation Service, or the Cooperative Extension Service.

Forest Habitat Types

John Kotar, research scientist, and Timothy Burger, Department of Forestry, University of Wisconsin-Madison, helped prepare this section.

The forest habitat type system used in Clark County is derived from a field guide developed for northern Wisconsin (Kotar and others, 1988). The system of habitat classification is based on the concept that plants, including trees, normally occur in predictable patterns or communities and that these communities reflect differences in site characteristics, primarily the moisture content and fertility of the soils. A forest habitat type is an association of dominant tree and ground flora species in a climax plant community. It encompasses all soils capable of producing similar plant communities at climax, which is the stage of ecological development when the vegetative community becomes stable and perpetuates itself.

A habitat type can be identified during most stages of successional growth by examining the reproductive success of various tree species and by inspecting the ground flora, which becomes relatively stable soon after the establishment of a forest canopy. In a young forest, the patterns or associations of understory plants can be used to predict the dominant tree species in the climax forest.

The successional stages and trends also are predictable for the various habitat types. This predictability allows forest managers to make accurate prescriptions for manipulating vegetation based on the ecological potential of the soil rather than on the current forest cover type, which can vary depending largely on how the forest has been disturbed.

Habitat types have been determined for most of the soils in Clark County. They are specified at the end of each map unit description in the section “Detailed Soil Map Units.” Although soil map units do not coincide exactly with habitat types, there is a strong correlation between them. Some map units encompass two ecologically different habitat types. The assigned habitat types may be different in some small included areas.

Clark County was not sampled by a standardized plot method as part of the general study of the habitat types of Northern Wisconsin. Instead, floristic information, including presence and relative abundance of plant species, was gathered at more than 100 sites during the soil survey fieldwork. This method, while useful, does not allow for quantitative floristic assessment and comparison among the stands or the preparation of reliable constancy tables. Some of the habitat types in Clark County also are based on plot data collected in adjacent Jackson County.

The plot and floristic data collected in Jackson and Clark Counties provide the basis for the habitat types identified in Clark County. These habitat types are described in the following paragraphs. The name of each habitat type is derived from the potential climax vegetation. It represents a combination of potential climax tree species, which are listed first, and ground flora species.

PVHa—Pinus/Vaccinium-Hamamelis habitat type. The common name is White pine/Blueberry-Witch hazel. This habitat type has a dry moisture regime and a poor or medium nutrient status. White pine, red maple, and pin oak are the most common existing trees, but white oak, red oak, and aspen also occur. Conspicuously absent are sugar maple, basswood, white ash, and ironwood.

The understory is generally not dense and commonly includes serviceberry, huckleberry, mapleleaf viburnum, black cherry, blackberries and raspberries, witch hazel, and beaked hazel. Mapleleaf viburnum and witch hazel are strong indicators of this habitat type. The ground flora includes brackenfern, wild sarsaparilla, blueberries, wintergreen, sessile bellwort, and bigleaf aster.

AQVb-V—Acer saccharum-Quercus rubra/ Viburnum acerifolium (Vaccinium variant) habitat type. The common name is Sugar maple-Red oak/ Mapleleaf viburnum (Blueberry variant). This habitat type has a dry-mesic moisture regime and a medium nutrient status. Red oak, white oak, red maple, and aspen are the most common existing trees, but sugar maple, ironwood, white ash, basswood, and bitternut hickory also occur.

The understory commonly includes mapleleaf viburnum, beaked hazel or American hazel, witch hazel, black cherry, and ironwood. The ground flora is relatively poorly developed. The most common species are bigleaf aster, brackenfern, interrupted fern, roundlobed hepatica, wild sarsaparilla, blueberries, and wintergreen.

AVb—Acer saccharum/Viburnum acerifolium habitat type. The common name is Sugar maple/ Mapleleaf viburnum. This habitat type has a dry-mesic moisture regime and a rich nutrient status. Red oak, aspen, and basswood are the most common existing trees, but sugar maple, red maple, white ash, and ironwood also occur.

The understory commonly includes hazel, blue beech, mapleleaf viburnum, ironwood, and black cherry. The most common ground flora species are bigleaf aster, wild geranium, hog peanut, wild sarsaparilla, and pointed-leaf tick trefoil.

AH—Acer saccharum/Hydrophyllum habitat type. The common name is Sugar maple/Virginia waterleaf. This habitat type has a mesic moisture regime and a very rich nutrient status. Sugar maple, basswood, and white ash are the most common existing trees, but red oak, bitternut hickory, red maple, ironwood, and yellow birch also occur.

The understory either is sparse or is dominated by seedlings and saplings of canopy species. The most common shrubs are hazel and gooseberries. The most common ground flora species are Virginia waterleaf, trillium, sweet cicely, miterwort, bloodroot, hairy solomon’s seal, and flox.

AH-Ci—Acer saccharum/Hydrophyllum (Circaea variant) habitat type. The common name is Sugar maple/Virginia waterleaf (Nightshade). This habitat type has the same nutrient status, moisture regime, documented tree species, understory composition, and successional trends as the AH habitat type. There are, however, some significant differences in composition of the ground flora that may have other ecological implications.

The most common ground flora species are Virginia creeper, enchanter’s nightshade, wild geranium, bigleaf aster, ladyfern, and wild leek. All of these species may also be found in areas of the AH habitat type.

PVGy—Pinus strobus/Vaccinium-Gaylussacia habitat type. The common name is White pine/ Blueberry-Huckleberry. This habitat type has a dry moisture regime and a poor nutrient status. Northern pin oak is the most common existing tree, but white oak, red pine, and jack pine also occur.

The understory and ground flora species commonly include brackenfern, huckleberry, and blueberry.

PVRh—Pinus strobus/Vaccinium-Rubus hispidus habitat type. The common name is White pine/ Blueberry-Dewberry. This habitat type has a dry-mesic moisture regime and a poor nutrient status. White pine and red pine are the most common existing trees, but pin oak, white oak, and jack pine also occur.

The understory and ground flora species commonly include brackenfern, huckleberry, blueberry, swamp dewberry, bunchberry, wintergreen, goldthread, partridgeberry, and cinnamon fern.

PVCr—Pinus strobus/Vaccinium-Cornus racemosa habitat type. The common name is White pine/ Blueberry-Dogwood. This habitat type has a dry moisture regime and a poor nutrient status. Pin oak and jack pine are the most common existing trees, but white oak, black oak, and white pine also occur.

The understory and ground flora species commonly include gray dogwood, chokecherry, Virginia creeper, and riverbank grape.

ArDe-V—Acer rubrum/Desmodium (Vaccinium variant) habitat type. The common name is Red maple/Tick trefoil (Blueberry variant). This habitat type has a dry-mesic moisture regime and a medium nutrient status. White oak and red maple are the most common existing trees, but red oak and black oak also occur.

The understory and ground flora species commonly include tick trefoil, hog peanut, wild geranium, sweet cicely, blueberry, brackenfern, wild rose, and whorled loosestrife.

ArCi—Acer rubrum/Circaea quadrisculata habitat type. The common name is Red maple/Nightshade. This habitat type has a mesic moisture regime and a very rich nutrient status. Red oak, white oak, and red maple are the most common existing trees, but basswood, white ash, white pine, and sugar maple also occur.

The understory and ground flora species commonly include enchanter's nightshade, lopseed, sweet cicely, black snakeroot, maidenhair fern, jack-in-the-pulpit, and elderberry.

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. Most of the windbreaks in Clark County are used to protect farmsteads and rural homes. Commonly planted tree species include Norway spruce, red pine, and eastern white pine. Generally, the trees are planted on the north or west side of the protected areas or on both sides.

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 9 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service, the Wisconsin Department of Natural Resources, or the Cooperative Extension Service or from a commercial nursery.

Recreation

Clark County offers many year-round recreational opportunities. The largest recreational area is the Clark County Forest, which is in the southern and southwestern parts of the county. This forest is about 200,000 acres in size and makes up about 25 percent of the wooded area in the county. The forest provides opportunities for hunting, skiing, snowmobiling, and hiking. Hunting is mainly for deer, but ruffed grouse, bear, and turkeys also are hunted.

Clark County has a few manmade lakes, including Lake Arbutus, Rockdam, and Meadlake. These lakes are used for fishing, boating, waterskiing, and swimming. Areas along the lakes are used as sites for homes or recreational facilities. The Black River and its tributaries provide additional recreational opportunities.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, 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 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

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 (fig. 12).

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

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

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

Wildlife Habitat

Robert Weihrouch, biologist, Natural Resources Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Land use also is a factor. The northern and eastern parts of Clark County are mostly private agricultural land, and the southern and western parts are county forest. Wildlife habitat can be created or improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

The eleven soil associations in Clark County, which are described under the heading “General Soil Map Units,” can be used for the purposes of describing the wildlife habitat in the county. Associations that provide similar kinds of habitat are grouped in the following paragraphs.

Association 1.—Most of the Freeon-Newood-Barronett association is woodland, but scattered areas of cropland and pasture also are typical. The major tree species are northern red oak, sugar maple, red maple, white ash, paper birch, balsam fir, and quaking aspen. The wooded wetlands of black ash and black spruce increase the diversity of the wildlife habitat. The typical wildlife species include white-tailed deer, black bear, ruffed grouse, woodcock, porcupine, coyote, red fox, snowshoe hare, bobcat, raccoon, red squirrel, and gray squirrel. The cropland areas are inhabited by such species as cottontail rabbit, woodchuck, badger,

Figure 12.—A picnic site in an area of Rockdam sand, 0 to 3 percent slopes. The sandy surface layer of this soil results in poor trafficability.

and skunk. The potholes and creeks provide habitat for muskrat, mink, otter, beaver, migrating waterfowl, and a variety of reptiles and amphibians.

Associations 2, 3, and 5.—The Almena-Spencer, Loyal-Withee-Marshfield, and Withee-Kert-Hiles associations are mostly cropland and scattered areas of pasture and woodland. The major tree species are sugar maple, white ash, and northern red oak. Many of the woodlots are pastured. As a result, their value for wildlife habitat is reduced. Wildlife species are typical of agricultural areas and include white-tailed deer, red fox, cottontail rabbit, fox squirrel, raccoon, opossum, skunk, and woodchuck. Grassy lowlands and old pasture areas associated with the cropland provide scattered habitat for prairie chicken, gray partridge, short-eared owl, rough-legged hawk, snowy owl, bobolink, meadowlark, and several members of the sparrow family.

The northern part of these associations has several flowages and more woodland. The flowages provide habitat for beaver, muskrat, giant Canada geese, cormorants, mallards, blue-winged teal, wood ducks, bald eagles, reptiles, and amphibians. Many other waterfowl species stop during the fall migration. The wooded areas of quaking aspen, northern red oak, red maple, hazelnut, and balsam fir provide habitat for black bear, snowshoe rabbit, ruffed grouse, woodcock, coyote, and bobcat. The bottom-land hardwoods along the Popple River provide habitat for the threatened Blandings turtle.

Association 4.—Most of the Maplehurst-Rib-Menahga association is woodland, but scattered areas of cropland and wetlands also are typical. The major tree species are river birch, silver maple, red maple, swamp white oak, northern pin oak, cottonwood, green ash, and speckled alder. This association provides important habitat for many bird species, including wood duck, hooded mergansers, bald eagles, osprey, herons, and the threatened red-shouldered hawk. The Black River, sloughs, oxbows, and creeks provide habitat for migrating waterfowl, shore birds, mink, otter, muskrat, and beaver. The habitat is also good for white-tailed deer, fox squirrel, gray squirrel, raccoon, ruffed grouse, woodcock, and the threatened Blandings turtle.

Association 6.—Most of the Flambeau-Merrillan-Fallcreek association is cropland and scattered areas of woodland and pasture. The major tree species are sugar maple, white ash, American basswood, northern red oak, and scattered white pine, red maple, and quaking aspen. Wet, brushy or marshy drainageways support willow and alder. Because of the interspersion of woodland and cropland, this association provides excellent habitat for many species of wildlife, including white-tailed deer, black bear, bobcat, red fox, otter, coyote, ruffed grouse, woodcock, fox squirrel, gray squirrel, raccoon, opossum, beaver, and muskrat. Large rocky mounds in this association provide habitat for gray fox.

Associations 7 and 11.—The Merrillan-Veedum-Humbird and Hiles-Kert-Veedum associations are mostly woodland, but scattered areas of cropland and pasture also are typical. Much of association 11 is in the Clark County Forest. The major tree species are northern pin oak, northern red oak, sugar maple, swamp white oak, red maple, quaking aspen, and jack pine. These associations provide good habitat for white-tailed deer, black bear, coyote, bobcat, red fox, ruffed grouse, porcupine, skunk, raccoon, opossum, gray squirrel, fox squirrel, and snowshoe hare. Grassy lowlands and old pasture areas associated with the cropland provide scattered habitat for a few prairie chickens. Flowages in these associations provide habitat for Canada geese, wood ducks, hooded mergansers, mallards, beaver, otter, muskrat, mink, salamanders, turtles, frogs, and wading birds.

Association 8.—Most of the Fairchild-Elm Lake-Ludington association is woodland. Part of the Clark County Forest is in areas of this association. The major tree species are jack pine, quaking aspen, northern pin oak, northern red oak, paper birch, and red maple. A few areas are planted to red pine. White-tailed deer, black bear, bobcat, ruffed grouse, woodcock, snowshoe hare, coyote, raccoon, porcupine, gray squirrel, and gray fox are common upland species. Wild turkeys are expanding into this association. Wetlands and flowages provide habitat for Canada geese, wood ducks, hooded mergansers, mallards, furbearers, the threatened bald eagle and osprey, and turtles, frogs, and herons.

Association 9.—Most of the Simescreek-Rockdam association is woodland. Some areas have red pine or jack pine plantations. The major tree species are northern pin oak and jack pine. Clearcut areas regenerate to northern pin oak, sumac, and big bluestem. Because of the sterile, droughty soils, this association provides poor habitat for most species of wildlife. Wildlife species in this association include white-tailed deer, ruffed grouse, gray squirrel, and coyote. The creeks provide habitat for beaver, otter, muskrat, mink, and raccoon. Open areas provide habitat for the Karner blue butterfly, which is on the state's endangered species list.

Association 10.—Most of the unglaciated Boone-Elevasil-Tarr association is cropland and scattered areas of pasture and woodland. The major tree species are northern red oak, white oak, and scattered white pine, white ash, and quaking aspen. Wet, brushy or marshy drainageways support willow and alder. Because of the interspersion of oak woodland and cropland, this association provides excellent habitat for white-tailed deer, ruffed grouse, turkey, fox squirrel, gray squirrel, raccoon, badger, skunk, coyote, red fox, opossum, and cottontail rabbit. Large rocky mounds in this association provide habitat for gray fox.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, 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, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cordgrass, rushes, sedges, and reeds.

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

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

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

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

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

Engineering

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

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

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

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

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

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

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

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

Building Site Development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, 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, and the available water capacity in the upper 40 inches 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 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

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

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

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

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

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, 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 and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

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

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

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

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock 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 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. 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 affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

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

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

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 13). “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.

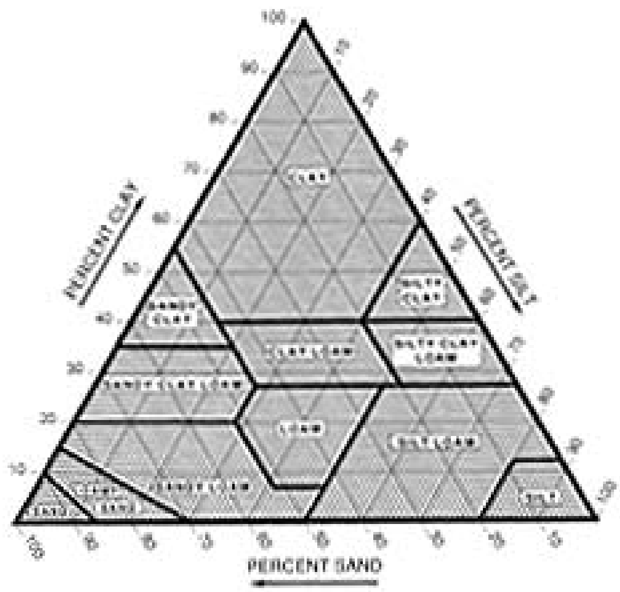

Figure 13.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

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

OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

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

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

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

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

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after the soil is dried at 105 degrees C. In table 17, 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.

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. The soils assigned to group 1 are the most susceptible to soil blowing, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

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

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. 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.

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.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected total subsidence, which usually is a result of drainage and oxidation.

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.

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section “Soil Series and Their Morphology.” The soil samples were tested by the Wisconsin Department of Transportation, Division of Highways and Transportation Facilities.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

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

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

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (USDA, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA, 1999). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Aftad Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Stream terraces
Parent material: Mostly loamy lacustrine deposits
Slope range: 2 to 6 percent

Taxonomic classification: Coarse-loamy, mixed Oxyaquic Glossoboralfs

Typical Pedon

Aftad very fine sandy loam, 2 to 6 percent slopes, approximately 1,600 feet south and 300 feet west of the northeast corner of sec. 21, T. 25 N., R. 2 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; moderate medium subangular blocky structure; very friable; few very fine and fine roots; neutral; abrupt smooth boundary.

E—7 to 13 inches; pale brown (10YR 6/3) very fine sandy loam, very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; very friable; few very fine and fine roots; slightly acid; gradual irregular boundary.

B/E—13 to 22 inches; 60 percent yellowish brown (10YR 5/4) very fine sandy loam (Bt); moderate fine and medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; penetrated by tongues of pale brown (10YR 6/3) fine sandy loam (E), very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; friable; few very fine and fine roots; strongly acid; clear wavy boundary.

Bt1—22 to 27 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—27 to 43 inches; yellowish brown (10YR 5/4) very fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; few very thin strata of very fine sand; very strongly acid; clear wavy boundary.

C—43 to 60 inches; dark yellowish brown (10YR 4/6) very fine sandy loam that has thin strata of fine sand, very fine sand, and silt; massive; breaks to weak thick plates along textural strata; friable; few medium faint brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid.

Range in Characteristics

Depth to stratified lacustrine deposits: 20 to 40 inches

Ap horizon:
Hue—7.5YR or 10YR
Value—3 or 4 (more than 5.5 dry)
Chroma—2 or 3
Texture—very fine sandy loam

A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—very fine sandy loam

E horizon and E part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, or loam

Bt horizon and Bt part of B/E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, very fine sandy loam, or loam; thin strata of coarser or finer texture in the lower part in some pedons

C horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—4 to 6
Texture—stratified and dominantly sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam with thin strata of coarser or finer texture

Almena Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty, mixed Aquic Glossoboralfs

Typical Pedon

Almena silt loam, 0 to 3 percent slopes, approximately 1,500 feet north and 200 feet west of the southeast corner of sec. 27, T. 29 N., R. 4 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; very friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.

E/B—9 to 19 inches; 80 percent pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; tongues into and surrounds remnants of dark brown (10YR 4/3) silt loam (Bt); moderate fine subangular blocky structure; friable; common very fine and fine roots; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; clear wavy boundary.

B/E—19 to 33 inches; 60 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and few fine distinct grayish brown (10YR 5/2) masses of iron depletion; penetrated by tongues of pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; few very fine and fine roots; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and few fine distinct grayish brown (10YR 5/2) masses of iron depletion; about 5 percent gravel; moderately acid; clear wavy boundary.

Bt—33 to 45 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and common fine distinct grayish brown (10YR 5/2) masses of iron depletion; about 2 percent gravel; moderately acid; clear wavy boundary.

2C—45 to 60 inches; reddish brown (5YR 4/4) sandy loam; massive; friable; few fine distinct yellowish red (5YR 5/6) masses of iron accumulation; about 10 percent gravel; slightly acid.

Range in Characteristics

Thickness of the silty mantle: 36 to 60 inches
Volume of gravel: 0 to 10 percent in the silty mantle and 3 to 35 percent in the till
Volume of cobbles: 0 to 5 percent throughout the profile

Ap horizon:
Hue—10YR
Value—2 to 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E part of E/B and B/E horizons:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

2C horizon and 2Bt horizon (if it occurs):
Hue—5YR or 7.5YR
Value—4 to 6
Chroma—3 to 6
Texture—sandy loam, loam, or the gravelly analogs of these textures

Arbutus Series

Depth class: Moderately deep to igneous bedrock
Drainage class: Excessively drained
Permeability: Rapid in the siliceous sandy alluvium and slow to rapid in the bedrock
Landform: Strath terraces
Parent material: Siliceous sandy alluvium
Slope range: 2 to 6 percent

Taxonomic classification: Sandy, siliceous, frigid Entic Haplorthods

Typical Pedon

Arbutus loamy sand, in an area of Ironrun-Ponycreek-Arbutus complex, 0 to 6 percent slopes; approximately 10 feet north and 100 feet west of the southeast corner of sec. 32, T. 23 N., R. 2 W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine to coarse roots; extremely acid; abrupt smooth boundary.

E—2 to 5 inches; dark brown (7.5YR 4/2) loamy sand, brown (7.5YR 5/2) dry; weak medium platy structure; very friable; many fine to coarse roots; extremely acid; abrupt wavy boundary.

Bs1—5 to 10 inches; dark brown (7.5YR 4/4) loamy sand; weak fine and medium subangular blocky structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

Bs2—10 to 17 inches; brown (7.5YR 5/4) loamy sand; weak medium subangular blocky structure; very friable; few fine and medium roots; strongly acid; clear wavy boundary.

Bw—17 to 25 inches; strong brown (7.5YR 5/6) sand; weak coarse subangular blocky structure; very friable; few fine roots; moderately acid; abrupt wavy boundary.

2R—25 inches; slightly fractured igneous bedrock.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Volume of rock fragments: 0 to 15 percent gravel and 0 to 3 percent cobbles throughout the profile

A horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—loamy sand

E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 7 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand or loamy sand

Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 8
Texture—sand or loamy sand

Auburndale Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, frigid Mollic Epiaqualfs

Typical Pedon

Auburndale silt loam, 0 to 2 percent slopes, approximately 100 feet south and 100 feet east of the northwest corner of sec. 15, T. 29 N., R. 4 W.

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

Eg—7 to 14 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium platy structure; friable; common very fine and fine roots; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; very strongly acid; clear wavy boundary.

Btg1—14 to 20 inches; light brownish gray (10YR 6/2) silt loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; few faint grayish brown (10YR 5/2) clay films on faces of some peds; many medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

Btg2—20 to 29 inches; light brownish gray (10YR 6/2) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; many medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid; clear wavy boundary.

Btg3—29 to 41 inches; grayish brown (10YR 5/2) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent strong brown (7.5YR 5/8) and common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation; moderately acid; clear wavy boundary.

2Btg4—41 to 53 inches; grayish brown (10YR 5/2) loam; weak medium and coarse subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of some peds; many coarse prominent reddish yellow (7.5YR 6/8) and common medium prominent yellowish red (5YR 5/6) masses of iron accumulation; about 5 percent gravel; moderately acid; gradual wavy boundary.

2C—53 to 60 inches; dark brown (7.5YR 3/4) sandy loam; massive; friable; few medium distinct strong brown (7.5YR 5/8) masses of iron accumulation; about 8 percent gravel; slightly acid.

Range in Characteristics

Thickness of the silty mantle: 36 to 60 inches
Volume of gravel: 0 to 10 percent in the silty mantle and 5 to 35 percent in the till
Volume of cobbles: 0 to 3 percent throughout the profile

Ap horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silt

Btg horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

2Btg or 2Bt horizon (if it occurs):
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—2 to 6 (value of 3 and chroma of 2 or 3 do not occur together)
Texture—sandy loam, loam, or the gravelly analogs of these textures

2C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—3 to 6 (value of 3 and chroma of 2 or 3 do not occur together)
Texture—sandy loam, loam, or the gravelly analogs of these textures

Au Gres Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Rapid or very rapid
Landform: Stream terraces
Parent material: Sandy outwash
Slope range: 0 to 3 percent

Taxonomic classification: Sandy, mixed, frigid Typic Endoaquods

Typical Pedon

Au Gres sand, in an area of Au Gres-Newson complex, 0 to 3 percent slopes; approximately 1,500 feet west and 1,000 feet south of the northeast corner of sec. 8, T. 27 N., R. 4 W.

Oi—0 to 1 inch; dark grayish brown (10YR 4/2) peat (fibric material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 3 inches; black (10YR 2/1) sand, very dark brown (10YR 2/2) dry; moderate medium granular structure; very friable; many very fine, fine, medium, and coarse roots; strongly acid; abrupt wavy boundary.
E—3 to 13 inches; dark grayish brown (10YR 4/2) sand, light gray (10YR 7/2) dry; weak fine subangular blocky structure; very friable; many very fine, fine, medium, and coarse roots; strongly acid; abrupt wavy boundary.
Bhs—13 to 17 inches; dark reddish brown (5YR 2.5/2) loamy sand; weak coarse subangular blocky structure; very friable; many very fine, fine, medium, and coarse roots; very strongly acid; abrupt wavy boundary.
Bs—17 to 27 inches; dark reddish brown (5YR 3/4) sand; weak coarse subangular blocky structure; very friable; common very fine, fine, and medium roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; abrupt irregular boundary.
C1—27 to 39 inches; strong brown (7.5YR 5/6) coarse sand; single grain; loose; about 5 percent gravel; strongly acid; abrupt wavy boundary.
C2—39 to 61 inches; strong brown (7.5YR 5/6) coarse sand; single grain; loose; about 10 percent gravel; strongly acid.

Range in Characteristics

Volume of gravel: 0 to 10 percent throughout the profile

A horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 to 4
Chroma—1 or 2
Texture—sand

E horizon:
Hue—7.5YR or 10YR

Value—4 to 7 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—1 to 3
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bhs horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

C horizon:
Hue—5YR, 7.5YR, 10YR, or 2.5Y
Value—4 to 7
Chroma—1 to 8
Texture—sand or coarse sand

Barronett Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty part and moderately slow in the stratified part
Landform: Glacial lake plains and stream terraces
Parent material: Mostly silty lacustrine deposits
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty, mixed, frigid Mollic Endoaqualfs

Typical Pedon

Barronett silt loam, 0 to 2 percent slopes, approximately 150 feet north and 150 feet east of the southwest corner of sec. 6, T. 29 N., R. 3 W.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

Eg—9 to 15 inches; dark gray (10YR 4/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; common very fine and fine roots; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; slightly acid; clear wavy boundary.

Btg—15 to 32 inches; dark grayish brown (10YR 4/2) silt loam; weak medium and coarse subangular blocky structure; friable; few fine roots; few faint very dark grayish brown (10YR 3/2) clay films on faces of some peds; many medium prominent yellowish red (5YR 5/6) masses of iron accumulation and few medium faint light brownish gray (10YR 6/2) masses of iron depletion; strongly acid; clear wavy boundary.

Cg—32 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam, loam, and very fine sandy loam; massive; friable; common medium prominent strong brown (7.5YR 5/8) and brownish yellow (10YR 6/8) masses of iron accumulation; moderately acid.

Range in Characteristics

Depth to stratified lacustrine deposits: 24 to 40 inches

Ap horizon or A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR, 2.5Y, 5Y, or 5G
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silt clay loam

Cg horizon or C horizon (if it occurs):
Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 3
Texture—stratified very fine sand, very fine sandy loam, loam, or silt loam; thin strata of coarser or finer texture in some pedons

Beseman Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderate or moderately rapid in the organic material and moderately slow in the loamy alluvium
Landform: Moraines
Parent material: Herbaceous organic material underlain by loamy alluvium
Slope range: 0 to 1 percent

Taxonomic classification: Loamy, mixed, dysic Terric Borosaprists

Typical Pedon

Beseman peat, in an area of Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes; approximately 2,480 feet north and 120 feet west of the southeast corner of sec. 20, T. 29 N., R. 3 W.

Oi—0 to 10 inches; peat (fibric material), dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2.5/2) rubbed; about 90 percent fiber, 45 percent rubbed; moderate coarse subangular blocky structure; nonsticky; many fine roots; primarily herbaceous fibers; very strongly acid (pH 4.5 in water 1:1); abrupt smooth boundary.

Oa1—10 to 21 inches; muck (sapric material), dark reddish brown (5YR 2.5/2) broken face and rubbed; about 30 percent fiber, 10 percent rubbed; moderate medium platy structure; nonsticky; common fine roots; primarily herbaceous fibers; very strongly acid (pH 4.5 in water 1:1); abrupt smooth boundary.

Oa2—21 to 29 inches; muck (sapric material), black (5YR 2.5/1) broken face and rubbed; about 10 percent fiber, trace rubbed; massive; nonsticky; few fine roots; primarily herbaceous fibers; about 30 percent mineral matter; very strongly acid (pH 4.5 in water 1:1); abrupt smooth boundary.

C—29 to 60 inches; grayish brown (2.5Y 5/2) silt loam; massive; friable; common medium prominent yellowish red (5YR 4/6) masses of iron accumulation; very strongly acid.

Range in Characteristics

Thickness of herbaceous organic material: 16 to 51 inches

Oi horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—peat

Oa horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—muck

C horizon:
Hue—5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—1 or 2
Texture—sandy loam, loam, or silt loam

Bilson Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid in the siliceous loamy alluvium and rapid in the siliceous sandy alluvium
Landform: Pediments and stream terraces
Parent material: Siliceous loamy alluvium underlain by siliceous sandy alluvium
Slope range: 0 to 6 percent

Taxonomic classification: Coarse-loamy, siliceous, mesic Mollic Hapludalfs

Typical Pedon

Bilson sandy loam, 0 to 6 percent slopes, approximately 1,200 feet north and 120 feet west of the southeast corner of sec. 17, T. 22 N., R. 4 W., in Jackson County:

Ap—0 to 8 inches; very dark brown (10YR 2/2) sandy loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many very fine and fine and few medium roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark brown (7.5YR 4/4) and prominent dark reddish brown (5YR 3/2) clay films on faces of peds; slightly acid; clear wavy boundary.

Bt2—12 to 18 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; common faint dark brown (7.5YR 3/4) and few distinct reddish brown (5YR 4/4) clay films on faces of peds; slightly acid; clear wavy boundary.

Bt3—18 to 32 inches; dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) sandy loam; weak coarse subangular blocky structure; friable; few very fine roots; common faint dark brown (7.5YR 3/4) and few distinct reddish brown (5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

2C—32 to 60 inches; brownish yellow (10YR 6/6) sand; single grain; loose; few thin (less than $^{1}/_{8}$ inch), dark brown (7.5YR 4/4) strata of loamy sand; strongly acid.

Range in Characteristics

Thickness of loamy alluvium: 20 to 40 inches
Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap or A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—sandy loam

Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4
Texture—sandy loam or loam

2Bt horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—loamy sand

2C horizon:
Hue—7.5YR or 10YR
Value—5 to 8
Chroma—3 to 8
Texture—sand, typically with a few thin strata of sandy loam or loamy sand

Boone Series

Depth class: Moderately deep to sandstone
Drainage class: Excessively drained
Permeability: Rapid in the siliceous sandy residuum and moderately slow or moderate in the sandstone
Landform: Hills
Parent material: Siliceous sandy residuum derived from the underlying sandstone
Slope range: 6 to 50 percent

Taxonomic classification: Mesic, uncoated Typic Quartzipsamments

Typical Pedon

Boone sand, in an area of Boone-Elevasil complex, 15 to 50 percent slopes; approximately 1,280 feet north and 2,000 feet west of the southeast corner of sec. 24, T. 19 N., R. 6 W., in Jackson County:

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 45 percent fiber, 20 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 3 inches; very dark grayish brown (10YR 3/2) sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many very fine and fine roots; pale brown (10YR 6/3) clean sand grains throughout; strongly acid; abrupt wavy boundary.
E—3 to 8 inches; brown (10YR 4/3) sand, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; very friable; common very fine and fine roots; about 14 percent sandstone channers; strongly acid; clear wavy boundary.
Bw—8 to 21 inches; dark yellowish brown (10YR 4/4) sand; weak coarse subangular blocky structure; very friable; few fine roots; about 13 percent sandstone channers; strongly acid; clear wavy boundary.
C—21 to 35 inches; brownish yellow (10YR 6/6) sand; single grain; loose; few fine roots; about 10 percent sandstone channers; strongly acid; gradual smooth boundary.
Cr—35 to 60 inches; white (10YR 8/2), weakly cemented sandstone.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Depth to sandstone: 20 to 40 inches
Volume of rock fragments: 0 to 35 percent sandstone channers and 0 to 5 percent flagstones throughout the profile

A horizon:
Hue—10YR
Value—2 to 5
Chroma—1 to 3
Texture—sand

Ap horizon (if it occurs):
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—sand

E horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2 or 3
Texture—sand, loamy sand, or the channery analogs of these textures

Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—sand, fine sand, or the channery analogs of these textures

C horizon:
Hue—7.5YR or 10YR
Value—5 to 8
Chroma—2 to 6

Texture—sand, fine sand, or the channery analogs of these textures

Brander Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Mostly silty alluvium underlain by sandy outwash
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty over sandy or sandy-skeletal, mixed Oxyaquic Glossoboralfs

Typical Pedon

Brander silt loam, 0 to 3 percent slopes, approximately 2,500 feet south and 1,000 feet west of the northeast corner of sec. 8, T. 29 N., R. 2 W.

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.

E/B—10 to 17 inches; 70 percent brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; tongues into and surrounds remnants of yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; common very fine and fine roots; about 1 percent gravel; moderately acid; gradual wavy boundary.

B/E—17 to 22 inches; 60 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; penetrated by tongues of brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; common very fine and fine roots; about 1 percent gravel; strongly acid; gradual wavy boundary.

Bt1—22 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; about 1 percent gravel; very strongly acid; clear wavy boundary.

Bt2—29 to 32 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; common medium distinct grayish brown (10YR 5/2) masses of iron depletion and common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; about 2 percent gravel; very strongly acid; clear wavy boundary.

2Bt3—32 to 35 inches; dark brown (7.5YR 4/4) gravelly loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (7.5YR 4/3) clay films on faces of peds; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 16 percent gravel; strongly acid; clear wavy boundary.

3C—35 to 60 inches; yellowish brown (10YR 5/4), stratified gravelly coarse sand and coarse sand; single grain; loose; few fine faint strong brown (7.5YR 5/6) masses of iron accumulation; about 20 percent gravel as an average; moderately acid.

Range in Characteristics

Thickness of the silty alluvium: 20 to 40 inches
Volume of gravel: 0 to 5 percent in the silty alluvium, 0 to 40 percent in the 2Bt horizon, and 3 to 65 percent in the 3C horizon
Volume of cobbles: 0 to 5 percent throughout the profile

Ap horizon:
Hue—7.5YR or 10YR
Value—3 to 5 (where moist value is 3, dry value is more than 5.5)
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon (if it occurs) and E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—silt loam

2Bt horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6

Chroma—4 to 6
Texture—sandy loam, loam, or the gravelly or very gravelly analogs of these textures

3C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—stratified sand, coarse sand, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

Capitola Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow or moderate in the loamy alluvium and moderately slow in the loamy till
Landform: Ground moraines
Parent material: Loamy alluvium underlain by loamy glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Coarse-loamy, mixed, frigid Mollic Epiaqualfs

Typical Pedon

Capitola muck, in an area of Capitola-Marshfield-Veedum complex, 0 to 2 percent slopes; approximately 2,500 feet south and 2,300 feet west of the northeast corner of sec. 19, T. 25 N., R. 2 W.

Oa—0 to 4 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 20 percent fiber, 5 percent rubbed; weak medium granular structure; nonsticky; many fine roots; moderately acid; abrupt wavy boundary.

A—4 to 6 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

Eg—6 to 12 inches; grayish brown (10YR 5/2) loam, light gray (10YR 7/2) dry; moderate thick platy structure; friable; few fine roots; common medium distinct yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.

Btg1—12 to 21 inches; grayish brown (10YR 5/2) sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of some peds and in pores and channels; many medium prominent strong brown (7.5YR 5/8) and many medium faint brown (10YR 5/3) masses of iron accumulation; strongly acid; abrupt wavy boundary.

Btg2—21 to 35 inches; gray (10YR 5/1) loam; moderate medium subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films on faces of some peds; many medium prominent strong brown (7.5YR 5/6) and many medium distinct light yellowish brown (10YR 6/4) masses of iron accumulation; about 5 percent gravel; very strongly acid; clear wavy boundary.

Bt—35 to 39 inches; dark brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few faint dark brown (7.5YR 4/3) clay films on faces of some peds; common medium distinct pinkish gray (7.5YR 6/2) masses of iron depletion and reddish yellow (7.5YR 6/6) masses of iron accumulation; about 8 percent gravel; moderately acid; abrupt wavy boundary.

C—39 to 64 inches; brown (7.5YR 5/4) sandy loam; massive; very friable; about 8 percent gravel; slightly acid.

Range in Characteristics

Volume of gravel: 0 to 15 percent in the loamy alluvium and 5 to 35 percent in the till
Volume of cobbles: 0 to 15 percent throughout the profile

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam

Eg horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—1 or 2
Texture—fine sandy loam, sandy loam, or loam

Btg or Bg horizon (if it occurs):
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—fine sandy loam, sandy loam, or loam

Bt horizon:
Hue—5YR or 7.5YR
Value—3 or 4
Chroma—3 or 4

Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

C horizon:

Hue—5YR or 7.5YR
Value—3 to 6
Chroma—2 to 4
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Cathro Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid in the organic material and moderately slow or moderate in the loamy deposits
Landform: Moraines
Parent material: Herbaceous organic material underlain by loamy deposits
Slope range: 0 to 1 percent

Taxonomic classification: Loamy, mixed, euic Terric Borosaprists

Typical Pedon

Cathro mucky peat, in an area of Newood-Magnor-Cathro complex, 0 to 15 percent slopes, very stony; approximately 100 feet south and 1,500 feet east of the northwest corner of sec. 6, T. 29 N., R. 3 W.

Oe—0 to 4 inches; mucky peat (hemic material), dark brown (7.5YR 3/2) broken face and rubbed; about 50 percent fiber, 20 percent rubbed; weak thick platy structure; nonsticky; common fine roots; primarily herbaceous fibers; moderately acid (pH 5.8 in water 1:1); abrupt wavy boundary.

Oa1—4 to 24 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 20 percent fiber, 5 percent rubbed; moderate thick platy structure; nonsticky; primarily herbaceous fibers; strongly acid (pH 5.3 in water 1:1); clear wavy boundary.

Oa2—24 to 30 inches; muck (sapric material), black (10YR 2/1) broken face, black (N 2/0) rubbed; about 5 percent fiber, trace rubbed; massive; nonsticky; primarily herbaceous fibers; about 30 percent mineral matter; few fine prominent brown (7.5YR 5/4) masses of iron accumulation; strongly acid (pH 5.1 in water 1:1); abrupt wavy boundary.

C—30 to 60 inches; dark gray (5Y 4/1) silt loam that has thin strata of fine sandy loam and loam; massive; friable; common fine prominent strong brown (7.5YR 4/6) masses of iron accumulation; slightly acid.

Range in Characteristics

Thickness of herbaceous organic material: 16 to 51 inches

Oe horizon:

Hue—5YR, 7.5YR, or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—mucky peat

Oa horizon:

Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

C horizon:

Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 3
Texture—sandy loam, fine sandy loam, very fine sandy loam, sandy clay loam, loam, silt loam, or silty clay loam; thin strata of fine sand or sand in some pedons

Citypoint Series

Depth class: Moderately deep or deep to interbedded sandstone and shale
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid in the organic material, slow to rapid in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Herbaceous organic material over residuum derived from the underlying interbedded sandstone and shale
Slope range: 0 to 1 percent

Taxonomic classification: Dysic Typic Borosaprists

Typical Pedon

Citypoint mucky peat, 0 to 1 percent slopes, approximately 50 feet north and 2,500 feet west of the southeast corner of sec. 28, T. 23 N., R. 1 W.

Oe—0 to 8 inches; mucky peat (hemic material), very dark grayish brown (10YR 3/2) broken face and rubbed; about 35 percent fiber, 20 percent rubbed; massive; nonsticky; primarily herbaceous fibers; extremely acid (pH 4.0 in water 1:1); gradual smooth boundary.

Oa—8 to 28 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 20 percent fiber, less than 5 percent rubbed; massive;

nonsticky; primarily herbaceous fibers; extremely acid (pH 4.0 in water 1:1); clear smooth boundary.

Cg—28 to 33 inches; light brownish gray (10YR 6/2) sand; single grain; loose; very strongly acid (pH 4.5); clear wavy boundary.

Cr—33 to 60 inches; pale olive (5Y 6/3), brownish yellow (10YR 6/8), gray (10YR 5/1), and light yellowish brown (10YR 6/4), interbedded sandstone and shale.

Range in Characteristics

Depth to interbedded sandstone and shale: 20 to 60 inches

Volume of sandstone channers: 0 to 15 percent in the C horizon

Thickness of herbaceous organic material: 16 to 51 inches

Oe horizon:

Hue—5YR, 7.5YR, or 10YR
Value—2 to 4
Chroma—2 or 3
Texture—mucky peat

Oa horizon:

Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 to 4
Chroma—0 to 2
Texture—muck

C horizon:

Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y, 5GY, or 5G
Value—3 to 7
Chroma—1 to 8
Texture—ranges from sand to clay

Cr horizon:

Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y, 5GY, or 5G
Value—3 to 7
Chroma—1 to 8

Comstock Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow in the stratified part
Landform: Glacial lake plains and stream terraces
Parent material: Mostly silty lacustrine deposits
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty, mixed Aquic Glossoboralfs

Typical Pedon

Comstock silt loam, 0 to 3 percent slopes, approximately 100 feet south and 300 feet west of the northeast corner of sec. 1, T. 29 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.

E—9 to 12 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium platy structure; friable; common very fine and fine roots; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; strongly acid; clear smooth boundary.

B/E—12 to 20 inches; 80 percent reddish brown (5YR 4/4) silt loam (Bt); moderate medium subangular blocky structure; friable; common faint reddish brown (5YR 5/3) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and common fine prominent brown (7.5YR 5/2) masses of iron depletion; penetrated by tongues of brown (7.5YR 5/3) silt loam (E), pink (7.5YR 7/3) dry; moderate medium subangular blocky structure; friable; few very fine and fine roots; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation and common fine faint brown (7.5YR 5/2) masses of iron depletion; strongly acid; gradual wavy boundary.

Bt1—20 to 36 inches; reddish brown (5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; common faint reddish brown (5YR 5/3) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation and few fine distinct reddish gray (5YR 5/2) masses of iron depletion; moderately acid; clear wavy boundary.

Bt2—36 to 41 inches; brown (10YR 5/3) silt loam; weak coarse subangular blocky structure; friable; few very fine and fine roots; few distinct brown (7.5YR 5/3) clay films on faces of some peds; few very thin lenses of silt and very fine sand; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and many fine faint grayish brown (10YR 5/2) masses of iron depletion; moderately acid; clear wavy boundary.

C1—41 to 51 inches; brown (10YR 5/3) silt loam that has a few thin strata of very fine sandy loam; massive; friable; many medium prominent reddish yellow (7.5YR 6/8) masses of iron accumulation and few medium faint grayish brown (10YR 5/2) masses of iron depletion; neutral; abrupt smooth boundary.

C2—51 to 60 inches; grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) silt loam that has thin strata of very fine sandy loam and very fine sand; massive; friable; neutral.

Range in Characteristics

Depth to stratified lacustrine deposits: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of B/E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam; thin strata of coarser texture in the lower part in some pedons

C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—2 to 6
Texture—silt loam that has thin strata of fine sand, very fine sand, loamy fine sand, fine sandy loam, very fine sandy loam, loam, or silt

Council Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Hills
Parent material: Silty and loamy colluvium
Slope range: 6 to 20 percent

Taxonomic classification: Coarse-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Council loam, in an area of Council and Seaton soils, 12 to 20 percent slopes, eroded; approximately 1,900 feet west and 200 feet north of the southeast corner of sec. 5, T. 19 N., R. 6 W., in Jackson County:

Ap—0 to 7 inches; dark brown (10YR 3/3) loam, pale brown (10YR 6/3) dry; weak coarse subangular blocky structure; common fragments of dark yellowish brown (10YR 4/4) subsoil material; friable; many fine and medium roots; moderately acid; abrupt smooth boundary.

Bt1—7 to 13 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; common fine and very fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few dark brown (10YR 4/3) silt coatings on faces of peds; strongly acid; clear wavy boundary.

Bt2—13 to 27 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; common fine and very fine roots; many distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt3—27 to 35 inches; dark yellowish brown (10YR 4/4) loam; moderate coarse subangular blocky structure; friable; few fine and very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt4—35 to 45 inches; dark yellowish brown (10YR 4/4) sandy loam; weak very coarse subangular blocky structure; friable; few fine and very fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; abrupt irregular boundary.

C—45 to 60 inches; light yellowish brown (10YR 6/4) and dark yellowish brown (10YR 4/4) silt loam that has pockets or layers of loam; massive; friable; common medium distinct brownish yellow (10YR 6/8) masses of iron accumulation and common fine distinct grayish brown (10YR 5/2) masses of iron depletion; about 5 percent sandstone channers; moderately acid.

Range in Characteristics

Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4

Chroma—2 to 4
Texture—loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, loam, or silt loam

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 8
Texture—sandy loam, fine sandy loam, loam, or silt loam

Crystal Lake Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty part and moderately slow in the stratified part
Landform: Glacial lake plains and stream terraces
Parent material: Mostly silty lacustrine deposits
Slope range: 2 to 6 percent

Taxonomic classification: Fine-silty, mixed Oxyaquic Glossoboralfs

Typical Pedon

Crystal Lake silt loam, 2 to 6 percent slopes, approximately 2,380 feet north and 150 feet west of the southeast corner of sec. 4, T. 29 N., R. 4 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; very friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; pale brown (10YR 6/3) silt loam, very pale brown (10YR 7/3) dry; weak very fine subangular blocky structure; very friable; many medium prominent brownish yellow (10YR 6/8) masses of iron accumulation; slightly acid; abrupt wavy boundary.

E/B—15 to 23 inches; 70 percent pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; weak very fine subangular blocky structure; very friable; many medium prominent brownish yellow (10YR 6/8) masses of iron accumulation; tongues into and surrounds remnants of yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few fine roots; few distinct dark yellowish brown (10YR 4/6) clay films on faces of peds; many medium distinct brownish yellow (10YR 6/8) masses of iron accumulation; very strongly acid; gradual irregular boundary.

B/E—23 to 31 inches; 75 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/6) clay films on faces of peds; many medium distinct brownish yellow (10YR 6/8) masses of iron accumulation; penetrated by tongues of pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; few fine roots; many medium prominent brownish yellow (10YR 6/8) masses of iron accumulation; very strongly acid; abrupt wavy boundary.

Bt1—31 to 39 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct dark yellowish brown (10YR 4/6) clay films on faces of peds; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

Bt2—39 to 42 inches; yellowish brown (10YR 5/4) silt loam that has thin strata of silt and very fine sand; weak medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of some peds; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid; clear wavy boundary.

C—42 to 60 inches; light yellowish brown (10YR 6/4) silt loam that has thin strata of very fine sand; massive; friable; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; moderately acid.

Range in Characteristics

Depth to stratified lacustrine deposits: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3

Chroma—1 or 2
Texture—silt loam

E horizon and E part of E/B and B/E horizons:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 or 4
Texture—silt loam or silty clay loam with thin strata of fine sand, very fine sand, loamy fine sand, fine sandy loam, very fine sandy loam, loam, or silt

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 or 4
Texture—silt loam with thin strata of fine sand, very fine sand, loamy fine sand, fine sandy loam, very fine sandy loam, loam, or silt

Dawsil Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid in the organic material and rapid or very rapid in the siliceous sandy alluvium
Landform: Pediments and stream terraces
Parent material: Herbaceous organic material underlain by siliceous sandy alluvium
Slope range: 0 to 1 percent

Taxonomic classification: Sandy or sandy-skeletal, siliceous, dysic Terric Borosaprists

Typical Pedon

Dawsil mucky peat, 0 to 1 percent slopes, approximately 1,800 feet north and 200 feet west of the southeast corner of sec. 33, T. 23 N., R. 3 W.

Oe—0 to 7 inches; mucky peat (hemic material), dark reddish brown (5YR 3/2) broken face and rubbed; about 60 percent fiber, 20 percent rubbed; nonsticky; many fine roots; primarily herbaceous fibers; very strongly acid (pH 4.8 in water 1:1); abrupt smooth boundary.
Oa—7 to 31 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 15 percent fiber, 5 percent rubbed; nonsticky; few fine roots; primarily herbaceous fibers; extremely acid (pH 4.3 in water 1:1); abrupt smooth boundary.
C—31 to 60 inches; pale brown (10YR 6/3) sand; single grain; loose; very strongly acid.

Range in Characteristics

Thickness of herbaceous organic material: 16 to 51 inches

Oe horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 to 4
Chroma—2 or 3
Texture—mucky peat

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

C horizon:
Hue—7.5YR or 10YR
Value—4 to 7
Chroma—1 to 4
Texture—sand, coarse sand, or fine sand

Dawson Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid in the organic material and rapid in the sandy deposits
Landform: Moraines
Parent material: Herbaceous organic material underlain by sandy deposits
Slope range: 0 to 1 percent

Taxonomic classification: Sandy or sandy-skeletal, mixed, dysic Terric Borosaprists

Typical Pedon

Dawson peat, in an area of Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes; approximately 1,360 feet south and 1,440 feet east of the northwest corner of sec. 31, T. 28 N., R. 4 W.

Oi—0 to 10 inches; peat (fibric material), dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2.5/2) rubbed; about 85 percent fiber, 45 percent rubbed; nonsticky; many very fine, fine, and medium roots; primarily herbaceous fibers; extremely acid (pH 4.2 in water 1:1); gradual wavy boundary.
Oa1—10 to 18 inches; muck (sapric material), dark

reddish brown (5YR 2.5/2) broken face, very dark brown (10YR 2/2) rubbed; about 30 percent fiber, 10 percent rubbed; nonsticky; common very fine, fine, and medium roots; primarily herbaceous fibers; extremely acid (pH 4.2 in water 1:1); clear wavy boundary.

Oa2—18 to 36 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 10 percent fiber, trace rubbed; nonsticky; few very fine and fine roots; primarily herbaceous fibers; very strongly acid (pH 4.5 in water 1:1); clear wavy boundary.

Oa3—36 to 42 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 10 percent fiber, trace rubbed; nonsticky; primarily herbaceous fibers; about 55 percent mineral matter; very strongly acid (pH 4.6 in water 1:1); clear wavy boundary.

C—42 to 60 inches; dark gray (10YR 4/1), stratified gravelly coarse sand and coarse sand; single grain; loose; about 15 percent gravel as an average; very strongly acid.

Range in Characteristics

Thickness of herbaceous organic material: 16 to 51 inches
Volume of gravel: 0 to 40 percent in the C horizon

Oi horizon:
Hue—5YR, 7.5YR, or 10YR
Value—2 to 4
Chroma—2 or 3
Texture—peat

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 3
Texture—muck

C horizon:
Hue—5YR, 7.5YR, 10YR, or 2.5Y
Value—3 to 6
Chroma—1 to 6
Texture—stratified sand, coarse sand, loamy sand, or the gravelly or very gravelly analogs of these textures

Eauclaire Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Rapid in the sandy alluvium and moderately slow or moderate in the loamy till
Landform: Disintegration moraines
Parent material: Sandy alluvium underlain by loamy glacial till
Slope range: 1 to 6 percent

Taxonomic classification: Sandy, mixed, frigid Oxyaquic Haplorthods

Typical Pedon

Eauclaire loamy sand, 1 to 6 percent slopes (fig. 14), approximately 400 feet north and 2,000 feet west of the southeast corner of sec. 4, T. 26 N., R. 4 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 2 inches; black (10YR 2/1) loamy sand, gray (10YR 5/1) and grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many very fine to coarse roots; about 10 percent gravel and 2 percent cobbles; very strongly acid; abrupt wavy boundary.

E—2 to 4 inches; grayish brown (10YR 5/2) sand, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; very friable; many very fine to coarse roots; about 8 percent gravel and 2 percent cobbles; very strongly acid; abrupt wavy boundary.

Bs—4 to 12 inches; dark brown (7.5YR 4/4) loamy sand; moderate medium subangular blocky structure; very friable; many very fine to coarse roots; about 8 percent gravel and 2 percent cobbles; very strongly acid; clear wavy boundary.

Bw1—12 to 24 inches; yellowish brown (10YR 5/4) sand; weak coarse subangular blocky structure; very friable; common very fine to coarse roots; about 8 percent gravel and 2 percent cobbles; strongly acid; clear wavy boundary.

Bw2—24 to 34 inches; light yellowish brown (10YR 6/4) sand; weak coarse subangular blocky structure; very friable; common very fine to coarse roots; common medium distinct brownish yellow (10YR 6/8) and many coarse distinct yellowish brown (10YR 5/8) masses of iron accumulation; about 10 percent gravel and 2 percent cobbles; moderately acid; clear wavy boundary.

2Bt1—34 to 39 inches; strong brown (7.5YR 5/6) gravelly sandy loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine to coarse roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; many coarse distinct strong brown (7.5YR 5/8) masses of iron accumulation and many coarse prominent light brownish gray (2.5Y 6/2) masses of iron depletion; about 15 percent gravel and 2 percent cobbles; very strongly acid; clear wavy boundary.

2Bt2—39 to 66 inches; yellowish red (5YR 4/6) sandy loam; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few fine and medium roots; common distinct reddish brown (5YR 4/4) clay films on faces of peds; common coarse prominent strong brown (7.5YR 5/8) masses of iron accumulation and light brownish gray (2.5Y 6/2) masses of iron depletion; about 10 percent gravel and 3 percent cobbles; very strongly acid; gradual wavy boundary.

2C—66 to 80 inches; yellowish red (5YR 5/8) sandy loam; massive; firm; about 10 percent gravel and 2 percent cobbles; very strongly acid.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Thickness of the sandy alluvium: 20 to 40 inches
Volume of gravel: 0 to 20 percent in the sandy alluvium and 3 to 20 percent in the till
Volume of cobbles: 0 to 5 percent throughout the profile

A horizon:
Hue—7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—loamy sand

Ap horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 or 3
Texture—loamy sand

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sand, fine sand, loamy sand, or the gravelly analogs of these textures

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand, fine sand, loamy sand, or the gravelly analogs of these textures

Bw horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—sand, fine sand, loamy sand, or the gravelly analogs of these textures

2Bt horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, loam, sandy clay loam, or the gravelly analogs of these textures

2C horizon:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—4 to 8
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Elevasil Series

Depth class: Moderately deep to sandstone
Drainage class: Well drained
Permeability: Moderate or moderately rapid in the siliceous loamy colluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Landform: Hills
Parent material: Siliceous loamy colluvium over siliceous sandy residuum derived from the underlying sandstone
Slope range: 2 to 50 percent

Taxonomic classification: Coarse-loamy, siliceous, mesic Ultic Hapludalfs

Typical Pedon

Elevasil sandy loam, in an area of Boone-Elevasil complex, 15 to 50 percent slopes; approximately 1,000 feet east and 1,300 feet south of the northwest corner of sec. 30, T. 19 N., R. 6 W., in Jackson County:

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 45 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 3 inches; very dark brown (10YR 2/2) sandy loam, brown (10YR 5/3) dry; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

Bt1—3 to 9 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; abrupt irregular boundary.

Bt2—9 to 27 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; common very fine to medium roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; about 5 percent sandstone channers in the lower part of the horizon; very strongly acid; abrupt irregular boundary.

2BC—27 to 31 inches; strong brown (7.5YR 5/6) loamy sand; weak medium subangular blocky structure; very friable; few very fine roots; about 10 percent sandstone channers; very strongly acid; abrupt wavy boundary.

2C—31 to 39 inches; reddish yellow (7.5YR 6/6) sand; single grain; loose; about 14 percent sandstone channers; strongly acid; clear smooth boundary.

2Cr—39 to 60 inches; very pale brown (10YR 7/4), weakly cemented sandstone.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.

Depth to sandstone: 20 to 40 inches

Volume of rock fragments: 0 to 35 percent sandstone channers and 0 to 5 percent flagstones throughout the profile

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—sandy loam

Ap horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 or 3
Texture—sandy loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—sandy loam, loam, or the channery analogs of these textures

2BC or 2Bt horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 7
Chroma—4 to 6
Texture—loamy sand or channery loamy sand

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 7
Chroma—2 to 6
Texture—sand or channery sand

Elm Lake Series

Depth class: Moderately deep to interbedded sandstone and shale

Drainage class: Poorly drained

Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale

Landform: Pediments

Parent material: Siliceous sandy alluvium over residuum derived from the underlying interbedded sandstone and shale

Slope range: 0 to 2 percent

Taxonomic classification: Sandy over loamy, siliceous, acid, frigid Humaqueptic Epiaquents

Typical Pedon

Elm Lake muck, in an area of Fairchild-Elm Lake complex, 0 to 3 percent slopes; approximately 1,350 feet north and 2,350 feet east of the southwest corner of sec. 28, T. 23 N., R. 3 W.

Oa—0 to 3 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 25 percent fiber, less than 5 percent rubbed; weak fine granular structure; nonsticky; many very fine and fine and few medium roots; extremely acid; abrupt smooth boundary.

A—3 to 4 inches; black (N 2/0) mucky sand, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Bg—4 to 16 inches; dark grayish brown (10YR 4/2) sand; weak coarse subangular blocky structure; very friable; few very fine and fine roots; the color is that of the uncoated sand grains with some organic staining; very strongly acid; clear wavy boundary.

Cg1—16 to 24 inches; light gray (10YR 7/2) sand; single grain; loose; few fine roots; the color is that of the uncoated sand grains; strongly acid; abrupt wavy boundary.

2Cg2—24 to 36 inches; light olive gray (5Y 6/2) silty clay loam; massive; firm; common medium prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; about 5 percent sandstone channers; extremely acid; clear wavy boundary.

2Cr—36 to 60 inches; interbedded very pale brown

(10YR 7/3) sandstone and red (2.5YR 4/6) and light brownish gray (2.5Y 6/2) shale.

Range in Characteristics

Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of siliceous sandy alluvium: 15 to 39 inches
Volume of gravel or sandstone channers: 0 to 15 percent in the siliceous sandy alluvium
Volume of sandstone channers: 3 to 15 percent in the 2Cg horizon

Oa horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

A horizon:
Hue—10YR or neutral
Value—2 or 3 (less than 5.5 dry)
Chroma—0 to 2
Texture—mucky sand

Bg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 3
Texture—sand or coarse sand

Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 7
Chroma—1 to 3
Texture—sand or coarse sand

2Cg or 2C horizon (if it occurs):
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—1 to 6
Texture—sandy loam, sandy clay loam, loam, silty clay loam, or clay loam; thin strata of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—1 to 6

Fairchild Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Siliceous sandy alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 0 to 3 percent

Taxonomic classification: Sandy over loamy, siliceous, frigid Ultic Epiaquods

Typical Pedon

Fairchild sand, in an area of Fairchild-Elm Lake complex, 0 to 3 percent slopes; approximately 1,300 feet north and 2,550 feet west of the southeast corner of sec. 28, T. 23 N., R. 3 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 40 percent fiber, 20 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt wavy boundary.

A—1 to 4 inches; black (10YR 2/1) sand, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; common very fine, fine, and medium roots; extremely acid; abrupt wavy boundary.

E—4 to 12 inches; grayish brown (10YR 5/2) sand, light brownish gray (10YR 6/2) dry; weak coarse subangular blocky structure; very friable; common very fine, fine, and medium roots; extremely acid; abrupt irregular boundary.

Bhs—12 to 14 inches; dusky red (2.5YR 3/2) sand; moderate medium subangular blocky structure; very friable; common very fine and fine roots; very strongly acid; abrupt wavy boundary.

Bs—14 to 19 inches; dark brown (7.5YR 4/4) sand; weak medium subangular blocky structure; very friable; common very fine and fine roots; few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; abrupt wavy boundary.

Bw—19 to 27 inches; brown (10YR 5/3) sand; weak coarse subangular blocky structure; very friable; common very fine and fine roots; few fine prominent strong brown (7.5YR 5/8) masses of iron accumulation and common medium faint grayish brown (10YR 5/2) masses of iron depletion; about 1 percent sandstone channers; very strongly acid; abrupt wavy boundary.

2Bt—27 to 33 inches; light olive gray (5Y 6/2) sandy clay loam; moderate fine subangular blocky structure; firm; common very fine and fine roots; few faint olive gray (5Y 5/2) clay films on faces of peds; common fine prominent strong brown

(7.5YR 5/8) masses of iron accumulation; about 14 percent sandstone channers; extremely acid; abrupt wavy boundary.

2Cr—33 to 60 inches; interbedded light gray (10YR 7/2) sandstone and light gray (5Y 7/2) shale.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of siliceous sandy alluvium: 15 to 39 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the siliceous sandy alluvium; 3 to 15 percent sandstone channers in the 2Bt horizon

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—sand

Ap horizon (if it occurs):
Hue—10YR
Value—2 to 4
Chroma—2 or 3
Texture—sand

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bhs horizon:
Hue—2.5YR, 5YR, or 7.5YR
Value—2 or 3
Chroma—2 or 3
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bw horizon:
Hue—10YR
Value—5 or 6
Chroma—3 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—2 to 6
Texture—sandy loam, sandy clay loam, loam, clay loam, or silty clay loam; thin strata of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—2 to 6

Fallcreek Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform: Ground moraines
Parent material: Loamy glacial till
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Fallcreek loam, in an area of Fallcreek-Merrillan complex, 0 to 3 percent slopes (fig. 15); approximately 50 feet north and 800 feet west of the southeast corner of sec. 24, T. 27 N., R. 3 W.

Ap—0 to 7 inches; dark brown (7.5YR 3/2) loam, pinkish gray (7.5YR 6/2) dry; moderate fine subangular blocky structure; friable; common very fine and fine and few medium roots; about 5 percent gravel and 5 percent cobbles; neutral; abrupt smooth boundary.

E/B—7 to 13 inches; 60 percent pinkish gray (7.5YR 6/2) loam (E), pinkish gray (7.5YR 7/2) dry; moderate fine subangular blocky structure; friable; tongues into and surrounds remnants of dark brown (7.5YR 4/4) loam (Bt); moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation; about 5 percent gravel and 5 percent cobbles; slightly acid; gradual irregular boundary.

B/E—13 to 21 inches; 70 percent dark brown (7.5YR 4/4) sandy loam (Bt); moderate medium subangular blocky structure; firm; few faint dark brown (7.5YR 4/3) clay films on faces of peds; penetrated by tongues of pinkish gray (7.5YR 6/2) sandy loam (E), pinkish white (7.5YR 8/2) dry;

moderate medium subangular blocky structure; firm; few very fine and fine roots; common medium distinct and prominent strong brown (7.5YR 5/8) masses of iron accumulation and common medium distinct and faint brown (7.5YR 5/2) masses of iron depletion; about 5 percent gravel and 5 percent cobbles; strongly acid; clear wavy boundary.

Bt1—21 to 27 inches; dark brown (7.5YR 4/4) loam; strong coarse subangular blocky structure; firm; few very fine and fine roots; common distinct strong brown (7.5YR 4/6) clay films on faces of peds; common distinct pinkish gray (7.5YR 6/2) clean sand grains coating faces of peds; common medium distinct reddish yellow (7.5YR 6/6) masses of iron accumulation and few fine distinct pinkish gray (7.5YR 6/2) masses of iron depletion; about 8 percent gravel and 3 percent cobbles; very strongly acid; clear wavy boundary.

Bt2—27 to 38 inches; dark brown (7.5YR 4/4) loam; moderate coarse subangular blocky structure; firm; few very fine and fine roots; common distinct strong brown (7.5YR 4/6) clay films on faces of peds; few distinct pinkish gray (7.5YR 6/2) clean sand grains coating faces of peds; common medium distinct reddish yellow (7.5YR 6/6) masses of iron accumulation; about 8 percent gravel and 3 percent cobbles; very strongly acid; clear wavy boundary.

Bt3—38 to 47 inches; brown (7.5YR 5/4) loam; weak coarse subangular blocky structure; firm; few very fine and fine roots; few distinct strong brown (7.5YR 4/6) clay films on faces of peds and in root channels; common medium distinct reddish yellow (7.5YR 6/6) masses of iron accumulation along root channels; about 8 percent gravel and 3 percent cobbles; very strongly acid; clear wavy boundary.

C—47 to 60 inches; brown (7.5YR 5/4) loam; massive; firm; about 8 percent gravel and 3 percent cobbles; strongly acid.

Range in Characteristics

Volume of rock fragments: 2 to 15 percent gravel and 0 to 5 percent cobbles throughout the profile

Ap horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam

A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—1 or 2
Texture—loam

E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam or loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 or 4
Texture—sandy loam or loam

C horizon:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam or loam

Flambeau Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and moderately slow in the lower part
Landform: Ground moraines
Parent material: Loamy glacial till
Slope range: 1 to 20 percent

Taxonomic classification: Fine-loamy, mixed Oxyaquic Glossoboralfs

Typical Pedon

Flambeau loam, 1 to 6 percent slopes (fig. 16), approximately 200 feet south and 1,650 feet west of the northeast corner of sec. 7, T. 26 N., R. 2 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; moderate very fine subangular blocky structure; friable; common fine roots; about 4 percent gravel; moderately acid; abrupt smooth boundary.

E/B—10 to 16 inches; 80 percent pale brown (10YR 6/3) sandy loam (E), light gray (10YR 7/2) dry; moderate fine and medium subangular blocky structure; friable; tongues into and surrounds remnants of dark brown (7.5YR 4/4) sandy loam (Bt); moderate medium subangular blocky structure; friable; few fine roots; few fine prominent and distinct reddish yellow (7.5YR 6/6) masses of iron accumulation; about 4 percent gravel; strongly acid; abrupt wavy boundary.

B/E—16 to 25 inches; 60 percent dark brown (7.5YR

4/4) sandy clay loam (Bt); moderate medium subangular blocky structure; firm; few faint dark brown (7.5YR 4/3) clay films on faces of peds; penetrated by tongues of pinkish gray (7.5YR 6/2) sandy loam (E), pinkish gray (7.5YR 7/2) dry; moderate medium subangular blocky structure; firm; few fine roots; common medium distinct and prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; about 4 percent gravel; very strongly acid; abrupt irregular boundary.

Bt1—25 to 34 inches; reddish brown (5YR 4/4) sandy loam; strong medium subangular blocky structure; firm; many faint reddish brown (5YR 5/3) clay films on faces of peds; prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; about 9 percent gravel; very strongly acid; abrupt wavy boundary.

Bt2—34 to 42 inches; reddish brown (5YR 5/4) sandy loam; moderate medium subangular blocky structure; firm; few faint reddish brown (5YR 5/3) clay films on faces of peds; about 12 percent gravel; very strongly acid; clear wavy boundary.

Bt3—42 to 50 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; firm; few faint dark brown (7.5YR 4/3) clay films on faces of peds; about 12 percent gravel; very strongly acid; gradual wavy boundary.

C—50 to 60 inches; strong brown (7.5YR 4/6) fine sandy loam; massive; firm; about 4 percent gravel; strongly acid.

Range in Characteristics

Volume of rock fragments: 3 to 15 percent gravel and 0 to 10 percent cobbles throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—loam or sandy loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam or sandy loam

E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, sandy clay loam, or loam

Bt part of E/B and B/E horizons:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam, sandy clay loam, loam, or clay loam

Bt horizon:
Hue—5YR or 7.5YR
Value—4 to 6
Chroma—3 to 6
Texture—sandy loam, sandy clay loam, loam, or clay loam

C horizon:
Hue—5YR or 7.5YR
Value—4 to 6
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, or loam

Fordum Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy alluvium
Landform: Flood plains
Parent material: Loamy alluvium underlain by sandy alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Coarse-loamy, mixed, nonacid, frigid Mollic Fluvaquents

Typical Pedon

Fordum silt loam, in an area of Moppet-Fordum complex, 0 to 3 percent slopes; approximately 200 feet south and 2,560 feet east of the northwest corner of sec. 34, T. 28 N., R. 3 W.

A—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; very friable; common fine roots; common medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; moderately acid; abrupt smooth boundary.

Cg1—9 to 23 inches; grayish brown (10YR 5/2) loam; massive; very friable; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; moderately acid; abrupt smooth boundary.

Cg2—23 to 28 inches; very dark gray (10YR 3/1) sandy loam that has thin strata of very dark gray (10YR 3/1) loam; massive; friable; few fine prominent yellowish brown (10YR 5/6) and few fine distinct brown (10YR 5/3) masses of iron accumulation; about 5 percent gravel as an

average; moderately acid; abrupt smooth boundary.
Cg3—28 to 60 inches; dark grayish brown (10YR 4/2), stratified gravelly coarse sand and coarse sand; single grain; loose; about 25 percent gravel as an average; slightly acid.

Range in Characteristics

Thickness of the loamy alluvium: 24 to 40 inches
Volume of gravel: 0 to 15 percent in the loamy alluvium and 0 to 60 percent in the sandy alluvium
Volume of cobbles: 0 to 10 percent throughout the profile

A horizon:
Hue—7.5YR, 10YR, 2.5Y, or neutral
Value—2 or 3 (5 or less dry)
Chroma—0 to 3
Texture—silt loam

Cg horizon (loamy alluvium):
Hue—7.5YR, 10YR, or 2.5Y
Value—2 to 6
Chroma—1 or 2
Texture—stratified sandy loam, fine sandy loam, loam, or silt loam

Cg horizon (sandy alluvium):
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—stratified sand, coarse sand, loamy sand, loamy coarse sand, or the gravelly or very gravelly analogs of these textures

Freeon Series

Depth class: Deep to dense loamy glacial till
Drainage class: Moderately well drained
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Landform: Moraines
Parent material: Loess or silty alluvium underlain by dense loamy glacial till
Slope range: 2 to 15 percent

Taxonomic classification: Coarse-loamy, mixed Oxyaquic Glossoboralfs

Typical Pedon

Freeon silt loam, 2 to 6 percent slopes, very stony; approximately 600 feet south and 100 feet east of the northwest corner of sec. 9, T. 29 N., R. 3 W.

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; very friable; many fine roots; about 2 percent gravel; slightly acid; abrupt smooth boundary.
E—10 to 14 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate very thin platy structure; very friable; common very fine and fine roots; about 2 percent gravel; strongly acid; clear wavy boundary.
E/B—14 to 23 inches; 60 percent brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate thin platy structure; friable; common fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; tongues into and surrounds remnants of brown (7.5YR 5/4) silt loam (Bt); moderate very fine subangular blocky structure; friable; few very fine and fine roots; common fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 3 percent gravel; very strongly acid; clear wavy boundary.
2B/E—23 to 30 inches; 70 percent dark brown (7.5YR 4/4) gravelly sandy loam (2Bt); moderate medium subangular blocky structure; friable; common faint dark brown (7.5YR 4/3) clay films on faces of peds; few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; penetrated by tongues of brown (7.5YR 5/3) sandy loam (E), pink (7.5YR 7/3) dry; moderate medium subangular blocky structure; friable; few fine roots; few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 13 percent gravel and 3 percent cobbles; moderately acid; clear irregular boundary.
2Bt1—30 to 44 inches; dark brown (7.5YR 4/4) gravelly sandy loam; moderate medium and coarse subangular blocky structure; friable; few fine roots; common distinct reddish brown (5YR 4/3) clay films on faces of peds; about 21 percent gravel and 3 percent cobbles; moderately acid; gradual wavy boundary.
2Bt2—44 to 52 inches; reddish brown (5YR 5/4) sandy loam; weak coarse subangular blocky structure; friable; few faint reddish brown (5YR 4/3) clay films on faces of peds; about 10 percent gravel and 3 percent cobbles; slightly acid; gradual wavy boundary.
2Cd—52 to 60 inches; reddish brown (5YR 4/4) sandy loam; massive; firm; dense and compact; about 7 percent gravel and 3 percent cobbles; slightly acid.

Range in Characteristics

Depth to dense loamy glacial till: 40 to 60 inches
Thickness of the silty mantle: 12 to 36 inches
Volume of gravel and cobbles: 0 to 10 percent gravel

and 0 to 3 percent cobbles in the silty mantle; 5 to 35 percent gravel and 0 to 10 percent cobbles in the till
Volume of stones: 2 to 3 percent on the surface; 0 to 5 percent throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon and E part of E/B horizon:
Hue—7.5YR or 10YR
Value—4 or 5 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam or silt

Bt part of E/B horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—silt loam

2E part of 2B/E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—loamy sand, sandy loam, loam, or the gravelly analogs of these textures

2Bt horizon and 2Bt part of 2B/E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

2Cd horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Gardenvale Series

Depth class: Deep to sandstone
Drainage class: Well drained
Permeability: Moderate in the silty and loamy alluvium, rapid in the siliceous sandy residuum, and moderately slow or moderate in the sandstone
Landform: Pediments
Parent material: Silty alluvium over loamy alluvium underlain by siliceous sandy residuum derived from the underlying sandstone
Slope range: 1 to 6 percent

Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs

Typical Pedon

Gardenvale silt loam, in an area of Merit-Gardenvale silt loams, 1 to 6 percent slopes; approximately 1,940 feet south and 1,840 feet east of the northwest corner of sec. 15, T. 22 N., R. 5 W., in Jackson County:

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; many very fine and fine roots; moderately acid; abrupt wavy boundary.
Bt1—8 to 14 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; many faint dark brown (7.5YR 3/4) clay films on faces of peds; moderately acid; clear wavy boundary.
Bt2—14 to 26 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common faint dark brown (7.5YR 3/4) clay films on faces of peds; very strongly acid; gradual irregular boundary.
2Bt3—26 to 30 inches; brown (7.5YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; few faint dark brown (7.5YR 4/4) clay films on faces of some peds; moderately acid; clear wavy boundary.
3C—30 to 50 inches; reddish yellow (7.5YR 6/8) fine sand; single grain; loose; about 3 percent sandstone channers; very strongly acid; clear wavy boundary.
3Cr—50 to 60 inches; reddish yellow (7.5YR 6/8), weakly cemented sandstone.

Range in Characteristics

Depth to sandstone: 40 to 60 inches
Thickness of the silty alluvium: 10 to 30 inches
Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap or A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3

Chroma—1 to 3
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4
Texture—silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—sandy loam or loam

3C horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 to 8
Texture—fine sand or sand; thin strata of loamy sand in some pedons

Hiles Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Loess or silty alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 1 to 12 percent

Taxonomic classification: Fine-loamy, mixed Oxyaquic Glossoboralfs

Typical Pedon

Hiles silt loam, 1 to 6 percent slopes, approximately 1,000 feet south and 100 feet east of the northwest corner of sec. 16, T. 24 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine and fine roots; about 1 percent gravel; slightly acid; abrupt wavy boundary.
B/E—9 to 19 inches; 70 percent dark yellowish brown (10YR 4/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few faint dark brown (10YR 4/3) clay films on faces of some peds; penetrated by tongues of brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; common very fine and fine roots; about 1 percent gravel; strongly acid; clear wavy boundary.
2Bt1—19 to 23 inches; dark brown (10YR 4/3) loam; strong medium subangular blocky structure; firm; few very fine and fine roots; many distinct dark brown (7.5YR 4/3) clay films on faces of most peds; few fine prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; about 2 percent gravel and sandstone channers; very strongly acid; clear wavy boundary.
2Bt2—23 to 29 inches; light olive brown (2.5Y 5/3) clay loam; strong medium subangular blocky structure; firm; few very fine and fine roots; few prominent brown (7.5YR 5/3) clay films on faces of some peds; few fine prominent brownish yellow (10YR 6/8) masses of iron accumulation and common fine faint grayish brown (2.5Y 5/2) masses of iron depletion; about 5 percent sandstone channers; very strongly acid; clear wavy boundary.
2Cr—29 to 60 inches; interbedded light gray (10YR 7/2) sandstone and olive gray (5Y 5/2) shale.

Range in Characteristics

Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of the silty mantle: 12 to 30 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the silty mantle and 2Bt1 horizon; 3 to 15 percent sandstone channers in the 2Bt2 horizon

Ap horizon (if it occurs):
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E part of B/E horizon:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam or silt

Bt part of B/E horizon:
Hue—10YR
Value—3 to 5

Chroma—3 to 6 (value and chroma of 3 do not occur together)
Texture—silt loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—3 to 7
Chroma—2 to 8
Texture—sandy loam, sandy clay loam, loam, clay loam, or silty clay loam; thin subhorizons of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—3 to 7
Chroma—1 to 8

Humbird Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Loamy alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 1 to 20 percent

Taxonomic classification: Coarse-loamy over clayey, mixed, frigid Oxyaquic Haplorthods

Typical Pedon

Humbird fine sandy loam (fig. 17), in an area of Humbird-Merrillan fine sandy loams, 0 to 6 percent slopes; approximately 100 feet north and 2,500 feet west of the southeast corner of sec. 29, T. 23 N., R. 1 E.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 35 percent fiber, 20 percent rubbed; weak thin platy structure; nonsticky; common very fine and fine and few medium roots; very strongly acid; abrupt smooth boundary.
A—1 to 2 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; weak fine granular structure; very friable; common very fine and fine and few medium roots; extremely acid; abrupt wavy boundary.
E—2 to 9 inches; pinkish gray (7.5YR 6/2) fine sandy loam, pinkish gray (7.5YR 7/2) dry; weak medium platy structure; very friable; common very fine and fine roots; very strongly acid; abrupt wavy boundary.
Bs—9 to 14 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; very friable; common very fine and fine roots; very strongly acid; clear wavy boundary.
Bw—14 to 21 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots; very strongly acid; abrupt wavy boundary.
2Bt—21 to 27 inches; light olive gray (5Y 6/2) clay loam; moderate fine subangular blocky structure; firm; few very fine and fine roots; few faint gray (5Y 6/1) clay films on faces of some peds; few fine prominent brownish yellow (10YR 6/8) masses of iron accumulation; about 8 percent sandstone channers; extremely acid; clear wavy boundary.
2Cr—27 to 60 inches; interbedded very pale brown (10YR 7/3) sandstone and light gray (5Y 7/2) shale.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of the loamy alluvium: 12 to 30 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the loamy alluvium; 3 to 15 percent sandstone channers in the 2Bt horizon

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—fine sandy loam or sandy loam

Ap horizon (if it occurs):
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—fine sandy loam or sandy loam

E horizon:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam or fine sandy loam

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam or fine sandy loam

Bw horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—sandy loam or fine sandy loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 8
Chroma—2 to 6
Texture—clay loam, silty clay loam, silty clay, or clay; thin subhorizons of coarser texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 8
Chroma—2 to 6

Ironrun Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Rapid or very rapid
Landform: Pediments and stream terraces
Parent material: Siliceous sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Sandy, siliceous, frigid Typic Endoaquods

Typical Pedon

Ironrun sand (fig. 18), in an area of Ironrun-Ponycreek complex, 0 to 3 percent slopes; approximately 2,550 feet south and 20 feet west of the northeast corner of sec. 33, T. 23 N., R. 3 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 3 inches; black (5YR 2.5/1) sand, very dark gray (5YR 3/1) dry; moderate medium granular structure; very friable; many fine, medium, and coarse roots; extremely acid; abrupt smooth boundary.
E—3 to 12 inches; brown (7.5YR 5/2) sand, pinkish gray (7.5YR 7/2) dry; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; very strongly acid; abrupt wavy boundary.
Bhs—12 to 19 inches; dark reddish brown (5YR 2.5/2) sand; moderate fine and medium subangular blocky structure; few fine and medium roots; very friable; extremely acid; abrupt wavy boundary.
Bs—19 to 29 inches; dark brown (7.5YR 4/4) sand; weak medium subangular blocky structure; very friable; few fine roots; many medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; extremely acid; gradual wavy boundary.
C—29 to 61 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; the color is that of the uncoated sand grains; few medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid.

Range in Characteristics

Volume of sandstone channers: 0 to 5 percent throughout the profile

A horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—sand

E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—1 to 3
Texture—sand or coarse sand

Bhs horizon:
Hue—5YR or 7.5YR
Value—2 or 3
Chroma—1 to 3
Texture—sand or coarse sand

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand or coarse sand

C horizon:
Hue—7.5YR or 10YR
Value—4 to 7
Chroma—1 to 8
Texture—sand or coarse sand

Kert Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow

to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Loess or silty alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 0 to 3 percent

Taxonomic classification: Fine-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Kert silt loam, 0 to 3 percent slopes, approximately 200 feet south and 500 feet west of the northeast corner of sec. 25, T. 24 N., R. 1 E.

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

B/E—9 to 22 inches; 70 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct brown (7.5YR 5/2) masses of iron depletion and common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; penetrated by tongues of brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; common very fine and fine roots; few fine faint grayish brown (10YR 5/2) masses of iron depletion and common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; strongly acid; clear wavy boundary.

2Bt1—22 to 26 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common faint dark brown (7.5YR 4/3) clay films on faces of peds; common medium distinct brown (7.5YR 5/2) masses of iron depletion and strong brown (7.5YR 5/8) masses of iron accumulation; very strongly acid; clear wavy boundary.

2Bt2—26 to 34 inches; light yellowish brown (2.5Y 6/4) silty clay loam; strong medium subangular blocky structure; firm; few very fine and fine roots; few faint light yellowish brown (2.5Y 6/3) clay films on faces of peds; few fine prominent dark gray (N 4/0) and common fine prominent gray (5Y 6/1) masses of iron depletion; few medium prominent brownish yellow (10YR 6/8) masses of iron accumulation; about 5 percent sandstone channers; very strongly acid; clear wavy boundary.

2Cr—34 to 60 inches; interbedded pale brown (10YR 6/3) sandstone and gray (5Y 6/1) shale.

Range in Characteristics

Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of the silty mantle: 12 to 30 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the silty mantle and 2Bt1 horizon; 3 to 15 percent sandstone channers in the 2Bt2 horizon

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E part of B/E horizon:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt part of B/E horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—silt loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—3 to 7
Chroma—2 to 8
Texture—sandy loam, loam, sandy clay loam, clay loam, or silty clay loam; thin subhorizons of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—3 to 7
Chroma—1 to 8

Loxley Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid
Landform: Moraines
Parent material: Herbaceous organic material
Slope range: 0 to 1 percent

Taxonomic classification: Dysic Typic Borosaprists

Typical Pedon

Loxley peat, 0 to 1 percent slopes, approximately 2,200 feet north and 480 feet east of the southwest corner of sec. 35, T. 25 N., R. 4 W.

Oi—0 to 6 inches; peat (fibric material), dark brown (10YR 3/3) broken face, very dark grayish brown (10YR 3/2) rubbed; about 90 percent fiber, 75 percent rubbed; weak thick platy structure; nonsticky; many fine roots; primarily sphagnum moss fibers; extremely acid (pH 4.2 in water 1:1); abrupt smooth boundary.

Oa1—6 to 20 inches; muck (sapric material), black (10YR 2/1) broken face and rubbed; about 45 percent fiber, 10 percent rubbed; weak thick platy structure; nonsticky; primarily herbaceous fibers; extremely acid (pH 4.4 in water 1:1); gradual wavy boundary.

Oa2—20 to 60 inches; muck (sapric material), black (5YR 2.5/1) broken face and rubbed; about 50 percent fiber, 15 percent rubbed; massive; nonsticky; primarily herbaceous fibers; extremely acid (pH 4.4 in water 1:1).

Range in Characteristics

Thickness of herbaceous organic material: Greater than 51 inches

Oi horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—peat

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

Loyal Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 1 to 12 percent

Taxonomic classification: Fine-loamy, mixed Oxyaquic Glossoboralfs

Typical Pedon

Loyal silt loam, 1 to 6 percent slopes, approximately 1,300 feet south and 200 feet east of the northwest corner of sec. 28, T. 25 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

E—9 to 14 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate thick platy structure parting to moderate fine subangular blocky; friable; few fine roots; common medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; neutral; abrupt smooth boundary.

E/B—14 to 20 inches; 75 percent brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; tongues into and surrounds remnants of brown (7.5YR 5/4) silt loam (Bt); strong coarse prismatic structure parting to strong medium and coarse subangular blocky; firm; few faint dark brown (7.5YR 4/4) clay films on faces of peds; few fine roots; common medium prominent and distinct strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.

2B/E—20 to 24 inches; 75 percent reddish brown (5YR 5/4) loam (2Bt); strong coarse prismatic structure parting to strong coarse subangular blocky; firm; few faint reddish brown (5YR 4/4) clay films on faces of peds; penetrated by tongues of brown (7.5YR 5/3) silt loam (E), light brown (7.5YR 6/3) dry; moderate coarse subangular blocky structure; friable; common fine prominent and distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 4 percent gravel; very strongly acid; clear wavy boundary.

2Bt1—24 to 36 inches; reddish brown (5YR 4/4) loam; strong coarse prismatic structure parting to strong coarse subangular blocky; firm; common faint dark reddish brown (5YR 3/4) clay films on faces of peds; common medium prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; about 4 percent gravel; very strongly acid; gradual smooth boundary.

2Bt2—36 to 45 inches; yellowish red (5YR 4/6) loam; moderate coarse subangular blocky structure; firm; few distinct reddish brown (5YR 4/4) clay films on vertical faces of peds; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 4 percent gravel; very strongly acid; gradual smooth boundary.

2C—45 to 60 inches; brown (7.5YR 5/4) sandy loam;

massive; firm; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; about 4 percent gravel; strongly acid.

Range in Characteristics

Thickness of the silty mantle: 12 to 36 inches
Volume of rock fragments: 0 to 10 percent gravel and 0 to 5 percent cobbles in the silty mantle; 3 to 35 percent gravel and 0 to 10 percent cobbles in the till

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon and E part of E/B horizon:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

2E part of 2B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—loam or gravelly loam

Bt part of E/B horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

2Bt part of 2B/E horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—loam, sandy clay loam, clay loam, or the gravelly analogs of these textures

2Bt horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—sandy loam, loam, sandy clay loam, or the gravelly analogs of these textures

2C horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—sandy loam, loam, sandy clay loam, or the gravelly analogs of these textures

Ludington Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Moderately well drained
Permeability: Rapid or very rapid in the siliceous sandy alluvium, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Siliceous sandy alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 1 to 20 percent

Taxonomic classification: Sandy over loamy, siliceous, frigid Oxyaquic Haplorthods

Typical Pedon

Ludington sand (fig. 19), in an area of Ludington-Fairchild sands, 0 to 6 percent slopes; approximately 1,300 feet north and 1,400 feet west of the southeast corner of sec. 28, T. 23 N., R. 3 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 4 inches; black (10YR 2/1) sand, gray (10YR 5/1) dry; weak fine granular structure; very friable; common very fine and fine and few medium roots; extremely acid; abrupt wavy boundary.
E—4 to 11 inches; grayish brown (10YR 5/2) sand, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; very friable; common very fine and fine and few medium roots; extremely acid; abrupt wavy boundary.
Bs—11 to 16 inches; dark brown (7.5YR 4/4) sand; moderate medium subangular blocky structure; very friable; few very fine and fine roots; very strongly acid; clear wavy boundary.
Bw1—16 to 26 inches; yellowish brown (10YR 5/6) sand; weak medium subangular blocky structure;

Figure 14.—Profile of Eauclaire loamy sand, 1 to 6 percent slopes. Depth is marked in feet.

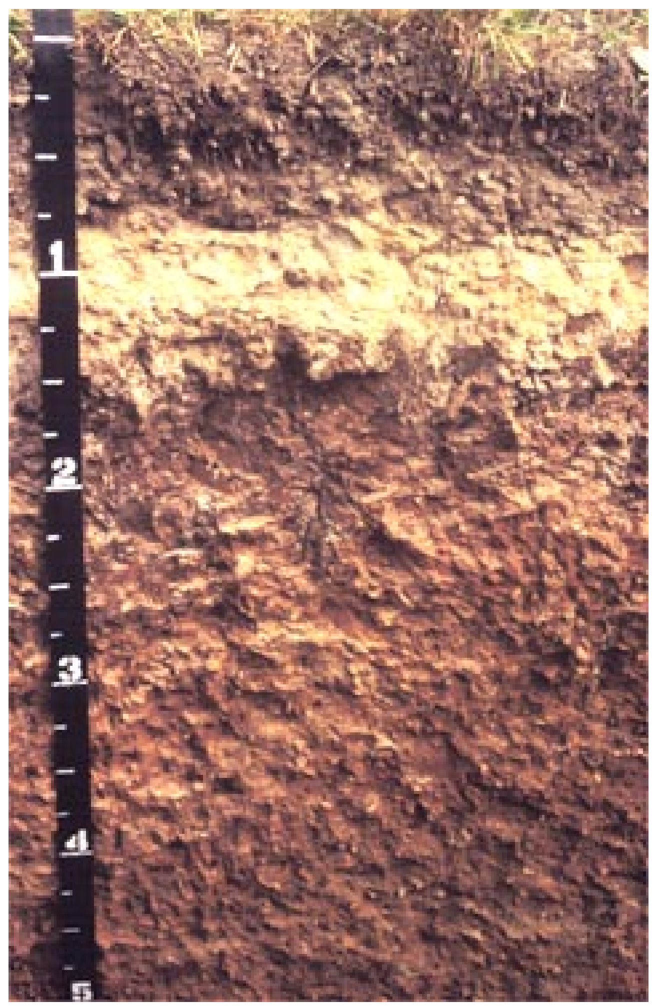

Figure 15.—Profile of a Fallcreek loam. Depth is marked in feet.

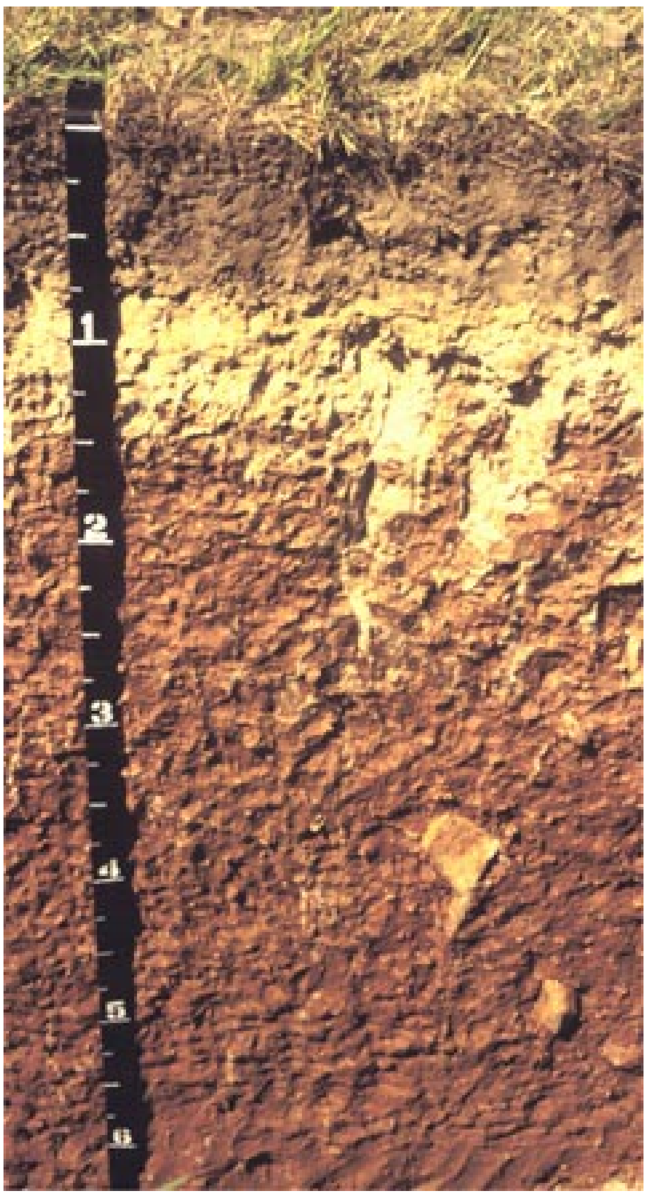

Figure 16.—Profile of Flambeau loam, 1 to 6 percent slopes. Depth is marked in feet.

Figure 17.—Profile of a Humbird fine sandy loam. Depth is marked in feet.

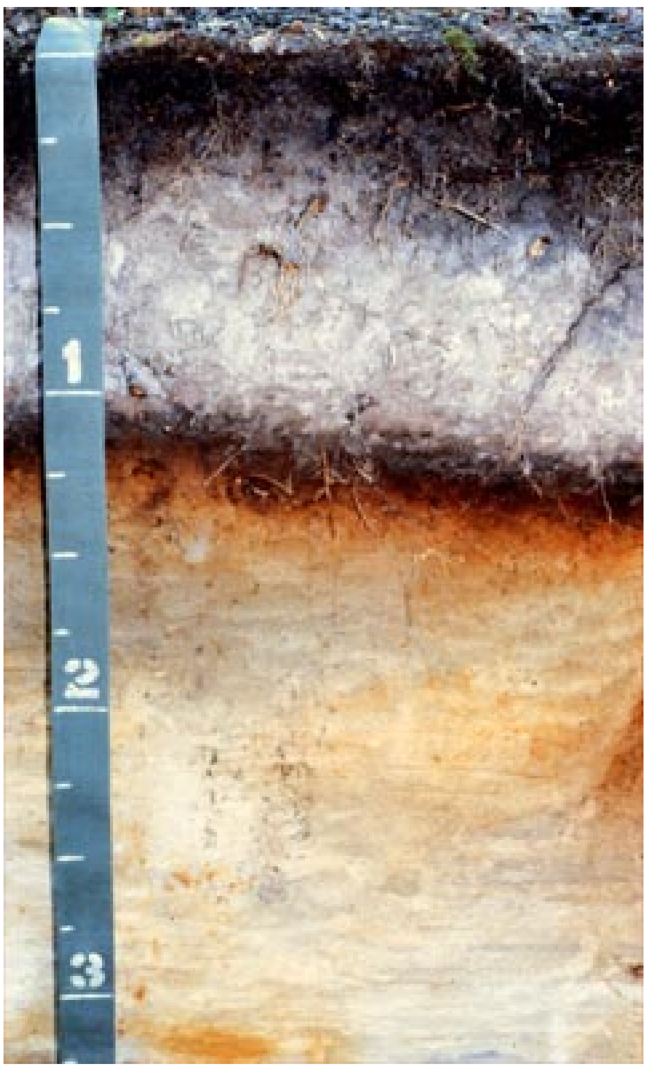

Figure 18.—Profile of an Ironrun sand. Depth is marked in feet.

Figure 19.—Profile of a Ludington sand. Depth is marked in feet.

Figure 20.—Profile of a Mahtomedi loamy sand. Depth is marked in feet.

Figure 21.—Profile of Withee silt loam, 0 to 3 percent slopes. Depth is marked in feet.

very friable; few very fine and fine roots; very strongly acid; clear wavy boundary.

Bw2—26 to 33 inches; very pale brown (10YR 7/4) sand; weak coarse subangular blocky structure; very friable; few fine roots; many coarse prominent strong brown (7.5YR 5/8) masses of iron accumulation; very strongly acid; abrupt wavy boundary.

2Bt—33 to 39 inches; light gray (5Y 7/2) sandy clay loam; moderate fine subangular blocky structure; firm; few fine roots; few faint light olive gray (5Y 6/2) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; about 5 percent sandstone channers; extremely acid; abrupt wavy boundary.

2Cr—39 to 60 inches; interbedded light gray (2.5Y 7/2) sandstone and light olive gray (5Y 6/2) shale.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.

Depth to interbedded sandstone and shale: 20 to 40 inches

Thickness of siliceous sandy alluvium: 15 to 39 inches

Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the siliceous sandy alluvium; 3 to 15 percent sandstone channers in the 2Bt horizon

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—sand

Ap horizon (if it occurs):
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—sand

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Bw horizon:
Hue—10YR
Value—5 to 7
Chroma—4 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—2 to 6
Texture—sandy loam, fine sandy loam, sandy clay loam, loam, clay loam, or silty clay loam; thin subhorizons of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—2 to 6

Magnor Series

Depth class: Deep to dense loamy glacial till
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part, slow or moderately slow in the upper part of the loamy till, and very slow in the lower part of the loamy till
Landform: Moraines
Parent material: Loess or silty alluvium underlain by dense loamy glacial till
Slope range: 0 to 4 percent

Taxonomic classification: Coarse-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Magnor silt loam, 0 to 4 percent slopes, very stony, approximately 2,175 feet south and 80 feet east of the northwest corner of sec. 2, T. 29 N., R. 4 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; very friable; many very fine and fine roots; neutral; abrupt smooth boundary.

E—9 to 15 inches; pale brown (10YR 6/3) silt loam, very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; common very fine and fine roots; common fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

B/E—15 to 21 inches; 60 percent dark yellowish brown (10YR 4/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 3/4) clay films on faces of peds; penetrated by tongues of pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; few very fine and fine roots; common coarse prominent strong brown (7.5YR 5/6) masses of iron accumulation and common medium distinct and faint grayish brown (10YR 5/2) masses of iron depletion; moderately acid; clear wavy boundary.

2Bt1—21 to 39 inches; reddish brown (5YR 4/4) gravelly sandy loam; moderate medium and coarse subangular blocky structure; friable; few very fine and fine roots; common faint reddish brown (5YR 4/3) clay films on faces of peds; pale brown (10YR 6/3) clean silt and sand grains coating faces of some peds; few fine distinct pinkish gray (5YR 6/2) masses of iron depletion and common medium distinct yellowish red (5YR 4/6) masses of iron accumulation; about 11 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2Bt2—39 to 45 inches; reddish brown (5YR 4/4) gravelly sandy loam; weak coarse subangular blocky structure; friable; few faint reddish brown (5YR 4/3) clay films on faces of peds; common medium distinct pinkish gray (5YR 6/2) masses of iron depletion and many medium distinct yellowish red (5YR 4/6) masses of iron accumulation; about 10 percent gravel and 5 percent cobbles; moderately acid; gradual wavy boundary.

2Cd—45 to 60 inches; reddish brown (5YR 4/4) sandy loam; massive; firm; dense and compact; few medium distinct yellowish red (5YR 4/6) masses of iron accumulation; about 9 percent gravel and 3 percent cobbles; slightly acid.

Range in Characteristics

Depth to dense loamy glacial till: 40 to 60 inches
Thickness of the silty mantle: 12 to 36 inches
Volume of gravel and cobbles: 0 to 10 percent gravel and 0 to 5 percent cobbles in the silty mantle; 5 to 35 percent gravel and 0 to 10 percent cobbles in the till
Volume of stones: 2 to 3 percent on the surface; 0 to 5 percent throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4 (where moist value is 3, dry value is 6 or more)
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon and E part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam or silt

Bt part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—silt loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

2Cd horizon:
Hue—2.5YR, 5YR, or 7.5YR
Value—3 to 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Mahtomedi Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid or very rapid
Landform: Stream terraces
Parent material: Sandy outwash
Slope range: 0 to 12 percent

Taxonomic classification: Mixed, frigid Typic Udipsamments

Typical Pedon

Mahtomedi loamy sand (fig. 20), 0 to 6 percent slopes, approximately 2,140 feet south and 1,840 feet west of the northeast corner of sec. 25, T. 23 N., R. 3 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 4 inches; black (10YR 2/1) loamy sand, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many common white (10YR 8/2) clean sand grains; common very fine and fine and few medium roots; strongly acid; abrupt smooth boundary.

Bw1—4 to 15 inches; dark brown (7.5YR 4/4) coarse sand; weak coarse subangular blocky structure; very friable; common very fine and fine roots; about 5 percent gravel; strongly acid; clear wavy boundary.

Bw2—15 to 20 inches; dark brown (7.5YR 4/4) gravelly coarse sand; weak coarse subangular blocky structure; very friable; few very fine and fine roots; about 15 percent gravel and 1 percent cobbles; strongly acid; clear wavy boundary.

C1—20 to 28 inches; strong brown (7.5YR 4/6), stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand; single grain; loose; few very fine and fine roots; about 30 percent gravel and 2 percent cobbles as an average; moderately acid; clear wavy boundary.

C2—28 to 61 inches; strong brown (7.5YR 5/6), stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand; single grain; loose; about 25 percent gravel and 2 percent cobbles as an average; moderately acid.

Range in Characteristics

Volume of rock fragments: 0 to 35 percent gravel and 0 to 5 percent cobbles throughout the profile

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loamy sand

Ap horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—1 to 3
Texture—loamy sand

E horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—1 to 3
Texture—sand, coarse sand, loamy sand, or the gravelly analogs of these textures

Bw horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—3 to 6
Texture—sand, coarse sand, or the gravelly analogs of these textures

C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—stratified sand, coarse sand, or the gravelly analogs of these textures

Maplehurst Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Mostly silty alluvium underlain by sandy outwash
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty, mixed Aquic Glossoboralfs

Typical Pedon

Maplehurst silt loam, 0 to 3 percent slopes, approximately 1,500 feet north and 350 feet west of the southeast corner of sec. 5, T. 29 N., R. 2 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; many fine roots; about 1 percent gravel; moderately acid; abrupt smooth boundary.

E/B—9 to 16 inches; 70 percent pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium platy structure; friable; tongues into and surrounds remnants of yellowish brown (10YR 5/4) silt loam (Bt); weak fine subangular blocky structure; friable; many fine roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; about 1 percent gravel; strongly acid; gradual wavy boundary.

B/E—16 to 25 inches; 60 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few distinct dark brown (7.5YR 4/3) clay films on faces of peds; penetrated by tongues of pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; few fine roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and few medium faint grayish brown (10YR 5/2) masses of iron depletion; about 1 percent gravel; strongly acid; gradual wavy boundary.

Bt1—25 to 44 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; common faint pale brown (10YR 6/3) coatings of clean silt grains on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and few medium prominent grayish brown (2.5Y 5/2) masses of iron depletion; about 1 percent gravel; very strongly acid; abrupt wavy boundary.

2Bt2—44 to 47 inches; dark brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few faint dark brown (7.5YR 4/3) clay films on faces of peds; few fine distinct strong brown (7.5YR 5/8) masses of iron accumulation; about 8 percent gravel; moderately acid; abrupt wavy boundary.

3C—47 to 60 inches; yellowish brown (10YR 5/4), stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand; single grain; loose; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; about 35 percent gravel and 5 percent cobbles as an average; moderately acid.

Range in Characteristics

Thickness of the silty alluvium: 40 to 60 inches
Volume of rock fragments: 0 to 5 percent gravel and 0 to 5 percent cobbles in the silty alluvium; 0 to 40 percent gravel and 0 to 10 percent cobbles in the 2Bt horizon; 3 to 65 percent gravel and 0 to 10 percent cobbles in the 3C horizon

Ap horizon:
Hue—7.5YR or 10YR
Value—3 or 4 (where moist value is 3, dry value is more than 5.5)
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

2Bt horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, sandy clay loam, loam, or the gravelly or very gravelly analogs of these textures

3C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—2 to 8
Texture—stratified sand, coarse sand, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

Markey Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow to moderately rapid in the organic material and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Herbaceous organic material underlain by sandy outwash
Slope range: 0 to 1 percent

Taxonomic classification: Sandy or sandy-skeletal, mixed, euic Terric Borosaprists

Typical Pedon

Markey muck, in an area of Markey-Newson mucks, 0 to 2 percent slopes; approximately 650 feet north and 2,050 feet west of the southeast corner of sec. 13, T. 23 N., R. 3 W.

Oa1—0 to 2 inches; muck (sapric material), black (10YR 2/1) broken face, black (N 2/0) rubbed; about 40 percent fiber, 5 percent rubbed; weak thin platy structure; nonsticky; common very fine and fine roots; primarily herbaceous fibers; strongly acid (pH 5.3 in water 1:1); abrupt wavy boundary.

Oa2—2 to 18 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 5 percent fiber, trace rubbed; weak medium platy structure; nonsticky; few very fine and fine roots; primarily herbaceous fibers; strongly acid (pH 5.3 in water 1:1); gradual wavy boundary.

Oa3—18 to 27 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 1 percent fiber, trace rubbed; weak coarse subangular blocky structure; primarily herbaceous fibers;

about 30 percent mineral matter; moderately acid (pH 5.8 in water 1:1); abrupt wavy boundary.
Cg—27 to 60 inches; dark gray (10YR 4/1), stratified coarse sand and gravelly coarse sand; single grain; loose; about 10 percent gravel as an average; slightly acid.

Range in Characteristics

Thickness of herbaceous organic material: 16 to 51 inches
Volume of gravel: 0 to 25 percent in the sandy outwash

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 to 4
Chroma—0 to 3
Texture—muck

C horizon:
Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 4
Texture—stratified sand, coarse sand, or the gravelly analogs of these textures

Marshfield Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 0 to 2 percent

Taxonomic classification: Fine-loamy, mixed, frigid Mollic Epiaqualfs

Typical Pedon

Marshfield silt loam, 0 to 2 percent slopes, approximately 1,100 feet north and 150 feet west of the southeast corner of sec. 35, T. 28 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.
Eg—9 to 14 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate very fine subangular blocky structure; very friable; common very fine and fine roots; common medium distinct dark yellowish brown (10YR 4/6) masses of iron accumulation; strongly acid; gradual irregular boundary.
Btg1—14 to 30 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; few faint very dark grayish brown (10YR 3/2) clay films on faces of peds; many coarse prominent strong brown (7.5YR 5/6) and common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; about 3 percent gravel; strongly acid; clear wavy boundary.
2Btg2—30 to 36 inches; grayish brown (10YR 5/2) loam; moderate medium subangular blocky structure; firm; common faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; many coarse prominent strong brown (7.5YR 5/8) and common medium distinct yellowish brown (10YR 5/8) masses of iron accumulation; about 10 percent gravel; strongly acid; clear wavy boundary.
2C—36 to 60 inches; brown (7.5YR 5/4) loam; massive; firm; few fine distinct very pale brown (10YR 7/3) masses of iron depletion and many coarse distinct strong brown (7.5YR 5/8) masses of iron accumulation; about 10 percent gravel; neutral.

Range in Characteristics

Thickness of the silty mantle: 12 to 36 inches
Volume of rock fragments: 0 to 10 percent gravel and 0 to 5 percent cobbles in the silty mantle; 5 to 35 percent gravel and 0 to 10 percent cobbles in the till

Ap horizon or A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Eg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silt

Btg1 horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

2Btg2 horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2

Texture—sandy loam, loam, sandy clay loam, clay loam, or the gravelly analogs of these textures

2C horizon:
Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 4
Texture—sandy loam, fine sandy loam, loam, sandy clay loam, clay loam, or the gravelly analogs of these textures

Menahga Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid or very rapid
Landform: Stream terraces
Parent material: Sandy outwash
Slope range: 0 to 6 percent

Taxonomic classification: Mixed, frigid Typic Udipsamments

Typical Pedon

Menahga loamy sand, 0 to 6 percent slopes, approximately 1,250 feet south and 1,100 feet west of the northeast corner of sec. 13, T. 23 N., R. 3 W.

Oi—0 to 1 inch; dark grayish brown (10YR 4/2) peat (fibric material occurring as a mat of partially decomposed forest litter); about 50 percent fiber and 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 4 inches; black (10YR 2/1) loamy sand, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many fine and medium roots; moderately acid; abrupt wavy boundary.

Bw1—4 to 11 inches; dark brown (7.5YR 3/4) loamy coarse sand; weak fine and medium subangular blocky structure; very friable; common fine and few medium roots; about 2 percent gravel; moderately acid; gradual wavy boundary.

Bw2—11 to 19 inches; dark brown (7.5YR 4/4) coarse sand; weak medium subangular blocky structure; very friable; few fine roots; about 5 percent gravel; moderately acid; gradual wavy boundary.

BC—19 to 24 inches; strong brown (7.5YR 4/6) coarse sand; weak medium subangular blocky structure; very friable; few fine roots; about 10 percent gravel; strongly acid; gradual wavy boundary.

C—24 to 61 inches; strong brown (7.5YR 5/6) coarse sand; single grain; loose; about 2 percent gravel; slightly acid.

Range in Characteristics

Volume of gravel: 0 to 10 percent throughout the profile

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

Ap horizon (if it occurs):
Hue—10YR
Value—4 to 6 (6 dry)
Texture—loamy sand

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—sand, coarse sand, loamy sand, or loamy coarse sand

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—sand or coarse sand

Merimod Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty and loamy alluvium and rapid in the siliceous sandy alluvium
Landform: Pediments and stream terraces
Parent material: Silty alluvium over loamy alluvium underlain by siliceous sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs

Typical Pedon

Merimod silt loam, 0 to 3 percent slopes, approximately 1,100 feet south and 1,600 feet east of the northwest corner of sec. 8, T. 23 N., R. 4 W., in Jackson County:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; very friable; many medium, fine, and very fine roots; moderately acid; abrupt wavy boundary.

Bt1—9 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—13 to 17 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; many faint dark brown (7.5YR 4/3) clay films on faces of peds; very strongly acid; clear wavy boundary.

2Bt3—17 to 29 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; many faint dark brown (7.5YR 4/3) clay films on faces of peds; very strongly acid; abrupt smooth boundary.

2Bt4—29 to 32 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; abrupt wavy boundary.

3C1—32 to 52 inches; yellowish brown (10YR 5/6) sand; single grain; loose; few strata of dark yellowish brown (10YR 4/4) loamy sand 1/8 inch thick; strongly acid; clear wavy boundary.

3C2—52 to 60 inches; brownish yellow (10YR 6/6) sand; single grain; loose; common medium distinct light yellowish brown (10YR 6/4) masses of iron depletion and many coarse distinct yellowish brown (10YR 5/8) masses of iron accumulation; moderately acid.

Range in Characteristics

Depth to siliceous sandy alluvium: 25 to 40 inches
Thickness of the silty alluvium: 10 to 30 inches
Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap or A horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—4
Texture—silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—4
Texture—sandy loam, sandy clay loam, or loam

3C horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 to 6
Texture—sand; thin strata of loamy sand or sandy loam in some pedons

Merit Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate in the silty and loamy alluvium and rapid in the siliceous sandy alluvium
Landform: Pediments and stream terraces
Parent material: Silty alluvium over loamy alluvium underlain by siliceous sandy alluvium
Slope range: 0 to 6 percent

Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs

Typical Pedon

Merit silt loam, in an area of Merit-Gardenvale silt loams, 1 to 6 percent slopes; approximately 2,100 feet south and 400 feet west of the northeast corner of sec. 15, T. 22 N., R. 5 W., in Jackson County:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—9 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; common fine and medium roots; common faint dark yellowish brown (10YR 3/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

2Bt2—12 to 20 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common distinct dark reddish brown (5YR 3/3) clay films on faces of peds; very strongly acid; clear wavy boundary.

2Bt3—20 to 30 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark reddish brown (5YR 3/3) clay films on faces of peds; very strongly acid; gradual wavy boundary.

3C—30 to 60 inches; strong brown (7.5YR 5/6) sand; single grain; loose; very strongly acid.

Range in Characteristics

Depth to siliceous sandy alluvium: 25 to 40 inches

Thickness of the silty alluvium: 10 to 30 inches
Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap or A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—4
Texture—silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—4 or 5
Texture—sandy loam, sandy clay loam, or loam

3C horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 to 6
Texture—sand; thin strata of loamy sand or sandy loam in some pedons

Merrillan Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Somewhat poorly drained
Permeability: Moderate or moderately rapid in the loamy alluvium, slow in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Loamy alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy over clayey, mixed, frigid Ultic Epiaquods

Typical Pedon

Merrillan fine sandy loam, in an area of Merrillan-Veedum complex, 0 to 3 percent slopes; approximately 100 feet north and 800 feet east of the southwest corner of sec. 26, T. 23 N., R. 1 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak very thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 3 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; common very fine, fine, and medium roots; extremely acid; abrupt wavy boundary.
E—3 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak medium platy structure; very friable; common very fine and fine and few medium roots; extremely acid; abrupt wavy boundary.
Bs1—6 to 11 inches; dark brown (7.5YR 3/4) sandy loam; moderate medium subangular blocky structure; very friable; few very fine and fine roots; very strongly acid; clear wavy boundary.
Bs2—11 to 13 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; very friable; few very fine and fine roots; few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; clear wavy boundary.
Bw—13 to 21 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; abrupt wavy boundary.
2Bt—21 to 30 inches; pinkish gray (5YR 6/2) clay loam; moderate medium subangular blocky structure; firm; few faint gray (5YR 6/1) clay films on faces of some peds; few fine prominent brownish yellow (10YR 6/6) and common coarse prominent dark reddish brown (2.5YR 3/4) masses of iron accumulation; about 10 percent sandstone channers; extremely acid; clear wavy boundary.
2Cr—30 to 60 inches; interbedded very pale brown (10YR 7/3) sandstone and light gray (5Y 7/2) shale.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of the loamy alluvium: 12 to 30 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the loamy alluvium; 3 to 15 percent sandstone channers in the 2Bt horizon

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Texture—fine sandy loam or sandy loam

Ap horizon (if it occurs):
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—fine sandy loam or sandy loam

E horizon:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam or fine sandy loam

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam or fine sandy loam

Bw horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—sandy loam or fine sandy loam

2Bt horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 8
Chroma—2 to 6
Texture—clay loam, silty clay loam, silty clay, or clay; thin subhorizons of coarser texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 8
Chroma—2 to 6

Moppet Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the loamy alluvium and rapid in the sandy alluvium
Landform: Flood plains
Parent material: Loamy alluvium underlain by sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, mixed, frigid Oxyaquic Dystrochrepts

Typical Pedon

Moppet fine sandy loam, in an area of Moppet-Fordum complex, 0 to 3 percent slopes; approximately 150 feet south and 1,850 feet east of the northwest corner of sec. 25, T. 28 N., R. 2 W.

A—0 to 5 inches; dark brown (7.5YR 3/2) fine sandy loam, brown (7.5YR 5/2) dry; weak fine subangular blocky structure; very friable; many very fine and fine roots; strongly acid; abrupt smooth boundary.
Bw1—5 to 13 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine and fine roots; strongly acid; clear wavy boundary.
Bw2—13 to 30 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine roots; extremely acid; abrupt smooth boundary.
Bw3—30 to 35 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; extremely acid; abrupt smooth boundary.
2BC—35 to 39 inches; yellowish brown (10YR 5/4) loamy sand; weak medium subangular blocky structure; very friable; common medium distinct brownish yellow (10YR 6/8) masses of iron accumulation; about 10 percent gravel; extremely acid; abrupt smooth boundary.
2C—39 to 60 inches; yellowish brown (10YR 5/6) sand that has thin strata of fine sand; single grain; loose; common medium distinct brownish yellow (10YR 6/8) masses of iron accumulation; extremely acid.

Range in Characteristics

Thickness of the loamy alluvium: 24 to 40 inches
Volume of gravel: 0 to 35 percent in the sandy alluvium

A horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—1 to 3
Texture—fine sandy loam

Bw horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—fine sandy loam, sandy loam, or loam

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—sand, fine sand, loamy sand, loamy fine sand, or the gravelly analogs of these textures; thin strata of finer texture in some pedons

Newood Series

Depth class: Deep or very deep to dense loamy glacial till
Drainage class: Moderately well drained
Permeability: Moderate in the upper part of the loamy till, slow in the middle part of the loamy till, and very slow in the lower part of the loamy till
Landform: Moraines
Parent material: Dense loamy glacial till
Slope range: 2 to 15 percent

Taxonomic classification: Coarse-loamy, mixed, frigid Oxyaquic Haplorthods

Typical Pedon

Newood sandy loam, in an area of Newood-Magnor-Cathro complex, 0 to 15 percent slopes, very stony; approximately 2,300 feet south and 100 feet east of the northwest corner of sec. 4, T. 29 N., R. 4 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 4 inches; black (10YR 2/1) sandy loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many very fine to coarse roots; about 6 percent gravel; strongly acid; abrupt wavy boundary.
E—4 to 5 inches; grayish brown (10YR 5/2) sandy loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; many very fine to coarse roots; about 6 percent gravel; strongly acid; abrupt wavy boundary.
Bs—5 to 15 inches; dark brown (7.5YR 3/4) sandy loam; weak fine subangular blocky structure; friable; common very fine to coarse roots; about 6 percent gravel; moderately acid; clear wavy boundary.
E/B—15 to 27 inches; 60 percent brown (7.5YR 5/3) sandy loam (E), pink (7.5YR 7/3) dry; weak thin platy structure; friable; tongues into and surrounds remnants of dark brown (7.5YR 4/4) sandy loam (Bt); moderate medium subangular blocky structure; friable; common fine and medium roots; about 10 percent gravel and 4 percent cobbles; strongly acid; clear wavy boundary.
B/E—27 to 38 inches; 70 percent dark brown (7.5YR 4/3) sandy loam (Bt); moderate medium subangular blocky structure; friable; few faint dark brown (7.5YR 4/3) clay films on faces of peds; penetrated by tongues of brown (7.5YR 5/3) sandy loam (E), pink (7.5YR 7/3) dry; weak thin play structure; friable; common fine and medium roots; about 10 percent gravel and 4 percent cobbles; slightly acid; clear wavy boundary.
Bt1—38 to 46 inches; reddish brown (5YR 4/4) gravelly sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint reddish brown (5YR 4/3) clay films on faces of most peds; common fine distinct yellowish red (5YR 4/6) masses of iron accumulation; about 20 percent gravel and 4 percent cobbles; slightly acid; clear wavy boundary.
Bt2—46 to 63 inches; reddish brown (5YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; few faint dark reddish brown (5YR 3/3) clay films on faces of most peds; about 10 percent gravel and 4 percent cobbles; slightly acid; gradual wavy boundary.
Cd—63 to 65 inches; reddish brown (5YR 4/3) sandy loam; massive; firm; dense and compact; about 10 percent gravel and 4 percent cobbles; slightly acid.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Depth to dense loamy glacial till: 40 to 70 inches
Volume of gravel: 2 to 20 percent in the upper part of the loamy till and 5 to 30 percent in the lower part of the loamy till
Volume of cobbles: 0 to 10 percent throughout the profile
Volume of stones: 2 to 3 percent on the surface; 0 to 2 percent throughout the profile

A horizon or Ap horizon (if it occurs):
Hue—5YR, 7.5YR, or 10YR
Value—2 to 4
Chroma—1 or 2
Texture—sandy loam

E horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

Bs horizon:
Hue—2.5YR, 5YR, or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

E part of E/B and B/E horizons:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—loamy sand, sandy loam, fine sandy loam, or the gravelly analogs of these textures

Bt horizon and Bt part of E/B and B/E horizons:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Cd horizon:
Hue—2.5YR, 5YR, or 7.5YR
Value—4 or 5
Chroma—3 or 4
Texture—sandy loam, fine sandy loam, or the gravelly analogs of these textures

Newson Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Rapid or very rapid
Landform: Stream terraces
Parent material: Sandy outwash
Slope range: 0 to 2 percent

Taxonomic classification: Mixed, frigid Humaqueptic Psammaquents

Typical Pedon

Newson muck, in an area of Markey-Newson mucks, 0 to 2 percent slopes; approximately 1,640 feet south and 1,400 feet west of the northeast corner of sec. 8, T. 27 N., R. 4 W.

Oa—0 to 4 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 25 percent fiber, 5 percent rubbed; weak medium subangular blocky structure; nonsticky; many very fine to coarse roots; extremely acid; clear wavy boundary.

A—4 to 8 inches; black (10YR 2/1) mucky sand, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; very friable; many very fine to coarse roots; extremely acid; clear wavy boundary.

Bg—8 to 25 inches; dark gray (10YR 4/1) sand; weak coarse subangular blocky structure; very friable; common very fine to coarse roots; the color is that of the uncoated sand grains with organic coatings on faces of some peds; very strongly acid; abrupt irregular boundary.

C1—25 to 36 inches; dark brown (7.5YR 4/4) coarse sand; single grain; loose; about 5 percent gravel; the color is that of the uncoated sand grains; moderately acid; clear wavy boundary.

C2—36 to 64 inches; yellowish brown (10YR 5/4), stratified coarse sand and gravelly coarse sand; single grain; loose; about 14 percent gravel; moderately acid.

Range in Characteristics

Volume of gravel: 0 to 35 percent throughout the profile

Oa horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

A horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 or 3
Chroma—1 to 3
Texture—mucky sand, loamy sand, or mucky loamy sand

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 7
Chroma—1 or 2
Texture—sand, coarse sand, loamy sand, loamy coarse sand, or the gravelly analogs of these textures

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 8
Chroma—1 to 6
Texture—sand, coarse sand, or the gravelly analogs of these textures

Northmound Series

Depth class: Moderately deep to sandstone
Drainage class: Well drained
Permeability: Moderate in the silty and loamy part and moderately slow or moderate in the bedrock
Landform: Monadnocks
Parent material: Loess or a mixture of loess and residuum derived from the underlying sandstone
Slope range: 6 to 50 percent

Taxonomic classification: Loamy-skeletal, mixed Typic Glossoboralfs

Typical Pedon

Northmound flaggy silt loam, in an area of Northmound-Rock outcrop complex, 15 to 50 percent slopes, very stony; approximately 600 feet south and 600 feet east of the northwest corner of sec. 5, T. 25 N., R. 1 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 5 inches; black (10YR 2/1) flaggy silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; very friable; many very fine to coarse roots; about 10 percent sandstone channers and 15 percent sandstone flagstones; moderately acid; abrupt wavy boundary.

Bw—5 to 11 inches; dark yellowish brown (10YR 3/4) flaggy silt loam; moderate medium subangular blocky structure; very friable; many very fine to coarse roots; about 10 percent sandstone channers and 15 percent sandstone flagstones; very strongly acid; clear wavy boundary.

B/E—11 to 24 inches; 75 percent dark yellowish brown (10YR 4/4) very flaggy silt loam (Bt); moderate medium subangular blocky structure; friable; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; penetrated by tongues of brown (10YR 5/3) very flaggy silt loam (E), very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; very friable; common very fine to coarse roots; about 15 percent sandstone channers and 25 percent sandstone flagstones; very strongly acid; clear wavy boundary.

2Bt—24 to 30 inches; dark yellowish brown (10YR 4/4) very flaggy loam; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; about 20 percent sandstone channers and 35 percent sandstone flagstones; extremely acid; clear wavy boundary.

R—30 inches; slightly fractured, light gray (10YR 7/2) sandstone.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.

Depth to sandstone: 20 to 40 inches

Thickness of the silty mantle: 0 to 39 inches

Volume of sandstone channers and flagstones: 2 to 15 percent sandstone channers and 5 to 25 percent flagstones in the upper part; 15 to 35 percent sandstone channers and 20 to 45 percent flagstones in the lower part

Volume of stones: 2 to 3 percent on the surface; 2 to 20 percent throughout the profile

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—flaggy silt loam

Ap horizon (if it occurs):
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—flaggy silt loam

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 or 4
Texture—sandy loam, loam, silt loam, or the channery, very channery, flaggy, or very flaggy analogs of these textures

E part of B/E horizon:
Hue—10YR
Value—4 or 5 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, loam, silt loam, or the channery, very channery, flaggy, or very flaggy analogs of these textures

Bt part of B/E horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—4 to 6
Texture—sandy loam, loam, silt loam, or the channery, very channery, flaggy, or very flaggy analogs of these textures

2Bt horizon and 2Bt part of 2B/E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 8
Texture—the channery, very channery, flaggy, or very flaggy analogs of sandy loam or loam

2E part of 2B/E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5 (where colors are 4/3 or 5/3, dry value is 7 or more)

Chroma—2 or 3
Texture—the channery, very channery, flaggy, or very flaggy analogs of sandy loam or loam

Oesterle Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the loamy alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Loamy alluvium underlain by sandy outwash
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Oesterle loam, 0 to 3 percent slopes, approximately 1,100 feet west and 600 feet north of the southeast corner of sec. 4, T. 27 N., R. 4 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.
A—1 to 6 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate coarse granular structure; friable; many very fine to coarse roots; strongly acid; abrupt irregular boundary.
B/E—6 to 12 inches; 75 percent dark yellowish brown (10YR 4/4) loam (Bt); moderate medium subangular blocky structure; friable; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; penetrated by tongues of brown (10YR 4/3) loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; many very fine to coarse roots; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; clear wavy boundary.
Bt1—12 to 18 inches; brown (10YR 5/3) loam; moderate medium subangular blocky structure; friable; many very fine to coarse roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; many fine prominent strong brown (7.5YR 4/6) masses of iron accumulation and common coarse faint grayish brown (10YR 5/2) masses of iron depletion; strongly acid; clear wavy boundary.
Bt2—18 to 27 inches; brown (10YR 5/3) sandy loam; moderate medium subangular blocky structure; very friable; few faint dark brown (10YR 4/3) clay films on faces of peds; common very fine to coarse roots; many medium prominent strong brown (7.5YR 4/6) masses of iron accumulation and many coarse faint grayish brown (10YR 5/2) masses of iron depletion; strongly acid; abrupt wavy boundary.
2BC—27 to 37 inches; dark brown (7.5YR 4/3) loamy coarse sand; single grain; loose; few very fine to coarse roots; about 2 percent gravel; moderately acid; clear wavy boundary.
2C—37 to 61 inches; pale brown (10YR 6/3), stratified gravelly coarse sand and coarse sand; single grain; loose; about 15 percent gravel as an average; moderately acid.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Thickness of the loamy mantle: 20 to 40 inches
Volume of gravel: 0 to 35 percent in the loamy alluvium and 0 to 60 percent in the sandy outwash
Volume of cobbles: 0 to 5 percent throughout the profile

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam

Ap horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—sandy loam

E part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

Bt horizon and Bt part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 8
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

2Bt horizon (if it occurs) or 2BC horizon:
Hue—7.5YR or 10YR
Value—4 to 6

Chroma—1 to 8
Texture—loamy sand, loamy coarse sand, or the gravelly or very gravelly analogs of these textures

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—1 to 8
Texture—stratified sand, coarse sand, or the gravelly or very gravelly analogs of these textures

Pelkie Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Rapid
Landform: Flood plains
Parent material: Sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Mixed, frigid Oxyaquic Udipsamments

Typical Pedon

Pelkie loamy fine sand, in an area of Pelkie-Winterfield loamy fine sands, 0 to 3 percent slopes; approximately 1,600 feet south and 1,840 feet east of the northwest corner of sec. 17, T. 26 N., R. 4 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; very friable; many very fine and fine and common medium and coarse roots; moderately acid; abrupt wavy boundary.
C1—4 to 13 inches; dark brown (10YR 4/3) fine sand; weak fine subangular blocky structure; very friable; many very fine and fine and common medium and coarse roots; common thin strata of very dark grayish brown (10YR 3/2) loamy fine sand; moderately acid; clear wavy boundary.
C2—13 to 26 inches; yellowish brown (10YR 5/4) fine sand; weak medium subangular blocky structure; very friable; common very fine and fine and few medium roots; common thin strata of dark brown (10YR 4/3) loamy fine sand; slightly acid; clear wavy boundary.
C3—26 to 38 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few very fine and fine roots; about 2 percent gravel; slightly acid; gradual wavy boundary.
C4—38 to 60 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; about 5 percent gravel; slightly acid.

Range in Characteristics

A horizon:
Hue—7.5YR or 10YR
Value—2 to 4
Chroma—1 or 2
Texture—loamy fine sand

C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—sand, fine sand, or loamy fine sand

Plover Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Stream terraces
Parent material: Mostly loamy lacustrine deposits
Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Plover very fine sandy loam, 0 to 3 percent slopes, approximately 1,500 feet south and 500 feet east of the northwest corner of sec. 22, T. 25 N., R. 2 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; very friable; common very fine and fine roots; neutral; abrupt smooth boundary.
E—10 to 17 inches; brown (10YR 5/3) very fine sandy loam, very pale brown (10YR 7/3) dry; weak thick platy structure parting to weak fine and very fine subangular blocky; very friable; few very fine and fine roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; moderately acid; clear wavy boundary.
B/E—17 to 28 inches; 65 percent yellowish brown (10YR 5/4) very fine sandy loam (Bt); moderate medium subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and few fine prominent brown (7.5YR 5/2) masses of iron depletion; penetrated by tongues of brown (10YR 5/3) very fine sandy loam (E), very pale brown (10YR 7/3) dry; weak

fine and medium subangular blocky structure; friable; few very fine and fine roots; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and few fine distinct brown (7.5YR 5/2) masses of iron depletion; moderately acid; clear wavy boundary.

Bt—28 to 33 inches; yellowish brown (10YR 5/4) very fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of some peds; brown (10YR 5/3) clean silt and sand grains coating faces of some peds; many medium prominent strong brown (7.5YR 5/8) and few medium distinct brownish yellow (10YR 6/8) masses of iron accumulation and few fine prominent brown (7.5YR 5/2) masses of iron depletion; moderately acid; clear wavy boundary.

C—33 to 60 inches; yellowish brown (10YR 5/6), stratified very fine sandy loam, very fine sand, and silt; massive; friable; few fine prominent brown (7.5YR 5/2) masses of iron depletion and few medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; moderately acid.

Range in Characteristics

Depth to stratified lacustrine deposits: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—very fine sandy loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—very fine sandy loam

E horizon and E part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—fine sandy loam, very fine sandy loam, or silt loam

Bt horizon and Bt part of B/E horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4
Texture—sandy loam, fine sandy loam, very fine sandy loam, or loam

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—stratified fine sand, very fine sand, sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam

Ponycreek Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Rapid and very rapid
Landform: Pediments and stream terraces
Parent material: Siliceous sandy alluvium
Slope range: 0 to 2 percent

Taxonomic classification: Siliceous, frigid Humaqueptic Psammaquents

Typical Pedon

Ponycreek muck, in an area of Ponycreek-Dawsil complex, 0 to 2 percent slopes; approximately 250 feet south and 450 feet west of the northeast corner of sec. 20, T. 23 N., R. 3 W.

Oa—0 to 4 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 25 percent fiber, 5 percent rubbed; weak fine subangular blocky structure; nonsticky; common very fine, fine, and medium roots; about 50 percent mineral soil material; extremely acid (pH in water 1:1); abrupt wavy boundary.

A—4 to 6 inches; black (10YR 2/1) mucky sand, very dark gray (10YR 3/1) dry; weak fine granular structure; very friable; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Bg—6 to 26 inches; grayish brown (10YR 5/2) sand; weak coarse subangular blocky structure; very friable; few very fine and fine roots; the color is that of the uncoated sand grains with organic coatings on faces of some peds; moderately acid; clear wavy boundary.

C—26 to 64 inches; brown (10YR 5/3) sand; single grain; loose; the color is that of the uncoated sand grains; slightly acid.

Range in Characteristics

Volume of sandstone channers: 0 to 5 percent throughout the profile

Oa horizon:
Hue—5YR, 7.5YR, 10YR, or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

A horizon:
Hue—10YR or neutral

Value—2 or 3
Chroma—0 to 2
Texture—mucky sand

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—sand or coarse sand

C or Cg horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 8
Chroma—1 to 8
Texture—sand or coarse sand

Poskin Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Silty alluvium underlain by sandy outwash
Slope range: 0 to 3 percent

Taxonomic classification: Fine-silty over sandy or sandy-skeletal, mixed Aquic Glossoboralfs

Typical Pedon

Poskin silt loam, 0 to 3 percent slopes, approximately 650 feet north and 200 feet west of the southeast corner of sec. 5, T. 28 N., R. 1 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 4 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many very fine to coarse roots; about 1 percent gravel; slightly acid; abrupt wavy boundary.

E—4 to 6 inches; dark brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; moderate thin platy structure; very friable; many very fine to coarse roots; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; about 1 percent gravel; strongly acid; clear wavy boundary.

E/B—6 to 14 inches; 60 percent brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate thin platy structure; very friable; common medium prominent strong brown (7.5YR 4/6) masses of iron accumulation; tongues into and surrounds remnants of yellowish brown (10YR 5/4) silt loam (Bt); moderate thin platy structure; very friable; common very fine to coarse roots; common medium prominent strong brown (7.5YR 4/6) masses of iron accumulation; about 1 percent gravel; strongly acid; clear wavy boundary.

B/E—14 to 25 inches; 70 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate medium subangular blocky structure; very friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine prominent light brownish gray (2.5Y 6/2) masses of iron depletion and many coarse prominent strong brown (7.5YR 4/6) masses of iron accumulation; penetrated by tongues of light brownish gray (10YR 6/2) silt loam (E), light gray (10YR 7/2) dry; moderate thin platy structure parting to moderate medium subangular blocky; very friable; few very fine and fine roots; few fine prominent light brownish gray (2.5Y 6/2) masses of iron depletion and many coarse prominent strong brown (7.5YR 4/6) masses of iron accumulation; about 1 percent gravel; very strongly acid; clear wavy boundary.

Bt1—25 to 28 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; grayish brown (10YR 5/2) silt coatings along cleavage planes; common fine prominent light brownish gray (2.5Y 6/2) masses of iron depletion and many coarse prominent strong brown (7.5YR 4/6) masses of iron accumulation; about 4 percent gravel; very strongly acid; clear wavy boundary.

2Bt2—28 to 31 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few faint dark yellowish brown (10YR 4/4) clay films on face of peds; common medium prominent light brownish gray (2.5Y 6/2) masses of iron depletion and strong brown (7.5YR 4/6) masses of iron accumulation; about 10 percent gravel; strongly acid; clear wavy boundary.

3C—31 to 61 inches; brown (10YR 5/3), stratified coarse sand and gravelly coarse sand; single grain; loose; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; about 5 percent gravel as an average; moderately acid.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.

Thickness of the silty alluvium: 20 to 40 inches
Volume of gravel: 0 to 5 percent in the silty alluvium, 0 to 40 percent in the 2B horizon, and 0 to 65 percent in the 3C horizon
Volume of cobbles: 0 to 5 percent throughout the profile

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Ap horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam

E horizon and E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt horizon and Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, fine sandy loam, loam, or the gravelly or very gravelly analogs of these textures

3C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 8
Texture—stratified sand, coarse sand, or the gravelly, very gravelly, or extremely gravelly analogs of these textures

Psammaquents

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Rapid
Landform: Pediments
Parent material: Siliceous sandy alluvium
Slope range: 0 to 1 percent

Taxonomic classification: Siliceous, frigid Typic Psammaquents

Range in Characteristics

• In most pedons, the color and thickness of individual layers are variable. Psammaquents are mostly sandy and are strongly acid to slightly acid.

Rib Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate in the silty alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces
Parent material: Silty alluvium underlain by sandy outwash
Slope range: 0 to 2 percent

Taxonomic classification: Fine-silty over sandy or sandy-skeletal, mixed, nonacid, frigid Mollic Endoaquepts

Typical Pedon

Rib silt loam, 0 to 2 percent slopes, approximately 2,300 feet north and 300 feet east of the southwest corner of sec. 9, T. 29 N., R. 2 W.

A—0 to 7 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.
Bg1—7 to 17 inches; grayish brown (10YR 5/2) silt loam; moderate medium and coarse subangular blocky structure; friable; common fine roots; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and common medium faint gray (10YR 5/1) masses of iron depletion; strongly acid; clear wavy boundary.
Bg2—17 to 27 inches; grayish brown (10YR 5/2) silt loam; moderate medium subangular blocky structure; friable; common fine roots; common medium prominent strong brown (7.5YR 5/6 and 5/8) masses of iron accumulation; strongly acid; clear wavy boundary.
2Bg3—27 to 31 inches; brown (7.5YR 5/2) loam; weak medium subangular blocky structure; friable; few fine roots; common medium distinct strong brown (7.5YR 4/6) and many coarse prominent strong brown (7.5YR 5/8) masses of iron accumulation; about 3 percent gravel; strongly acid; abrupt smooth boundary.
3C—31 to 60 inches; dark brown (7.5YR 4/2),

stratified gravelly coarse sand and coarse sand; single grain; loose; about 18 percent gravel as an average; slightly acid.

Range in Characteristics

Thickness of the silty alluvium: 20 to 40 inches
Volume of gravel: 0 to 5 percent in the silty alluvium, 0 to 35 percent in the 2Bg3 horizon, and 3 to 45 percent in the 3C horizon
Volume of cobbles: 0 to 5 percent throughout the profile

Ap horizon or A horizon (if it occurs):
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2
Texture—silt loam

Bg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

2Bg horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—sandy loam, loam, or the gravelly analogs of these textures

3C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 8
Chroma—1 to 6
Texture—stratified sand, coarse sand, or the gravelly or very gravelly analogs of these textures

Rockdam Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Rapid or very rapid
Landform: Pediments and stream terraces
Parent material: Siliceous sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Sandy, siliceous, frigid Entic Haplorthods

Typical Pedon

Rockdam sand, 0 to 3 percent slopes, approximately 1,500 feet north and 350 feet east of the southwest corner of sec. 27, T. 23 N., R. 3 W.

Oe—0 to 1 inch; very dark grayish brown (10YR 3/2) mucky peat (hemic material occurring as a mat of partially decomposed forest litter); about 50 percent fiber, 25 percent rubbed; weak thin platy structure; nonsticky; very strongly acid; abrupt smooth boundary.

A—1 to 4 inches; very dark grayish brown (10YR 3/2) sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; common very fine and fine roots; strongly acid; abrupt smooth boundary.

E—4 to 9 inches; grayish brown (10YR 5/2) sand, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; very friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.

Bs—9 to 13 inches; dark brown (7.5YR 4/4) sand; weak medium subangular blocky structure; very friable; few fine roots; moderately acid; clear wavy boundary.

Bw1—13 to 21 inches; strong brown (7.5YR 5/6) sand; weak medium and coarse subangular blocky structure; very friable; few fine roots; slightly acid; clear wavy boundary.

Bw2—21 to 35 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few fine roots; slightly acid; gradual wavy boundary.

C1—35 to 45 inches; brownish yellow (10YR 6/6) sand; single grain; loose; slightly acid; clear wavy boundary.

C2—45 to 61 inches; brownish yellow (10YR 6/6) sand; single grain; loose; many coarse distinct yellowish brown (10YR 5/8) masses of iron accumulation; slightly acid.

Range in Characteristics

Note: Thickness and depth are measured from the top of the mineral soil.
Volume of sandstone channers: 0 to 15 percent throughout the profile

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—sand

Ap horizon (if it occurs):
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 or 3
Texture—sand

E horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)

Chroma—2 or 3
Texture—sand or coarse sand

Bs horizon:
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sand or coarse sand

Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—sand or coarse sand

C horizon:
Hue—7.5YR or 10YR
Value—5 to 7
Chroma—2 to 8
Texture—sand or coarse sand

Rosholt Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid in the loamy alluvium and rapid or very rapid in the sandy outwash
Landform: Stream terraces and kames
Parent material: Loamy alluvium underlain by sandy outwash
Slope range: 0 to 12 percent

Taxonomic classification: Coarse-loamy, mixed Typic Glossoboralfs

Typical Pedon

Rosholt sandy loam, 0 to 2 percent slopes, approximately 900 feet south and 1,500 feet east of the northwest corner of sec. 8, T. 23 N., R. 2 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, light brownish gray (10YR 6/2) dry; moderate medium subangular blocky structure; very friable; common fine and few medium roots; about 10 percent gravel; slightly acid; abrupt smooth boundary.

E/B—8 to 16 inches; 50 percent brown (10YR 5/3) sandy loam (E), very pale brown (10YR 7/3) dry; moderate medium subangular blocky structure; friable; tongues into and surrounds remnants of dark yellowish brown (10YR 4/4) sandy loam (Bt); moderate medium subangular blocky structure; friable; common fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; about 10 percent gravel; slightly acid; clear wavy boundary.

Bt1—16 to 24 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few fine roots; many faint dark brown (7.5YR 3/4) clay films on faces of peds; about 10 percent gravel; slightly acid; clear wavy boundary.

Bt2—24 to 31 inches; dark brown (7.5YR 4/4) gravelly sandy loam; moderate medium subangular blocky structure; friable; few fine roots; common faint dark brown (7.5YR 3/4) clay films on faces of peds; about 20 percent gravel; strongly acid; gradual wavy boundary.

2C—31 to 60 inches; light yellowish brown (10YR 6/4), stratified very gravelly coarse sand, gravelly coarse sand, and coarse sand; single grain; loose; about 45 percent gravel as an average; moderately acid.

Range in Characteristics

Thickness of the loamy alluvium: 20 to 40 inches
Volume of rock fragments: 0 to 35 percent gravel and 0 to 2 percent cobbles in the loamy alluvium; 0 to 60 percent gravel and 0 to 15 percent cobbles in the sandy outwash

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—sandy loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—sandy loam

E horizon (if it occurs) and E part of E/B horizon:
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

Bt horizon and Bt part of E/B horizon:
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam, fine sandy loam, loam, or the gravelly analogs of these textures

2Bt horizon (if it occurs):
Hue—5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—4 to 6

Texture—loamy sand, loamy coarse sand, or the gravelly or very gravelly analogs of these textures

2C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—stratified sand, coarse sand, or the gravelly or very gravelly analogs of these textures

Rozellville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ground moraines
Parent material: Loamy glacial till over loamy residuum derived from the underlying igneous and metamorphic rock
Slope range: 2 to 12 percent

Taxonomic classification: Fine-loamy, mixed Typic Glossoboralfs

Typical Pedon

Rozellville silt loam, 2 to 6 percent slopes, approximately 2,440 feet south and 650 feet west of the northeast corner of sec. 26, T. 25 N., R. 1 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; very friable; common very fine and fine roots; moderately acid; abrupt wavy boundary.

E—9 to 13 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate thick platy structure; very friable; common very fine and fine roots; moderately acid; abrupt wavy boundary.

2B/E—13 to 17 inches; 70 percent dark brown (7.5YR 4/4) loam (2Bt); moderate medium subangular blocky structure; friable; few faint dark brown (7.5YR 4/3) clay films on faces of peds; penetrated by tongues of brown (10YR 5/3) loam (E), very pale brown (10YR 7/3) dry; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; about 3 percent gravel (angular granite); very strongly acid; clear wavy boundary.

2Bt1—17 to 25 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; few faint dark brown (7.5YR 4/3) clay films on faces of peds; thin brown (10YR 5/3) silt coatings on faces of some peds; about 3 percent gravel (angular granite); very strongly acid; abrupt wavy boundary.

2Bt2—25 to 33 inches; dark brown (7.5YR 4/4) loam; strong coarse subangular blocky structure; firm; few very fine and fine roots; few faint dark brown (7.5YR 3/4) clay films on faces of peds; thin brown (10YR 5/3) silt coatings on faces of some peds; about 10 percent gravel (angular granite); very strongly acid; clear wavy boundary.

2Bt3—33 to 38 inches; dark brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (7.5YR 4/3) clay films on faces of peds; about 10 percent gravel (angular granite); very strongly acid; clear wavy boundary.

2C—38 to 61 inches; brown (7.5YR 5/4) gravelly sandy loam; massive; friable; about 20 percent gravel (angular granite); very strongly acid.

Range in Characteristics

Thickness of the silty mantle: 0 to 15 inches
Volume of gravel: 0 to 15 percent in the silty mantle, 3 to 35 percent in the upper loamy part, and 20 to 50 percent in the lower loamy part
Volume of cobbles: 0 to 5 percent in the silty mantle and 0 to 15 percent in the loamy part

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—5 or 6 (where color is 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—loam or silt loam

E part of 2B/E horizon:
Hue—10YR
Value—5 or 6 (where color is 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy loam, loam, or the gravelly analogs of these textures

Bt part of 2B/E horizon:
Hue—5YR or 7.5YR
Value—3 to 5

Chroma—3 to 5
Texture—sandy loam, loam, silt loam, or the gravelly analogs of these textures

2Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—sandy loam, loam, or the gravelly analogs of these textures

2C horizon:
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam, loam, or the gravelly analogs of these textures

Seaton Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Hills
Parent material: Loess
Slope range: 12 to 20 percent

Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Seaton silt loam, in an area of Council and Seaton soils, 12 to 20 percent slopes, eroded; approximately 1,800 feet north and 800 feet east of the southwest corner of sec. 19, T. 19 N., R. 5 W., in Jackson County:

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common coarse and medium fragments of dark brown (7.5YR 4/4) subsoil material; many fine roots; neutral; abrupt smooth boundary.
Bt1—9 to 24 inches; dark brown (7.5YR 4/4) silt loam; moderate fine subangular blocky structure; friable; common fine roots; many faint dark brown (7.5YR 3/4) clay films on faces of peds; slightly acid; clear wavy boundary.
Bt2—24 to 34 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many distinct dark brown (7.5YR 3/4) clay films on faces of peds; moderately acid; clear wavy boundary.
Bt3—34 to 46 inches; dark yellowish brown (10YR 4/4) silt loam; moderate coarse subangular blocky structure; friable; few fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds and in pores; common coarse prominent strong brown (7.5YR 5/8) and yellowish red (5YR 5/6) masses of iron accumulation; moderately acid; clear wavy boundary.
2C—46 to 60 inches; pale brown (10YR 6/3) silt loam; massive; friable; few fine roots; common coarse prominent strong brown (7.5YR 5/8) masses of iron accumulation; moderately acid.

Range in Characteristics

Ap horizon or A horizon (if it occurs):
Hue—10YR
Value—2 to 4
Chroma—2 or 3
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam

C horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—silt loam

Simescreek Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid or very rapid
Landform: Pediments and stream terraces
Parent material: Siliceous sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Frigid, uncoated Typic Quartzipsamments

Typical Pedon

Simescreek sand, 0 to 3 percent slopes, approximately 700 feet north and 750 feet east of the southwest corner of sec. 19, T. 26 N., R. 4 W.

A—0 to 2 inches; very dark brown (10YR 2/2) sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
Bw1—2 to 6 inches; dark yellowish brown (10YR 3/4) sand; weak medium subangular blocky structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.
Bw2—6 to 24 inches; dark yellowish brown (10YR 4/4) sand; weak medium subangular blocky structure;

very friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bw3—24 to 32 inches; yellowish brown (10YR 5/6) sand; weak coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.

C—32 to 60 inches; yellow (10YR 7/6) sand; single grain; loose; moderately acid.

Range in Characteristics

Volume of sandstone channers: 0 to 5 percent throughout the profile

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 to 3
Texture—sand

E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 or 3
Texture—sand or coarse sand

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—3 to 8
Texture—sand or coarse sand

C horizon:
Hue—7.5YR or 10YR
Value—4 to 8
Chroma—2 to 8
Texture—sand or coarse sand

Spencer Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the silty part and moderately slow or moderate in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 2 to 12 percent

Taxonomic classification: Fine-silty, mixed Oxyaquic Glossoboralfs

Typical Pedon

Spencer silt loam, 2 to 6 percent slopes, approximately 770 feet north and 180 feet east of the southwest corner of sec. 26, T. 29 N., R. 4 W.

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

E/B—10 to 20 inches; 70 percent brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate thin platy structure; friable; common fine prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; tongues into and surrounds remnants of dark yellowish brown (10YR 4/4) silt loam (Bt); moderate very fine subangular blocky structure; friable; common fine roots; common fine prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; strongly acid; clear wavy boundary.

B/E—20 to 35 inches; 70 percent yellowish brown (10YR 5/4) silt loam (Bt); moderate fine and medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; penetrated by tongues of brown (10YR 5/3) silt loam (E), very pale brown (10YR 7/3) dry; moderate fine subangular blocky structure; friable; few fine roots; common medium prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; strongly acid; gradual wavy boundary.

Bt—35 to 43 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; friable; few fine roots; common medium prominent reddish yellow (7.5YR 6/6) masses of iron accumulation; strongly acid; abrupt wavy boundary.

2C—43 to 60 inches; brown (7.5YR 5/4) sandy loam; massive; friable; about 8 percent gravel and 3 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the silty mantle: 36 to 60 inches
Volume of gravel: 0 to 10 percent in the silty mantle and 3 to 35 percent in the till
Volume of cobbles: 0 to 5 percent throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4 (where moist value is 3, dry value is 6 or more)
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR

Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E part of E/B and B/E horizons:
Hue—10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam or silt

Bt horizon and Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—4 to 6
Texture—silt loam

2C horizon and 2Bt horizon (if it occurs):
Hue—5YR or 7.5YR
Value—3 to 6
Chroma—4 to 6
Texture—sandy loam, loam, or the gravelly analogs of these textures

Tarr Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Landform: Pediments
Parent material: Siliceous sandy alluvium
Slope range: 0 to 6 percent

Taxonomic classification: Mesic, uncoated Typic Quartzipsamments

Typical Pedon

Tarr sand, 0 to 6 percent slopes, approximately 400 feet south and 900 feet east of the northwest corner of sec. 12, T. 24 N., R. 6 W., in Jackson County:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sand, brown (10YR 5/3) dry; weak fine granular structure; very friable; common fine roots; moderately acid; abrupt smooth boundary.
Bw1—8 to 18 inches; dark brown (7.5YR 4/4) sand; single grain; loose; few fine roots; moderately acid; gradual smooth boundary.
Bw2—18 to 36 inches; brown (7.5YR 5/4) sand; single grain; loose; moderately acid; gradual smooth boundary.
C—36 to 60 inches; yellow (10YR 7/6) sand; single grain; loose; slightly acid.

Range in Characteristics

Volume of sandstone channers: 0 to 15 percent throughout the profile

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—sand

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—sand

E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—2 or 3
Texture—sand or fine sand

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—3 to 8 (value and chroma of 3 do not occur together)
Texture—sand or fine sand

C horizon:
Hue—7.5YR or 10YR
Value—5 to 8
Chroma—3 to 8
Texture—sand or fine sand

Veedum Series

Depth class: Moderately deep to interbedded sandstone and shale
Drainage class: Poorly drained
Permeability: Moderate in the silty part, moderately slow or moderate in the residuum, and very slow to moderately slow in the interbedded sandstone and shale
Landform: Pediments
Parent material: Loess or silty alluvium over residuum derived from the underlying interbedded sandstone and shale
Slope range: 0 to 2 percent

Taxonomic classification: Fine-loamy, mixed, acid, frigid Humic Epiaquepts

Typical Pedon

Veedum muck, in an area of Merrillan-Veedum complex, 0 to 3 percent slopes; approximately 700 feet north and 150 feet east of the southwest corner of sec. 33, T. 24 N., R. 1 E.

Oa—0 to 5 inches; muck (sapric material), black (N 2/0) broken face and rubbed; about 25 percent fiber, 5 percent rubbed; weak fine granular structure; nonsticky; many very fine and fine roots; extremely acid; abrupt wavy boundary.

A—5 to 7 inches; black (N 2/0) silt loam, very dark grayish brown (10YR 3/2) dry; weak thin platy structure; very friable; many very fine and fine roots; very strongly acid; abrupt wavy boundary.

Eg—7 to 9 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; very friable; few very fine and fine roots; many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; very strongly acid; abrupt wavy boundary.

Bg1—9 to 20 inches; gray (10YR 5/1) silt loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; many coarse prominent yellowish brown (10YR 5/8) masses of iron accumulation; very strongly acid; clear smooth boundary.

2Bg2—20 to 26 inches; grayish brown (2.5Y 5/2) clay loam; moderate medium subangular blocky structure; firm; many coarse distinct dark gray (N 4/0) masses of iron depletion and many coarse prominent dark red (2.5YR 3/6), few medium prominent reddish yellow (5YR 6/8), and common medium prominent brownish yellow (10YR 6/8) masses of iron accumulation; about 8 percent sandstone channers; extremely acid; gradual wavy boundary.

2Cr—26 to 60 inches; interbedded gray (10YR 5/1) sandstone and dark red (2.5YR 3/6) shale.

Range in Characteristics

Depth to interbedded sandstone and shale: 20 to 40 inches
Thickness of the silty mantle: 12 to 30 inches
Volume of gravel or sandstone channers: 0 to 15 percent gravel or sandstone channers in the silty mantle; 3 to 15 percent sandstone channers in the 2Bg horizon

Oa horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2
Texture—muck

A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 to 2
Texture—silt loam

Ap horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silt loam

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silt loam

2Bg horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y, or neutral
Value—3 to 7
Chroma—0 to 6
Texture—sandy loam, sandy clay loam, loam, silty clay loam, or clay loam; thin strata of coarser or finer texture in some pedons

2Cr horizon:
Hue—2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y, or neutral
Value—4 to 7
Chroma—0 to 6

Winterfield Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Rapid
Landform: Flood plains
Parent material: Sandy alluvium
Slope range: 0 to 3 percent

Taxonomic classification: Mixed, frigid Aquic Udipsamments

Typical Pedon

Winterfield loamy fine sand, in an area of Pelkie-Winterfield loamy fine sands, 0 to 3 percent slopes; approximately 2,440 feet south and 1,280 feet east of the northwest corner of sec. 17, T. 26 N., R. 4 W.

A—0 to 7 inches; dark brown (10YR 3/3) loamy fine sand, brown (10YR 5/3) dry; weak fine subangular blocky structure; very friable; many very fine and fine and common medium and coarse roots; slightly acid; abrupt wavy boundary.

C1—7 to 31 inches; dark yellowish brown (10YR 4/4) fine sand; weak medium subangular blocky structure; very friable; common very fine and fine roots; few thin strata of dark brown (10YR 3/3) loamy fine sand; few fine faint yellowish brown (10YR 5/4) masses of iron accumulation; about 1 percent gravel; neutral; clear wavy boundary.

C2—31 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few thin strata of dark brown (10YR 3/3) loamy fine sand and fine sand; common fine distinct brownish yellow (10YR 6/6) masses of iron accumulation and few fine distinct grayish brown (10YR 5/2) masses of iron depletion; about 3 percent gravel; neutral.

Range in Characteristics

A horizon:
Hue—7.5YR or 10YR
Value—2 to 4
Chroma—1 to 3
Texture—loamy fine sand

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—2 to 6
Chroma—2 to 6
Texture—sand, fine sand, or loamy fine sand

Withee Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate in the silty part and moderately slow in the loamy till
Landform: Ground moraines
Parent material: Loess or silty alluvium underlain by loamy glacial till
Slope range: 0 to 3 percent

Taxonomic classification: Fine-loamy, mixed Aquic Glossoboralfs

Typical Pedon

Withee silt loam, 0 to 3 percent slopes (fig. 21), approximately 5 feet south and 620 feet west of the northeast corner of sec. 21, T. 25 N., R. 1 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

E—9 to 14 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; common fine roots; common medium prominent brownish yellow (10YR 6/6) and few fine prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; few fine faint light brownish gray (10YR 6/2) masses of iron depletion; neutral; clear wavy boundary.

E/B—14 to 18 inches; 70 percent pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; tongues into and surrounds remnants of light yellowish brown (10YR 6/4) silt loam (Bt); moderate fine and medium subangular blocky structure; friable; few fine roots; common medium prominent reddish yellow (7.5YR 6/8) and few medium distinct brownish yellow (10YR 6/6) masses of iron accumulation; few fine faint and distinct light brownish gray (10YR 6/2) masses of iron depletion; very strongly acid; clear irregular boundary.

B/E—18 to 24 inches; 60 percent light brown (7.5YR 6/4) silt loam (Bt); moderate medium subangular blocky structure; friable; few faint brown (7.5YR 5/4) clay films on faces of peds; penetrated by tongues of pale brown (10YR 6/3) silt loam (E), very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; friable; few fine roots; few fine prominent and faint light brownish gray (10YR 6/2) masses of iron depletion; common medium distinct and prominent reddish yellow (7.5YR 6/8) and few medium prominent and distinct brownish yellow (10YR 6/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

2Bt1—24 to 34 inches; reddish brown (5YR 5/3) loam; moderate medium subangular blocky structure; friable; common faint reddish brown (5YR 4/3) clay films on faces of peds; few faint pale brown (10YR 6/3) clean silt and sand grains coating faces of some peds; common medium faint reddish gray (5YR 5/2) masses of iron depletion and many coarse prominent brownish yellow (10YR 6/6) masses of iron accumulation; about 3 percent gravel; very strongly acid; abrupt wavy boundary.

2Bt2—34 to 47 inches; reddish brown (5YR 4/4) loam; moderate medium subangular blocky structure; firm; common faint reddish brown (5YR 4/3) clay films on faces of peds; few pale brown (10YR 6/3) clean silt and sand grains coating faces of some peds; few medium distinct yellowish red (5YR 5/8) masses of iron accumulation; about 3 percent gravel; very strongly acid; gradual wavy boundary.

2C—47 to 60 inches; reddish brown (5YR 4/4) loam;

massive; firm; about 3 percent gravel; very strongly acid.

Range in Characteristics

Thickness of the silty mantle: 12 to 36 inches
Volume of rock fragments: 0 to 10 percent gravel and 0 to 5 percent cobbles in the silty mantle; 3 to 35 percent gravel and 0 to 10 percent cobbles in the till

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam

A horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon and E part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 7 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—silt loam

Bt part of E/B and B/E horizons:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—silt loam

2E part of 2B/E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6 (where colors are 4/3 or 5/3, dry value is 7 or more)
Chroma—2 or 3
Texture—sandy clay loam, loam, or the gravelly analogs of these textures

2Bt part of 2B/E horizon (if it occurs):
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—3 to 6 (value and chroma of 3 do not occur together)
Texture—sandy clay loam, loam, clay loam, or the gravelly analogs of these textures

2Bt horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—3 to 6
Texture—sandy clay loam, loam, clay loam, or the gravelly analogs of these textures; sandy loam or gravelly sandy loam in the lower part in some pedons

2C horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—fine sandy loam, sandy loam, loam, sandy clay loam, clay loam, or the gravelly analogs of these textures

Formation of the Soils

This section describes the geology and underlying material in Clark County. It also relates the factors of soil formation to the soils in the county and explains the processes of soil formation.

Geology and Underlying Material

Dr. Fred Madison, Wisconsin Geological and Natural History Survey, helped prepare this section.

Clark County is in two physiographic regions—the Central Plain, which makes up about 95 percent of the county, and the Northern Highland, which makes up about 5 percent (Finley, 1965). The Central Plain is a dissected landscape of Cambrian age. The bedrock is mostly sandstone but includes some siltstone and shale. The Northern Highland is an ancient peneplain of complexly folded and faulted igneous and metamorphic rocks (granite, rhyolite, chloritic schist, phyllites, and gneisses) of Precambrian age. The Cambrian sandstones overlap the Precambrian rocks, which are at or near the surface in and along the channels of the Black River and its tributaries.

The best exposures of Precambrian and Upper Cambrian rocks are in road cuts, along the main streams, and on mounds. The mounds have discontinuous slope outcrops and small ledge outcrops.

The Precambrian and Cambrian rock is overlain by as much as 120 feet of Pleistocene material (Bell and Sherrill, 1974). Sorted Pleistocene deposits are on the flood plains and terraces of the Black, Eau Claire, and Popple Rivers and their tributaries. In these areas, the streams marginal to and draining from the Pleistocene glaciers deposited stratified sandy and gravelly outwash. These deposits are quite variable in extent and thickness. Generally, they are not extensive and are thin. They are locally overlain by thin deposits of postglacial alluvium or windblown silt. The sand or gravelly sand deposited by meltwater streams is mined in many areas. The extent of these outwash deposits coincides generally with association 4, which is described under the heading “General Soil Map Units.”

Glacial materials were deposited by ice lobes during the Pleistocene epoch. The stratigraphic sequence of glacial formations is complex. Stratigraphic units are separated based on the mineralogical, chemical, and physical characteristics of the till, alluvial deposits, and lacustrine deposits.

The oldest till in Clark County was deposited by an advance of ice from the northwest (Milan Phase) in the early Pleistocene. This till is the Edgar Member of the Marathon Formation (Clayton and others, 1991). This deposit is generally reddish brown to pinkish gray loam, sandy loam, sandy clay loam, or clay loam. It is leached to a depth of more than 5 feet in most areas of Clark County. Presently the extent of the Edgar Member is not well defined in Clark County. In Marathon and Wood Counties, it is defined by the Withee-Marshfield and Withee-Marshfield-Santiago associations. In Clark County the tentative extent is defined by the Withee and Marshfield soils in some areas of association 3, by the Withee soils in some areas of association 5, and by the Fallcreek soils in some areas of association 6.

Another glacial deposit was transported later from the north or northwest (Nasonville Phase) during the middle Pleistocene. This deposit is the Bakerville Member of the Lincoln Formation (Clayton, 1991). It is generally reddish brown sandy loam. Its extent also is not well defined in Clark County. This deposit is not separated from the Merrill Member (Hamburg Phase) of the Lincoln Formation that is recognized in Taylor County along the Clark-Taylor county line. More field studies are needed to determine whether extensive areas of the younger Merrill Member occur in Clark County. The Merrill Member has a gently rolling landscape and more well preserved landforms and more undrained depressions than the Bakerville Member. Presently the tentative extent of the Bakerville and/or Merrill Formation appears to be defined by the Spencer soils in some areas of association 2, the Loyal soils in some areas of association 3, and the Flambeau soils in some areas of association 6.

The most recent glacial deposit in Clark County, the Pokegama Creek Member of the Copper Falls

Formation, is of early Wisconsin age. This till is reddish brown sandy loam or gravelly sandy loam (Attig and others, 1988). It occurs in the extreme northwest corner of the county and was deposited by the Chippewa ice lobe. Because this area is the most recently glaciated in Clark County, the landforms are well preserved and undrained depressions are common. The extent of this area generally coincides with association 1.

The area south of Neillsville and the southwestern part of the county are driftless, and the Precambrian sandstones and Precambrian igneous and metamorphic rocks are near or at the surface. The extent of the driftless area is generally defined by associations 7, 8, 9, 10, and 11.

Processes of Soil Formation

A combination of basic processes is responsible for horizon differentiation. The main processes are gains, losses, transfers, and transformations. These processes generally do not occur alone. Some changes promote horizon differentiation, and others retard it. The nature of the soil at any given point is the net result of all changes (Simonson, 1959).

The interactions among these soil-forming processes is evident in Loyal soils. The parent material of these soils was loess or other silty deposits underlain by loamy till. The silt loam was probably deposited over the till during and after the glacial period. Because these nearly level to sloping soils are underlain by nonporous till, they are moderately well drained. The climate favored the growth of plants. Plants and animals contributed to the accumulation of organic matter and organic acids, and they mixed the soil. These processes accelerated as more and higher forms of organisms grew in the soils and produced more organic residue and acids.

Organic matter in various stages of decomposition accumulated on or near the surface. Decomposed organic matter gave the surface layer a darker color than it originally had. Suspended particles of clay were translocated downward in the soils by slowly percolating water. Chemical weathering of minerals, along with the accumulation of clay, gradually changed the middle part of the soil profile to loam. Periodic wetting and drying in the upper part of the soils caused oxidation and reduction of the iron in the subsurface layer and subsoil. This process gave these horizons a mottled color.

As a result of these processes, the Loyal soils have a very dark grayish brown silt loam surface layer, a mottled silt loam subsurface layer, and a mottled loam subsoil. They are underlain by acid sandy loam glacial till at a depth of about 45 inches. This underlying till has changed little since it was deposited.

Processes that took place in the formation of the Loyal soils were gains of organic matter in the surface layer, loss of clay in the subsurface layer and the subsequent transfer of clay to the subsoil, and the transformation of iron compounds in the subsurface layer and subsoil. All of these processes are active in the soils of Clark County. The kinds of parent material and the relief in Clark County have, to a great extent, determined the kinds of processes that are dominant in the formation of all of the soils. These processes are, in turn, largely responsible for the differences and similarities among the soils.

Factors of Soil Formation

Soil forms through processes that act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineral composition of the parent material, the climate under which the soil material accumulated and has existed since accumulation, the plant and animal life on and in the soil, the relief and drainage, and the length of time that the forces of soil formation have acted on the soil material.

Climate and vegetation are active factors of soil formation. They act on the parent material that has accumulated through the weathering or physical disintegration of rocks and slowly change it into a natural body that has genetically related horizons. The effects of climate and of plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and in some areas determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil. Some time is always needed for the differentiation of soil horizons. Usually, a long time is needed for the development of distinct horizons.

The factors of soil formation are so closely interrelated that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It largely determines the chemical and mineralogical composition of the soil. Some soils form in more than one kind of parent material. Many have silty mantles of eolian or water-laid (alluvial) origin.

Most of the soils in Clark County formed partially in glacial till or glacial outwash. Many formed partially in residuum derived from the underlying sandstone or interbedded sandstone and shale bedrock. Some soils formed in lacustrine deposits, alluvium, or organic material.

Glacial till is unstratified, unsorted glacial debris consisting of clay, silt, and sand. It may contain gravel, cobbles, stones, or boulders. There were three or more glacial ice advances into Clark County. They are distinguished by at least three different tills having different textures and slightly different landforms with drainage patterns in different states of development. These tills are the parent material for different soils.

The oldest till is typically loam but ranges from sandy loam to clay loam. It is an important parent material for most of the Fallcreek, Marshfield, and Withee soils and for some of the Flambeau and Loyal soils. Fallcreek and Flambeau soils formed in loamy glacial till. Marshfield and Withee soils formed in loess or silty alluvium underlain by loamy glacial till.

The till of intermediate age is typically sandy loam but ranges to loam. It is an important parent material for some of the Flambeau and Loyal soils. Flambeau soils formed in loamy glacial till. Loyal soils formed in loess or silty alluvium underlain by loamy glacial till.

The most recent till is typically sandy loam or gravelly sandy loam. It is an important parent material for the Freeon, Newood, and Magnor soils and for some of the Almena, Auburndale, Capitola, Eauclaire, and Spencer soils. Almena and Auburndale soils formed in loess or silty alluvium underlain by loamy glacial till. Capitola soils formed in loamy alluvium underlain by loamy glacial till. Eauclaire soils formed in sandy alluvium underlain by loamy glacial till. Freeon and Magnor soils formed in loess or silty alluvium underlain by dense loamy glacial till. Newood soils formed in dense loamy glacial till.

Rozellville soils formed in loamy glacial till over loamy residuum derived from the underlying igneous and metamorphic bedrock. Northmound soils formed mostly in loess or in a mixture of loess and residuum derived from the underlying slightly fractured, cemented sandstone.

Glacial outwash was deposited by meltwater flowing from glacial ice. These sandy and gravelly deposits are stratified in many areas. The outwash is mostly on terraces adjacent to rivers and major streams and on kames in some areas of till. Glacial outwash is an important part of the Au Gres, Brander, Mahtomedi, Maplehurst, Menahga, Newson, Oesterle, Poskin, Rib, and Rosholt soils. Au Gres, Mahtomedi, Menahga, and Newson soils formed in sandy outwash. Brander, Maplehurst, Poskin, and Rib soils formed in silty alluvium underlain by sandy outwash. Oesterle and Rosholt soils formed in loamy alluvium underlain by sandy outwash.

Lacustrine deposits occur in glacial lake plains. They were exposed when water levels dropped or the elevation of the land rose. Aftad and Plover soils formed mostly in loamy lacustrine deposits. Barronett, Comstock, and Crystal Lake soils formed mostly in silty lacustrine deposits.

Recent alluvium on flood plains was deposited by the overflow of rivers and streams. It is the primary parent material for the Fordum, Moppet, Pelkie, and Winterfield soils. Soils that formed in recent alluvium generally do not have distinct horizons. Fordum and Moppet soils formed in loamy alluvium underlain by sandy alluvium. Pelkie and Winterfield soils formed in sandy alluvium.

Organic material consists mainly of sedges, reeds, grasses, and a few wood fragments in varying stages of decomposition. It is the parent material for the Beseman, Cathro, Citypoint, Dawsil, Dawson, Loxley, and Markey soils. Beseman and Cathro soils formed in herbaceous organic materials underlain by loamy deposits or loamy alluvium. Citypoint soils formed in herbaceous organic materials underlain by interbedded sandstone and shale. Dawsil, Dawson, and Markey soils formed in herbaceous organic materials underlain by sandy deposits or sandy alluvium. Loxley soils formed in herbaceous organic materials more than 51 inches thick.

The parent materials in the driftless part of Clark County consist of silty or loamy deposits, loess, or sandy deposits over residuum derived from the underlying sandstone or the underlying interbedded sandstone and shale. Arbutus soils formed in siliceous sandy alluvium underlain by igneous bedrock. Bilson soils formed in siliceous loamy alluvium over siliceous sandy alluvium. Merimod and Merit soils formed in silty and loamy alluvium underlain by siliceous sandy alluvium. Boone soils formed in siliceous sandy residuum derived from the underlying sandstone. Council soils formed in silty and loamy colluvium. Elevasil soils formed in siliceous loamy colluvium over siliceous sandy residuum derived from the underlying sandstone. Gardenvale soils formed in silty and loamy alluvium underlain by siliceous sandy residuum derived from the underlying sandstone. Elm Lake, Fairchild, and Ludington soils formed in siliceous sandy alluvium over residuum derived from the underlying interbedded sandstone and shale.

Humbird and Merrillan soils formed in loamy alluvium over residuum derived from the underlying interbedded sandstone and shale. Ironrun, Ponycreek, Rockdam, Simescreek, and Tarr soils formed in siliceous sandy alluvium. Hiles, Kert, and Veedum soils formed in silty alluvium over residuum derived from the underlying interbedded sandstone and shale. The well drained Seaton soils formed in loess.

Climate

Climate affects soil formation through its effect on the moisture supply in the soil and on soil temperature. It affects the weathering of rocks and the alteration of the parent material through the mechanical action of freezing and thawing and the chemical action generated by the leaching of water.

Climate indirectly affects soil formation through its influence on plant and animal life. Climatic factors, such as precipitation and temperature, influence the rate of plant growth and thus also influence the accumulation of organic matter in the soil and the level of soil fertility. Cold soil temperatures in the winter greatly retard the soil-forming processes.

Clark County has a cool, subhumid continental climate that favors the growth of trees and the formation of soils having a thin dark surface layer and a leached, acid subsurface layer. Cool temperatures inhibit the bacterial breakdown of organic matter, thus promoting its accumulation. This accumulation of organic matter results in the darkening of the surface layer.

Wind can affect the development of soil by adding windblown silt or sand. Climate can also have more localized effects. North- and east-facing slopes tend to be cooler and wetter than south- and west-facing slopes. Depressional areas may receive more moisture and have cooler temperatures for a longer part of the year than ridgetops and valley slopes.

Plant and Animal Life

Living organisms are important factors of soil formation. Earthworms, ants, and rodents continually mix the soil. They bring subsoil materials to the surface and transport surface materials down into lower layers. They also help to keep the soil porous, thus enhancing air and water movement. Plants obtain nutrients from the soil, incorporate nutrients and carbohydrates from photosynthesis into their tissues, and release them later when dead leaves and twigs fall to the soil surface. Bacteria and fungi decompose this organic material. This process recycles nutrients that were leached into the lower layers of the soil and adds organic matter to the surface layer.

The influence of different kinds of vegetation on the formation of soils is shown by the differences in color between soils that formed under trees and soils that formed under a mixture of trees and prairie grasses. Loyal soils, for example, formed under trees. They have a lighter colored or thinner surface layer than soils that formed under a mixture of trees and grasses, and they are generally more acid. Merit soils formed under trees and grasses. These soils have a moderately thick, dark surface layer. Soils that formed under a mixture of trees and grasses accumulate more organic matter and retain it longer than soils that formed under trees, and this organic matter contributes to their darker color.

During the past 125 years, human activities have influenced the soils by disturbing and altering the soil-forming processes. Clearing, burning, and cultivating the land have altered the original condition of many soils, and repeated removal of plant cover has accelerated erosion. Over-cultivation has contributed to a loss of organic matter, and the use of heavy equipment has compacted the soil and reduced the rate of water infiltration.

Where soils are well managed and suitable crop rotations are used, human activities have not harmed the soils. Crop yields have gradually increased. Adding animal manure and planting alfalfa and grasses, such as bromegrass, have increased the content of organic matter in the surface layer and the upper part of the subsoil beyond the level found in virgin woodland soils.

The addition of lime has altered the natural acidity of the soils. The lime not only has improved plant growth but also has created a more favorable environment for soil bacteria. The increased bacterial action, in turn, has hastened the decomposition of organic matter.

Adding fertilizers to the soil has increased the supply of plant nutrients. Planting alfalfa has also improved the supply of nutrients in the soil. Alfalfa has a long taproot, which transfers calcium and other plant food elements from the lower part of the subsoil and the substratum to the surface layer.

The drainage of some soils has been improved by the construction of waterways and water-control structures. Draining the wetlands has permitted the cultivation of some high-potential soils but has contributed to a general lowering of the water table and water quality throughout the area.

Human activity is evident in areas where the surface layer now consists mostly of brown subsoil material exposed by erosion and along footslopes and natural drainageways, where sediments washed from the surrounding soils accumulated to a thickness of 1 foot to more than 2 feet. Fordum and Moppet soils formed in such sediments.

Other changes caused by human manipulation of the soil and landscape include the tendency toward more flash flooding where woodland cover is removed from the more sloping soils of the watershed; the rapid filling of lakes and reservoirs with sediments; the contamination of ground water by sewage effluent and fertilizer elements, especially nitrates; and the negative effect of pesticides on soil organisms and ground water. Some of the effects of human activities, such as the addition of fertilizers and pesticides, may not be evident for many years.

Relief and Drainage

The glacial moraines, stream terraces, and glacial lake basins of Clark County have been formed by wind, rain, running water, and glacial meltwater. Where bedrock controls the topography, the resistance or lack of resistance of the underlying rock has determined the relief. Relief, in turn, influences soil formation by controlling drainage, runoff, and other direct or indirect effects of water, including erosion. In many places the relief of a given soil can be correlated closely with the drainage class, the thickness of the surface layer, the content of organic matter in the surface layer, the thickness of the solum, and the differentiation of horizons in the soil profile.

In the soils of Clark County, the surface layer is generally light colored in the more sloping areas and successively darker and thicker in the less sloping areas and in areas where the slope changes from convex to concave. Where the slopes are more gentle, runoff is slower, and consequently more water soaks into the soil. As a result, plants grow better on more gentle slopes and more organic matter accumulates in the surface layer. Also, surface material eroded from steep upper slopes accumulates on the lower, more gentle slopes.

Soil drainage is greatly affected by relief. Runoff water from sloping to very steep, excessively drained to well drained soils accumulates on the nearly level drainageways and flood plains, where the soils are mostly somewhat poorly drained to very poorly drained. Drainage characteristics are generally reflected in the color, degree, and kind of mottling or gleying in the soil. For example, the well drained Rosholt soils are free of mottles throughout the upper 60 inches. The moderately well drained Flambeau and Loyal soils have grayish mottles in the lower part of the B horizon. The somewhat poorly drained Fallcreek, Merrillan, and Withee soils have grayish mottles in the upper part of the B horizon. The poorly drained Auburndale and Marshfield soils are gleyed and mottled below the A horizon.

Time

The effects of the soil-forming factors are modified by time. The longer the other soil-forming factors have interacted, the more highly developed the soils can become. Fordum soils, for example, are relatively young soils in Clark County. These soils have few or no genetic differences between horizons because they have not been in place long enough for the soil-forming processes to take full effect. Loyal soils, on the other hand, are considered mature because they have well defined horizons. The soil-forming processes have been active in these soils for thousands of years.

References

American Association of State Highway and Transportation Officials (AASHTO). 1986. Standard specifications for highway materials and methods of sampling and testing. 14th edition, 2 volumes.

American Society for Testing and Materials (ASTM). 1993. Standard classification of soils for engineering purposes. ASTM Standard D 2487.

Attig, John W., Lee Clayton, and D.M. Mickelson. 1988. Pleistocene stratigraphic units of Wisconsin. 1984-87. University of Wisconsin Extension, Wisconsin Geological and Natural History Survey, Information Circular 62.

Bell, E.A., and M.G. Sherrill. 1974. Water availability in central Wisconsin—an area of near-surface crystalline rock. University of Wisconsin Extension, Wisconsin Geological and Natural History Survey, Geological Survey, Water Supply Paper 2022.

Clark County. 1988. Drinking water program. University of Wisconsin Extension.

Clayton, Lee, J.W. Attig, D.M. Mickelson, and M.D. Johnson. 1991. Glaciation of Wisconsin. University of Wisconsin Extension, Wisconsin Geological and Natural History Survey, Educational Series 36.

Clayton, Lee. 1991. Pleistocene geology of Wood County, Wisconsin. University of Wisconsin Extension, Wisconsin Geological and Natural History Survey, Information Circular 68.

Curtiss, John T. 1959. The vegetation of Wisconsin: An ordination of plant communities.

Finley, R.W. 1965. Geography of Wisconsin: A content outline.

Hahn, Jerold T., principal mensurationist. 1985. Timber resources of Wisconsin’s central survey unit 1983. U.S. Department of Agriculture, Forest Service, Research Bulletin NC-84.

Kammerer, P.A., Jr. 1984. An overview of ground-water quality data in Wisconsin. U.S. Geological Survey, Water Resources Investigations Report 83-4239.

Kotar, John, and others. 1988. Field guide to forest habitat types of northern Wisconsin. Department of Forestry, University of Wisconsin-Madison, and Wisconsin Department of Natural Resources.

Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Science Society of America Proceedings 23: 152-156.

United States Department of Agriculture. 1970. Soil and water conservation needs inventory. Soil Conservation Service.

United States Department of Agriculture. 1993. Soil survey manual. Soil Conservation Service, U.S. Department of Agriculture Handbook 210.

United States Department of Agriculture. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436.

Whitson, A.R., and others. 1918. Reconnaissance soil survey of south part of north central Wisconsin. Wisconsin Geological and Natural History Survey Bulletin 52-A.

Wisconsin Conservation Department. 1965. Surface water resources of Clark County.

Wisconsin Department of Administration. Official population estimates for 1992. Demographic Services Center.

Wisconsin Department of Agriculture, Trade, and Consumer Protection, United States Department of Agriculture, and Wisconsin Agricultural Statistics Service. 1990. Wisconsin agricultural statistics.

Wisconsin Department of Development. Clark County economic profile. Bureau of Public Information.

Wisconsin Department of Transportation. 1990. 1990 highway mileage data. In cooperation with U.S. Department of Transportation, Federal Highway Administration.

Zaporozec, Alexander, and R.D. Cotter. 1985. Major ground-water units of Wisconsin. University of Wisconsin Extension, Wisconsin Geological and Natural History Survey.

Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvial. Pertaining to material or processes associated with transportation or deposition by running water.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bedrock outcrop (map symbol). A small exposure of bedrock.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measurement represented by a board 1 foot wide, 1 foot long, and 1 inch thick.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clayey. General term for the textural classes clay, silty clay, and sandy clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcutting. Removal of all the timber in a stand when trees are harvested.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cradle-knoll. A small mound made up of soil material that temporarily clung to the roots when a tree was uprooted.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. General term for the textural classes very fine sandy loam, fine sandy loam, sandy loam, coarse sandy loam, loam, clay loam, and sandy clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Monadnock. A hill or mountain of resistant rock surmounting a peneplain.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Organic soil. A soil that contains 12 to more than 18 percent organic carbon, depending on the content of mineral materials, and is 16 or more inches thick.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Peneplain. A land surface of considerable area and slight relief shaped by erosion.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitted outwash. An outwash area characterized by many irregular depressions, such as kettles, shallow pits, and potholes.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits. Soil scientists regard as soil only that part of the regolith that is modified by organisms and other soil-forming forces. Most engineers describe the whole regolith, even to a great depth, as “soil.”

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. General term for the textural classes loamy very fine sand, loamy fine sand, loamy sand, loamy coarse sand, very fine sand, fine sand, sand, and coarse sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood cut. A method of tree harvest in which enough large trees are left to protect the younger and shorter trees from windthrow and other damage.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Silty. General term for the textural classes silt, silt loam, and silty clay loam.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil blowing. The detachment and transport of soil particles by wind.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A type of stream terrace that formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, representing the remnants of an abandoned flood plain, streambed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lakeshore, or seashore. The term is generally applied to both the relatively flat summit surface (tread), cut or built by stream or wave action, and the steeper descending slope (scarp, riser), graded to a lower base level of erosion. Practically, terraces are considered to be generally flat alluvial areas above the 100-year flood stage.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tiers. Layers used to define the control section in the classification of organic soils. The organic material is divided into three tiers. The surface tier is the upper 12 inches, the subsurface tier is the next 24 inches, and the bottom tier is the lower 16 inches.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland. Land at a higher elevation, in general, than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-88 at Neillsville, Wisconsin)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	22.3	0.9	11.6	46	-35	0	0.71	0.29	1.11	2	9.0
February---	28.8	6.3	17.5	51	-28	0	.80	.21	1.31	2	7.1
March------	39.4	17.9	28.6	69	-16	3	1.67	.73	2.47	4	8.8
April------	56.3	32.6	44.4	83	11	53	2.77	1.79	3.67	6	2.0
May--------	69.7	43.2	56.5	88	24	233	3.37	2.00	4.59	7	.2
June-------	77.7	51.9	64.8	93	34	443	3.99	2.25	5.53	7	.0
July-------	82.1	56.6	69.3	94	41	599	4.31	2.57	5.87	6	.0
August-----	79.8	54.8	67.3	94	37	535	4.01	2.22	5.59	6	.0
September--	70.4	46.2	58.3	90	26	266	4.03	1.89	5.87	7	.0
October----	59.1	36.2	47.6	83	15	80	2.29	1.00	3.39	4	.2
November---	41.4	23.0	32.2	66	-5	4	1.70	.75	2.59	4	4.0
December---	27.5	9.3	18.4	52	-25	0	1.06	.47	1.57	3	9.4
Yearly:											
Average---	54.5	31.6	43.1	---	---	---	---	---	---	---	---
Extreme---	99	-48	---	96	-36	---	---	---	---	---	---
Total-----	---	---	---	---	---	2,217	30.71	25.51	35.12	58	40.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-88 at Neillsville, Wisconsin)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 4	May 19	May 30
2 years in 10 later than--	Apr. 30	May 13	May 25
5 years in 10 later than--	Apr. 20	May 2	May 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 29	Sept. 21	Sept. 11
2 years in 10 earlier than--	Oct. 4	Sept. 25	Sept. 14
5 years in 10 earlier than--	Oct. 14	Oct. 4	Sept. 21

Table 3.--Growing Season

(Recorded in the period 1951-88 at Neillsville, Wisconsin)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	152	134	109
8 years in 10	160	140	115
5 years in 10	175	153	126
2 years in 10	190	165	138
1 year in 10	198	171	144

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AbB	Aftad very fine sandy loam, 2 to 6 percent slopes	1,326	0.2
AgA	Almena silt loam, 0 to 3 percent slopes	15,273	2.0
AnA	Au Gres-Newson complex, 0 to 3 percent slopes	823	0.1
Au	Auburndale silt loam, 0 to 2 percent slopes	7,787	1.0
Ba	Barronett silt loam, 0 to 2 percent slopes	1,104	0.1
BlB	Bilson sandy loam, 0 to 6 percent slopes	996	0.1
BoC	Boone sand, 6 to 15 percent slopes	704	0.1
BoF	Boone sand, 15 to 50 percent slopes	1,307	0.2
BpF	Boone-Elevasil complex, 15 to 50 percent slopes	1,180	0.2
BrA	Brander silt loam, 0 to 3 percent slopes	1,639	0.2
Ca	Capitola-Marshfield-Veedum complex, 0 to 2 percent slopes	15,145	1.9
Cd	Citypoint mucky peat, 0 to 1 percent slopes	20,050	2.6
CmA	Comstock silt loam, 0 to 3 percent slopes	389	0.1
CoC2	Council loam, 6 to 12 percent slopes, eroded	671	0.1
CsD2	Council and Seaton soils, 12 to 20 percent slopes, eroded	611	0.1
CuB	Crystal Lake silt loam, 2 to 6 percent slopes	347	*
Da	Dawsil mucky peat, 0 to 1 percent slopes	6,357	0.8
EaB	Eauclaire loamy sand, 1 to 6 percent slopes	4,990	0.6
ElB	Elevasil sandy loam, 2 to 6 percent slopes	365	0.1
ElC2	Elevasil sandy loam, 6 to 12 percent slopes, eroded	658	0.1
ElD2	Elevasil sandy loam, 12 to 20 percent slopes, eroded	248	*
FeA	Fairchild-Elm Lake complex, 0 to 3 percent slopes	51,381	6.6
FfA	Fallcreek loam, 0 to 3 percent slopes	4,307	0.6
FgA	Fallcreek-Merrillan complex, 0 to 3 percent slopes	14,387	1.8
FhB	Flambeau loam, 1 to 6 percent slopes	26,569	3.4
FhC	Flambeau loam, 6 to 12 percent slopes	3,393	0.4
FhD	Flambeau loam, 12 to 20 percent slopes	623	0.1
FkB	Flambeau sandy loam, 1 to 6 percent slopes	7,552	1.0
FlB	Flambeau-Humbird complex, 1 to 6 percent slopes	5,539	0.7
FlC	Flambeau-Humbird sandy loams, 6 to 12 percent slopes	7,652	1.0
Fm	Fordum silt loam, 0 to 2 percent slopes	8,252	1.1
FnB	Freeon silt loam, 2 to 6 percent slopes, very stony	3,183	0.4
FnC	Freeon silt loam, 6 to 15 percent slopes, very stony	312	*
HeB	Hiles silt loam, 1 to 6 percent slopes	12,675	1.6
HuB	Humbird fine sandy loam, 1 to 6 percent slopes	14,183	1.8
HuC	Humbird fine sandy loam, 6 to 12 percent slopes	6,886	0.9
HxB	Humbird-Merrillan fine sandy loams, 0 to 6 percent slopes	17,787	2.3
IxA	Ironrun-Ponycreek complex, 0 to 3 percent slopes	5,988	0.8
IzB	Ironrun-Ponycreek-Arbutus complex, 0 to 6 percent slopes	926	0.1
KeA	Kert silt loam, 0 to 3 percent slopes	13,155	1.7
Lk	Loxley peat, 0 to 1 percent slopes	2,797	0.4
Lm	Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes	5,562	0.7
LoB	Loyal silt loam, 1 to 6 percent slopes	170,879	21.7
LoC	Loyal silt loam, 6 to 12 percent slopes	8,658	1.1
LsB	Loyal-Hiles silt loams, 1 to 6 percent slopes	4,619	0.6
LsC	Loyal-Hiles silt loams, 6 to 12 percent slopes	6,691	0.9
LuB	Ludington sand, 1 to 6 percent slopes	7,260	0.9
LuC	Ludington sand, 6 to 12 percent slopes	7,525	1.0
LxB	Ludington-Fairchild sands, 0 to 6 percent slopes	21,872	2.8
LyD	Ludington-Humbird complex, 12 to 20 percent slopes	1,172	0.2
MaB	Magnor silt loam, 0 to 4 percent slopes, very stony	1,055	0.1
MbB	Mahtomedi loamy sand, 0 to 6 percent slopes	738	0.1
MbC	Mahtomedi loamy sand, 6 to 12 percent slopes	282	*
McA	Maplehurst silt loam, 0 to 3 percent slopes	1,634	0.2
Me	Markey-Newson mucks, 0 to 2 percent slopes	2,555	0.3
Mf	Marshfield silt loam, 0 to 2 percent slopes	29,972	3.8
MgB	Menahga loamy sand, 0 to 6 percent slopes	1,196	0.2
MmA	Merimod silt loam, 0 to 3 percent slopes	943	0.1
MnB	Merit silt loam, 0 to 6 percent slopes	1,262	0.2
MoB	Merit-Gardenvale silt loams, 1 to 6 percent slopes	359	0.1
MpA	Merrillan fine sandy loam, 0 to 3 percent slopes	7,095	0.9

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
MrA	Merrillan-Veedum complex, 0 to 3 percent slopes	31,565	4.0
MxA	Moppet-Fordum complex, 0 to 3 percent slopes	13,513	1.7
NeB	Newood sandy loam, 2 to 6 percent slopes, very stony	415	0.1
NeC	Newood sandy loam, 6 to 15 percent slopes, very stony	647	0.1
NmC	Newood-Magnor-Cathro complex, 0 to 15 percent slopes, very stony	3,207	0.4
NoC	Northmound flaggy silt loam, 6 to 15 percent slopes, very stony	642	0.1
NrF	Northmound-Rock outcrop complex, 15 to 50 percent slopes, very stony	914	0.1
OeA	Oesterle loam, 0 to 3 percent slopes	789	0.1
PeA	Pelkie-Winterfield loamy fine sands, 0 to 3 percent slopes	1,140	0.2
Pg	Pits	1,710	0.2
PoA	Plover very fine sandy loam, 0 to 3 percent slopes	1,250	0.2
Pv	Ponycreek-Dawsil complex, 0 to 2 percent slopes	2,489	0.3
PxA	Poskin silt loam, 0 to 3 percent slopes	1,305	0.2
Py	Psammaquents, nearly level	96	*
Rb	Rib silt loam, 0 to 2 percent slopes	2,501	0.3
RkA	Rockdam sand, 0 to 3 percent slopes	3,046	0.4
RoA	Rosholt sandy loam, 0 to 2 percent slopes	591	0.1
RoB	Rosholt sandy loam, 2 to 6 percent slopes	1,008	0.1
RoC	Rosholt sandy loam, 6 to 12 percent slopes	601	0.1
RzB	Rozellville silt loam, 2 to 6 percent slopes	531	0.1
RzC	Rozellville silt loam, 6 to 12 percent slopes	444	0.1
ScA	Simescreek sand, 0 to 3 percent slopes	2,204	0.3
SrB	Spencer silt loam, 2 to 6 percent slopes	8,708	1.1
SrC	Spencer silt loam, 6 to 12 percent slopes	502	0.1
TrB	Tarr sand, 0 to 6 percent slopes	1,657	0.2
Ve	Veedum silt loam, 0 to 2 percent slopes	11,949	1.5
Vs	Veedum-Elm Lake mucks, 0 to 2 percent slopes	4,170	0.5
WeA	Withee silt loam, 0 to 3 percent slopes	91,267	11.5
WkA	Withee-Kert silt loams, 0 to 3 percent slopes	16,423	2.1
	Water	3,823	0.5
	Total	779,953	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
AbB------------- Aftad	IIe	95	16	35	70	3.5	3.0	3.4
AgA------------- Almena	IIw	95	16	35	80	4.0	3.5	4.3
AnA-------------		---	---	---	---	---	---	---
Au Gres--------	IVw							
Newson---------	VIw							
Au-------------- Auburndale	IIIw	85	14	30	70	---	3.0	2.9
Ba-------------- Barronett	IIIw	85	14	30	70	---	3.0	2.7
BlB------------- Bilson	IIIs	80	13	30	65	3.5	3.0	2.0
BoC------------- Boone	VIs	30	5	15	25	1.5	---	0.4
BoF------------- Boone	VIIs	---	---	---	---	---	---	---
BpF-------------		---	---	---	---	---	---	1.0
Boone----------	VIIs							
Elevasil-------	VIIe							
BrA------------- Brander	IIs	90	15	---	75	4.0	---	3.7
Ca-------------- Capitola-Marshfield-Veedum	VIw	---	---	---	---	---	---	2.1
Cd-------------- Citypoint	VIIw	---	---	---	---	---	---	---
CmA------------- Comstock	IIw	90	15	30	70	4.0	3.5	4.1
CoC2------------ Council	IIIe	120	19	45	65	4.5	---	3.7
CsD2------------ Council and Seaton	IVe	105	17	35	60	4.0	---	---
CuB------------- Crystal Lake	IIe	100	17	40	80	4.5	3.5	4.0

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
Da-------------- Dawsil	VIIw	---	---	---	---	---	---	---
EaB------------- Eauclaire	IIIs	75	12	25	60	---	---	3.1
ElB------------- Elevasil	IIIs	85	14	25	60	4.0	2.5	3.2
ElC2------------ Elevasil	IIIe	75	12	25	50	3.5	---	2.6
ElD2------------ Elevasil	IVe	65	10	20	40	3.0	---	2.2
FeA-------------		---	---	---	---	---	---	1.7
Fairchild------	IIIw							
Elm Lake-------	VIw							
FfA------------- Fallcreek	IIw	80	13	30	65	3.5	3.0	3.2
FgA-------------		75	12	30	65	3.0	2.5	2.7
Fallcreek------	IIw							
Merrillan------	IIIw							
FhB------------- Flambeau	IIe	90	15	30	70	4.0	3.0	3.6
FhC------------- Flambeau	IIIe	85	14	30	65	4.0	---	3.4
FhD------------- Flambeau	IVe	75	12	25	55	3.5	---	3.0
FkB------------- Flambeau	IIe	85	14	30	65	4.0	2.5	3.6
FlB-------------		75	12	30	65	3.5	2.5	2.8
Flambeau-------	IIe							
Humbird--------	IIIe							
FlC-------------		70	11	25	55	3.5	---	2.5
Flambeau-------	IIIe							
Humbird--------	IVe							
Fm-------------- Fordum	VIw	---	---	---	---	---	---	3.0
FnB------------- Freeon	IIe	95	16	30	75	4.0	3.0	3.9
FnC------------- Freeon	IIIe	85	14	30	70	4.0	---	3.7

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
HeB------------- Hiles	IIe	90	15	25	65	3.5	2.5	2.7
HuB------------- Humbird	IIIe	65	11	30	60	3.5	2.5	2.0
HuC------------- Humbird	IVe	55	9	25	50	3.0	---	1.5
HxB-------------		70	11	25	60	3.0	2.5	2.0
Humbird--------	IIIe							
Merrillan------	IIIw							
IxA-------------		---	---	---	---	---	---	---
Ironrun--------	IVw							
Ponycreek------	VIw							
IzB-------------		---	---	---	---	---	---	---
Ironrun--------	IVw							
Ponycreek------	VIw							
Arbutus--------	IVs							
KeA------------- Kert	IIw	80	13	30	65	3.0	3.0	2.7
Lk-------------- Loxley	VIIw	---	---	---	---	---	---	---
Lm-------------- Loxley, Beseman, and Dawson	VIIw	---	---	---	---	---	---	---
LoB------------- Loyal	IIe	100	16	40	80	4.5	3.0	4.0
LoC------------- Loyal	IIIe	95	16	35	70	4.0	---	3.5
LsB------------- Loyal-Hiles	IIe	90	15	30	70	4.0	3.0	3.5
LsC------------- Loyal-Hiles	IIIe	85	14	25	65	3.5	---	3.1
LuB------------- Ludington	IVs	55	9	20	50	3.5	2.5	3.0
LuC------------- Ludington	IVs	50	8	15	45	3.0	---	2.8
LxB-------------		55	9	20	50	2.5	2.0	2.8
Ludington------	IVs							
Fairchild------	IIIw							

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
LyD-------------		40	7	---	40	2.5	---	1.7
Ludington------	VIs							
Humbird--------	VIe							
MaB------------ Magnor	IIw	80	13	30	70	3.5	3.0	3.7
MbB------------ Mahtomedi	IVs	45	6	---	45	2.5	---	1.4
MbC------------ Mahtomedi	VIs	40	5	---	40	2.2	---	1.2
McA------------ Maplehurst	IIw	100	16	30	80	4.0	3.0	4.3
Me--------------		---	---	---	---	---	---	---
Markey---------	Vw							
Newson---------	VIw							
Mf------------- Marshfield	IIIw	80	12	35	70	---	3.0	3.0
MgB------------ Menahga	IVs	45	6	15	40	2.0	---	1.2
MmA------------ Merimod	IIs	110	17	40	70	4.0	3.0	3.3
MnB------------ Merit	IIe	100	16	35	65	4.0	3.0	3.1
MoB------------ Merit-Gardenvale	IIe	100	16	35	65	4.0	---	3.1
MpA------------ Merrillan	IIIw	70	11	25	60	3.0	2.5	1.9
MrA------------ Merrillan-Veedum	IIIw	70	11	25	60	---	2.5	2.6
MxA------------		---	---	---	---	---	---	2.8
Moppet---------	IIIw							
Fordum---------	VIw							
NeB------------ Newood	IIe	85	14	---	60	3.5	3.0	2.8
NeC------------ Newood	IIIe	75	12	---	55	3.0	2.5	2.6

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
NmC-------------		---	---	---	---	---	---	---
Newood---------	VIs							
Magnor---------	IVs							
Cathro---------	VIw							
NoC------------- Northmound	IIIe	70	11	25	55	3.0	---	2.0
NrF-------------		---	---	---	---	---	---	---
Northmound-----	VIIe							
Rock outcrop---	VIIIs							
OeA------------- Oesterle	IIw	85	14	25	70	3.5	2.5	3.4
PeA-------------		---	---	---	---	---	---	---
Pelkie---------	IVs							
Winterfield----	IVw							
Pg-------------- Pits	VIIIs	---	---	---	---	---	---	---
PoA------------- Plover	IIw	85	14	30	65	3.5	3.0	3.1
Pv--------------		---	---	---	---	---	---	---
Ponycreek------	VIw							
Dawsil---------	VIIw							
PxA------------- Poskin	IIw	85	14	28	75	3.5	3.0	4.3
Py-------------- Psammaquents	VIw	---	---	---	---	---	---	---
Rb-------------- Rib	VIw	---	---	---	---	---	---	3.3
RkA------------- Rockdam	IVs	55	9	---	50	2.5	---	1.3
RoA------------- Rosholt	IIs	80	13	30	65	3.5	---	3.2
RoB------------- Rosholt	IIe	80	13	30	65	3.5	---	3.2
RoC------------- Rosholt	IIIe	65	11	25	50	3.0	---	2.0
RzB------------- Rozellville	IIe	90	15	30	70	4.0	3.5	4.0
RzC------------- Rozellville	IIIe	80	13	25	65	4.0	3.8	3.8

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Soybeans	Oats	Bromegrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass
		Bu	Tons	Bu	Bu	Tons	Tons	AUM*
ScA------------- Simescreek	IVs	35	5	---	35	1.5	---	1.0
SrB------------- Spencer	IIe	110	18	40	75	4.0	3.5	4.1
SrC------------- Spencer	IIIe	105	17	35	70	4.0	---	3.9
TrB------------- Tarr	IVs	30	5	---	30	1.5	1.3	0.8
Ve-------------- Veedum	IIIw	75	12	25	60	---	2.5	3.3
Vs-------------- Veedum-Elm Lake	VIw	---	---	---	---	---	---	1.9
WeA------------- Withee	IIw	90	15	35	75	3.5	3.0	3.9
WkA------------- Withee-Kert	IIw	85	14	30	70	3.0	3.0	3.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AbB	Aftad very fine sandy loam, 2 to 6 percent slopes
AgA	Almena silt loam, 0 to 3 percent slopes (where drained)
Au	Auburndale silt loam, 0 to 2 percent slopes (where drained)
Ba	Barronett silt loam, 0 to 2 percent slopes (where drained)
BlB	Bilson sandy loam, 0 to 6 percent slopes
BrA	Brander silt loam, 0 to 3 percent slopes
Ca	Capitola-Marshfield-Veedum complex, 0 to 2 percent slopes (where drained)
CmA	Comstock silt loam, 0 to 3 percent slopes (where drained)
CuB	Crystal Lake silt loam, 2 to 6 percent slopes
FfA	Fallcreek loam, 0 to 3 percent slopes (where drained)
FgA	Fallcreek-Merrillan complex, 0 to 3 percent slopes (where drained)
FhB	Flambeau loam, 1 to 6 percent slopes
FkB	Flambeau sandy loam, 1 to 6 percent slopes
FlB	Flambeau-Humbird complex, 1 to 6 percent slopes
FnB	Freeon silt loam, 2 to 6 percent slopes, very stony
HeB	Hiles silt loam, 1 to 6 percent slopes
KeA	Kert silt loam, 0 to 3 percent slopes (where drained)
LoB	Loyal silt loam, 1 to 6 percent slopes
LsB	Loyal-Hiles silt loams, 1 to 6 percent slopes
MaB	Magnor silt loam, 0 to 4 percent slopes, very stony (where drained)
McA	Maplehurst silt loam, 0 to 3 percent slopes (where drained)
Mf	Marshfield silt loam, 0 to 2 percent slopes (where drained)
MmA	Merimod silt loam, 0 to 3 percent slopes
MnB	Merit silt loam, 0 to 6 percent slopes
MoB	Merit-Gardenvale silt loams, 1 to 6 percent slopes
NeB	Newood sandy loam, 2 to 6 percent slopes, very stony
OeA	Oesterle loam, 0 to 3 percent slopes (where drained)
PoA	Plover very fine sandy loam, 0 to 3 percent slopes (where drained)
PxA	Poskin silt loam, 0 to 3 percent slopes (where drained)
Rb	Rib silt loam, 0 to 2 percent slopes (where drained)
RoA	Rosholt sandy loam, 0 to 2 percent slopes
RoB	Rosholt sandy loam, 2 to 6 percent slopes
RzB	Rozellville silt loam, 2 to 6 percent slopes
SrB	Spencer silt loam, 2 to 6 percent slopes
WeA	Withee silt loam, 0 to 3 percent slopes (where drained)
WkA	Withee-Kert silt loams, 0 to 3 percent slopes (where drained)

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
AbB------------- Aftad	3L	Slight	Slight	Slight	Severe	Sugar maple---------	60	3	Red pine, eastern white pine, white spruce.
						American basswood---	---	---	
						Yellow birch--------	---	---	
						Red maple-----------	---	---	
						Northern red oak----	---	---	
						Quaking aspen-------	---	---	
						White ash-----------	---	---	
AgA------------- Almena	3W	Slight	Slight	Moderate	Severe	Sugar maple---------	64	3	White spruce, red pine, eastern white pine, red maple, black spruce.
						American basswood---	68	4	
						Red maple-----------	63	3	
						Quaking aspen-------	---	---	
AnA:									
Au Gres--------	6W	Slight	Moderate	Severe	Severe	Quaking aspen-------	70	6	White spruce, red pine, eastern white pine, Norway spruce.
						Bigtooth aspen------	---	---	
						Paper birch---------	---	---	
						Yellow birch--------	---	---	
						Red maple-----------	65	3	
						Eastern white pine--	---	---	
						Northern whitecedar-	---	---	
						Jack pine-----------	51	5	
						Red pine------------	61	7	
Newson---------	6W	Slight	Severe	Severe	Severe	Jack pine-----------	59	6	Eastern white pine, white spruce, balsam fir, tamarack.
						Quaking aspen-------	50	3	
						Paper birch---------	---	---	
						Eastern white pine--	---	---	
Au-------------- Auburndale	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	White spruce, black spruce, cottonwood.
						American basswood---	---	---	
						Balsam fir----------	54	7	
						Black ash-----------	45	2	
						Quaking aspen-------	---	---	
Ba-------------- Barronett	2W	Slight	Severe	Severe	Severe	Tamarack------------	40	2	White spruce, black spruce.
						Black ash-----------	---	---	
						Quaking aspen-------	---	---	
						American elm--------	---	---	
						Willow--------------	---	---	
BlB------------- Bilson	4A	Slight	Slight	Slight	Moderate	Northern red oak----	60	4	Red pine, eastern white pine, white spruce, Norway spruce.
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Northern pin oak----	---	---	
BoC------------- Boone	2S	Slight	Moderate	Slight	Slight	Black oak-----------	44	2	Red pine, jack pine.
						Northern red oak----	---	---	
						Jack pine-----------	49	4	
						Eastern white pine--	---	---	
						Northern pin oak----	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
BoF------------- Boone	2R	Moderate	Moderate	Slight	Slight	Black oak-----------	44	2	Red pine, jack pine.
						Northern red oak----	---	---	
						Jack pine-----------	49	4	
						Eastern white pine--	---	---	
						Northern pin oak----	---	---	
BpF:									
Boone----------	2R	Moderate	Moderate	Slight	Slight	Black oak-----------	44	2	Red pine, jack pine.
						Northern red oak----	---	---	
						Jack pine-----------	49	4	
						Eastern white pine--	---	---	
						Northern pin oak----	---	---	
Elevasil-------	2R	Moderate	Moderate	Slight	Moderate	Black oak-----------	45	2	Jack pine, red pine.
						Jack pine-----------	---	---	
						Northern pin oak----	---	---	
						Northern red oak----	---	---	
BrA------------- Brander	3L	Slight	Slight	Slight	Severe	Sugar maple---------	62	3	White spruce, eastern white pine, red pine.
						Red maple-----------	---	---	
						White spruce--------	---	---	
						Eastern white pine--	---	---	
Ca:									
Capitola-------	7W	Slight	Severe	Severe	Severe	Balsam fir----------	52	7	Balsam fir, red maple, white ash, black spruce, white spruce.
						Red maple-----------	56	2	
						Black ash-----------	48	2	
						Quaking aspen-------	---	---	
						Northern whitecedar-	---	---	
						Tamarack------------	---	---	
						American elm--------	---	---	
						Eastern hemlock-----	---	---	
Marshfield-----	3W	Slight	Severe	Severe	Severe	White ash-----------	54	3	White ash, red maple, white spruce.
						Red maple-----------	---	---	
						White spruce--------	---	---	
						Black ash-----------	---	---	
						Quaking aspen-------	---	---	
Veedum---------	1W	Slight	Severe	Severe	Severe	White ash-----------	39	1	---
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
Cd-------------- Citypoint	2W	Slight	Severe	Severe	Severe	Black spruce--------	15	2	---
						Tamarack------------	---	---	
CmA------------- Comstock	3W	Slight	Slight	Moderate	Severe	Red maple-----------	61	3	Eastern white pine, white spruce, red pine.
						Sugar maple---------	65	3	
						Balsam fir----------	---	---	
						Quaking aspen-------	---	---	
						White ash-----------	---	---	
						Paper birch---------	---	---	
						Yellow birch--------	---	---	
						American hornbeam---	---	---	
						American basswood---	---	---	
						American elm--------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
CoC2------------ Council	4A	Slight	Slight	Slight	Severe	Northern red oak----	66	4	Red pine, eastern white pine, white spruce, Norway spruce.
						Sugar maple---------	---	---	
						Red maple-----------	---	---	
						American basswood---	---	---	
						Paper birch---------	---	---	
						Quaking aspen-------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
CsD2:									
Council--------	4R	Moderate	Moderate	Slight	Severe	Northern red oak----	66	4	Red pine, eastern white pine, white spruce, Norway spruce.
						Sugar maple---------	---	---	
						Red maple-----------	---	---	
						American basswood---	---	---	
						Paper birch---------	---	---	
						Quaking aspen-------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
Seaton---------	5R	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	5	Black walnut, red pine, white spruce, northern whitecedar.
						Sugar maple---------	---	---	
						American basswood---	---	---	
CuB------------- Crystal Lake	3L	Slight	Slight	Slight	Severe	Sugar maple---------	61	3	Eastern white pine, red pine, white spruce.
						American basswood---	69	4	
						Yellow birch--------	---	---	
						Quaking aspen-------	---	---	
						Bigtooth aspen------	---	---	
						American elm--------	---	---	
						White ash-----------	71	5	
						Black cherry--------	---	---	
Da-------------- Dawsil	2W	Slight	Severe	Severe	Severe	Black spruce--------	15	2	---
						Tamarack------------	---	---	
EaB------------- Eauclaire	5A	Slight	Slight	Slight	Moderate	Northern red oak----	73	5	Red pine, white spruce, northern red oak.
						Northern pin oak----	---	---	
						White oak-----------	---	---	
						Paper birch---------	---	---	
						Quaking aspen-------	---	---	
ElB, ElC2------- Elevasil	2A	Slight	Slight	Slight	Moderate	Black oak-----------	45	2	Jack pine, red pine.
						Jack pine-----------	---	---	
						Northern pin oak----	---	---	
						Northern red oak----	---	---	
ElD2------------ Elevasil	2R	Moderate	Moderate	Slight	Moderate	Black oak-----------	45	2	Jack pine, red pine.
						Jack pine-----------	---	---	
						Northern pin oak----	---	---	
						Northern red oak----	---	---	
FeA:									
Fairchild------	5W	Slight	Moderate	Moderate	Moderate	Jack pine-----------	55	5	Jack pine, red pine, eastern white pine, Norway spruce.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Paper birch---------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
FeA:									
Elm Lake-------	3W	Slight	Severe	Severe	Severe	Red maple-----------	60	3	White spruce,
						White ash-----------	---	---	red maple,
						Quaking aspen-------	---	---	white ash.
FfA-------------	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	68	4	Red pine, white
Fallcreek						Sugar maple---------	---	---	spruce,
						White ash-----------	---	---	eastern white
						American basswood---	---	---	pine.
						Red maple-----------	---	---	
FgA:									
Fallcreek------	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	68	4	Red pine, white
						Sugar maple---------	---	---	spruce,
						White ash-----------	---	---	eastern white
						American basswood---	---	---	pine.
						Red maple-----------	---	---	
Merrillan------	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	60	4	Red pine,
						Northern pin oak----	---	---	eastern white
						Red maple-----------	---	---	pine, white
						Eastern white pine--	---	---	spruce, red
									maple.
FhB, FhC--------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine,
Flambeau						Northern pin oak----	---	---	eastern white
						White oak-----------	---	---	pine, white
						White ash-----------	---	---	spruce, jack
						American basswood---	---	---	pine.
						Sugar maple---------	---	---	
FhD-------------	4R	Moderate	Moderate	Slight	Moderate	Northern red oak----	65	4	Red pine,
Flambeau						Northern pin oak----	---	---	eastern white
						White oak-----------	---	---	pine, white
						White ash-----------	---	---	spruce, jack
						American basswood---	---	---	pine.
						Sugar maple---------	---	---	
FkB-------------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine,
Flambeau						Northern pin oak----	---	---	eastern white
						White oak-----------	---	---	pine, white
						White ash-----------	---	---	spruce, jack
						American basswood---	---	---	pine.
						Sugar maple---------	---	---	
FlB, FlC:									
Flambeau-------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine,
						Northern pin oak----	---	---	eastern white
						White oak-----------	---	---	pine, white
						White ash-----------	---	---	spruce, jack
						American basswood---	---	---	pine.
						Sugar maple---------	---	---	
Humbird--------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine,
						Northern pin oak----	55	3	eastern white
						Red maple-----------	---	---	pine, white
						Quaking aspen-------	---	---	spruce, red
						Jack pine-----------	63	6	maple.

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Fm-------------- Fordum	2W	Slight	Severe	Severe	Severe	Silver maple--------	80	2	Silver maple, red maple, white ash.
						Red maple-----------	---	---	
						White ash-----------	---	---	
						White spruce--------	---	---	
FnB, FnC-------- Freeon	3L	Slight	Slight	Slight	Severe	Sugar maple---------	62	3	Red pine, eastern white pine, white spruce, black spruce.
						Northern red oak----	63	4	
						American basswood---	---	---	
						Red maple-----------	---	---	
						White oak-----------	62	4	
						Quaking aspen-------	---	---	
						Bigtooth aspen------	---	---	
						White ash-----------	---	---	
HeB------------- Hiles	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine, eastern white pine, white spruce.
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						American basswood---	---	---	
						Quaking aspen-------	---	---	
HuB, HuC-------- Humbird	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	55	3	
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
						Jack pine-----------	63	6	
HxB:									
Humbird--------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	55	3	
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
						Jack pine-----------	63	6	
Merrillan------	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	60	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Eastern white pine--	---	---	
IxA:									
Ironrun--------	6W	Slight	Moderate	Moderate	Severe	Quaking aspen-------	70	6	Eastern white pine, white spruce, red pine, Norway spruce.
						Bigtooth aspen------	---	---	
						Paper birch---------	---	---	
						Red maple-----------	---	---	
						Eastern white pine--	---	---	
						Northern pin oak----	---	---	
						Jack pine-----------	---	---	
						Swamp white oak-----	---	---	
Ponycreek------	6W	Slight	Severe	Severe	Severe	Jack pine-----------	59	6	Eastern white pine, white spruce.
						Quaking aspen-------	50	3	
						Paper birch---------	---	---	
						Eastern white pine--	---	---	
						Black ash-----------	---	---	
						Red maple-----------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
IzB:									
Ironrun	6W	Slight	Moderate	Moderate	Severe	Quaking aspen	70	6	Eastern white pine, white spruce, red pine, Norway spruce.
						Bigtooth aspen	---	---	
						Paper birch	---	---	
						Red maple	---	---	
						Eastern white pine	---	---	
						Northern pin oak	---	---	
						Jack pine	---	---	
						Swamp white oak	---	---	
Ponycreek	6W	Slight	Severe	Severe	Severe	Jack pine	59	6	Eastern white pine, white spruce.
						Quaking aspen	50	3	
						Paper birch	---	---	
						Eastern white pine	---	---	
						Black ash	---	---	
						Red maple	---	---	
Arbutus	2S	Slight	Moderate	Moderate	Slight	Red maple	56	2	Jack pine, red pine, eastern white pine.
						Quaking aspen	---	---	
						Paper birch	---	---	
						Bigtooth aspen	---	---	
						Jack pine	---	---	
						Northern pin oak	---	---	
						Eastern white pine	---	---	
						Black cherry	---	---	
KeA Kert	4W	Slight	Slight	Moderate	Severe	Northern red oak	65	4	White spruce, eastern white pine, red pine.
						Sugar maple	---	---	
						Swamp white oak	---	---	
						Red maple	---	---	
Lk Loxley	2W	Slight	Severe	Severe	Severe	Black spruce	15	2	---
						Tamarack	---	---	
						Balsam fir	---	---	
Lm:									
Loxley	2W	Slight	Severe	Severe	Severe	Black spruce	15	2	---
						Tamarack	---	---	
						Balsam fir	---	---	
Beseman	3W	Slight	Severe	Severe	Severe	Black spruce	35	3	Black spruce, tamarack.
						Tamarack	50	2	
Dawson	2W	Slight	Severe	Severe	Severe	Black spruce	15	2	---
						Tamarack	---	---	
LoB, LoC Loyal	3L	Slight	Slight	Slight	Severe	Sugar maple	60	3	Red pine, eastern white pine, white spruce.
						Northern red oak	---	---	
						American basswood	---	---	
						White ash	---	---	
						Eastern white pine	---	---	
LsB, LsC:									
Loyal	3L	Slight	Slight	Slight	Severe	Sugar maple	60	3	Red pine, eastern white pine, white spruce.
						Northern red oak	---	---	
						American basswood	---	---	
						White ash	---	---	
						Eastern white pine	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
LsB, LsC:									
Hiles----------	4L	Slight	Slight	Slight	Moderate	Northern red oak----	65	4	Red pine, eastern white pine, white spruce.
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						American basswood---	---	---	
						Quaking aspen-------	---	---	
LuB, LuC-------- Ludington	5S	Slight	Moderate	Slight	Moderate	Jack pine-----------	55	5	Jack pine, red pine.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Paper birch---------	---	---	
LxB:									
Ludington------	5S	Slight	Moderate	Slight	Moderate	Jack pine-----------	55	5	Jack pine, red pine.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Paper birch---------	---	---	
Fairchild------	5W	Slight	Moderate	Moderate	Moderate	Jack pine-----------	55	5	Jack pine, red pine, eastern white pine, Norway spruce.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Paper birch---------	---	---	
LyD:									
Ludington------	5R	Moderate	Moderate	Slight	Moderate	Jack pine-----------	55	5	Jack pine, red pine.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Paper birch---------	---	---	
Humbird--------	4R	Moderate	Moderate	Slight	Moderate	Northern red oak----	65	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	55	3	
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
						Jack pine-----------	63	6	
MaB------------- Magnor	3W	Slight	Slight	Moderate	Severe	Sugar maple---------	61	3	Eastern white pine, white spruce, red pine.
						Northern red oak----	67	4	
						Red maple-----------	65	3	
						American basswood---	67	4	
						Yellow birch--------	65	3	
						White ash-----------	68	4	
						Quaking aspen-------	---	---	
						American hornbeam---	---	---	
						Balsam fir----------	---	---	
MbB, MbC-------- Mahtomedi	8S	Slight	Moderate	Slight	Slight	Red pine------------	64	8	Red pine, jack pine, eastern white pine, white spruce.
						White spruce--------	62	8	
						Jack pine-----------	69	7	
						Eastern white pine--	59	8	
						Bigtooth aspen------	77	6	
McA------------- Maplehurst	3W	Slight	Slight	Moderate	Severe	Red maple-----------	65	3	White spruce, red maple, white ash, black spruce.
						White ash-----------	---	---	
						White spruce--------	---	---	
						Sugar maple---------	---	---	
						Yellow birch--------	---	---	
						Quaking aspen-------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Me:									
Markey	2W	Slight	Severe	Severe	Severe	Quaking aspen	45	2	---
						Balsam fir	---	---	
						Black spruce	---	---	
						Tamarack	---	---	
						Black ash	---	---	
						Northern whitecedar	---	---	
						Paper birch	---	---	
						Red maple	---	---	
						White spruce	---	---	
Newson	6W	Slight	Severe	Severe	Severe	Jack pine	59	6	Eastern white pine, white spruce, balsam fir, tamarack.
						Quaking aspen	50	3	
						Paper birch	---	---	
						Eastern white pine	---	---	
Mf Marshfield	3W	Slight	Severe	Severe	Severe	White ash	54	3	White ash, red maple, white spruce.
						Red maple	---	---	
						White spruce	---	---	
						Black ash	---	---	
						Quaking aspen	---	---	
MgB Menahga	8S	Slight	Moderate	Slight	Slight	Red pine	63	8	Red pine, white spruce, eastern white pine, jack pine.
						Jack pine	65	7	
						Eastern white pine	57	8	
						Quaking aspen	66	5	
						Bigtooth aspen	76	6	
						Paper birch	60	4	
						Northern red oak	55	3	
MmA Merimod	4A	Slight	Slight	Slight	Severe	Northern red oak	68	4	Red pine, eastern white pine, white spruce.
						Sugar maple	---	---	
						American basswood	---	---	
						White ash	---	---	
						White oak	---	---	
MnB Merit	4A	Slight	Slight	Slight	Severe	Northern red oak	68	4	Red pine, eastern white pine, white spruce.
						Sugar maple	---	---	
						American basswood	---	---	
						White ash	---	---	
						White oak	---	---	
MoB:									
Merit	4A	Slight	Slight	Slight	Severe	Northern red oak	68	4	Red pine, eastern white pine, white spruce.
						Sugar maple	---	---	
						American basswood	---	---	
						White ash	---	---	
						White oak	---	---	
Gardenvale	4A	Slight	Slight	Slight	Moderate	Northern red oak	68	4	Red pine, white spruce, northern red oak.
						White oak	---	---	
						American basswood	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
MpA-------------Merrillan	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	60	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Eastern white pine--	---	---	
MrA:									
Merrillan------	4W	Slight	Slight	Moderate	Moderate	Northern red oak----	60	4	Red pine, eastern white pine, white spruce, red maple.
						Northern pin oak----	---	---	
						Red maple-----------	---	---	
						Eastern white pine--	---	---	
Veedum---------	1W	Slight	Severe	Severe	Severe	White ash-----------	39	1	---
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
MxA:									
Moppet---------	3L	Slight	Slight	Slight	Severe	Red maple-----------	60	3	White spruce, eastern white pine, red pine, black spruce.
						Northern red oak----	---	---	
						American basswood---	---	---	
						White ash-----------	---	---	
						White spruce--------	---	---	
						Eastern white pine--	---	---	
Fordum---------	2W	Slight	Severe	Severe	Severe	Silver maple--------	80	2	Silver maple, red maple, white ash.
						Red maple-----------	---	---	
						White ash-----------	---	---	
						White spruce--------	---	---	
NeB, NeC--------Newood	3L	Slight	Slight	Slight	Moderate	Sugar maple---------	59	3	Red pine, eastern white pine, white spruce.
						Red maple-----------	---	---	
						Northern red oak----	---	---	
						Eastern hophornbeam-	---	---	
						Paper birch---------	---	---	
						Bigtooth aspen------	---	---	
						Yellow birch--------	---	---	
						Eastern hemlock-----	---	---	
						White ash-----------	---	---	
NmC:									
Newood---------	3L	Slight	Slight	Slight	Moderate	Sugar maple---------	59	3	Red pine, eastern white pine, white spruce.
						Red maple-----------	---	---	
						Northern red oak----	---	---	
						Eastern hophornbeam-	---	---	
						Paper birch---------	---	---	
						Bigtooth aspen------	---	---	
						Yellow birch--------	---	---	
						Eastern hemlock-----	---	---	
						White ash-----------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
NmC:									
Magnor	3W	Slight	Slight	Moderate	Severe	Red maple	65	3	Eastern white pine, white spruce, red pine.
						Northern red oak	67	4	
						Sugar maple	61	3	
						American basswood	67	4	
						Yellow birch	65	3	
						White ash	68	4	
						Quaking aspen	---	---	
						American hornbeam	---	---	
						Balsam fir	---	---	
Cathro	5W	Slight	Severe	Severe	Severe	Balsam fir	53	5	---
						Northern whitecedar	33	3	
						Tamarack	---	---	
						Paper birch	---	---	
						White spruce	---	---	
NoC: Northmound	3X	Slight	Moderate	Slight	Moderate	Sugar maple	59	3	Red pine, white spruce, northern red oak.
						Northern red oak	66	4	
						American basswood	---	---	
						White oak	---	---	
						Bitternut hickory	---	---	
						Quaking aspen	---	---	
NrF:									
Northmound	3R	Moderate	Moderate	Slight	Moderate	Sugar maple	59	3	Red pine, white spruce, northern red oak.
						Northern red oak	66	4	
						American basswood	---	---	
						White oak	---	---	
						Bitternut hickory	---	---	
						Quaking aspen	---	---	
Rock outcrop.									
OeA: Oesterle	3W	Slight	Slight	Moderate	Severe	Red maple	66	3	Red maple, white ash, white spruce.
						Northern red oak	72	5	
						Quaking aspen	78	6	
						Paper birch	---	---	
						Yellow birch	---	---	
PeA:									
Pelkie	3A	Slight	Moderate	Slight	Moderate	Sugar maple	65	3	Red pine, white spruce, Norway spruce.
						American elm	---	---	
						Red maple	---	---	
						American basswood	---	---	
						Yellow birch	---	---	
						White spruce	---	---	
Winterfield	6W	Slight	Moderate	Severe	Severe	Quaking aspen	70	6	White spruce, eastern white pine, northern whitecedar.
						Red maple	65	3	
						Yellow birch	---	---	
						White spruce	---	---	
						White ash	---	---	
						Eastern white pine	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
PoA------------- Plover	3W	Slight	Slight	Moderate	Severe	Red maple-----------	65	3	Eastern white pine, white spruce, black spruce.
						American basswood---	---	---	
						Yellow birch--------	---	---	
Pv:									
Ponycreek------	6W	Slight	Severe	Severe	Severe	Jack pine-----------	59	6	Eastern white pine, white spruce.
						Quaking aspen-------	50	3	
						Paper birch---------	---	---	
						Eastern white pine--	---	---	
						Black ash-----------	---	---	
						Red maple-----------	---	---	
Dawsil---------	2W	Slight	Severe	Severe	Severe	Black spruce--------	15	2	---
						Tamarack------------	---	---	
PxA------------- Poskin	3W	Slight	Slight	Moderate	Severe	Red maple-----------	65	3	White spruce, red maple, white ash, black spruce.
						White ash-----------	---	---	
Rb-------------- Rib	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	Red maple, white spruce.
						Black ash-----------	---	---	
						Silver maple--------	---	---	
RkA------------- Rockdam	6S	Slight	Moderate	Slight	Slight	Jack pine-----------	56	6	Jack pine, red pine, eastern white pine.
						Red pine------------	52	6	
						Eastern white pine--	---	---	
						Northern pin oak----	---	---	
						White oak-----------	---	---	
RoA, RoB, RoC--- Rosholt	3L	Slight	Slight	Slight	Moderate	Sugar maple---------	65	3	Red pine, eastern white pine.
						White ash-----------	77	5	
						American basswood---	---	---	
						Northern red oak----	69	4	
RzB, RzC-------- Rozellville	3L	Slight	Slight	Slight	Severe	Sugar maple---------	60	3	Red pine, eastern white pine, white spruce.
						American basswood---	---	---	
						Northern red oak----	---	---	
						White ash-----------	---	---	
						Paper birch---------	---	---	
						Eastern white pine--	---	---	
						Eastern hemlock-----	---	---	
ScA------------- Simescreek	8S	Slight	Moderate	Slight	Slight	Eastern white pine--	60	8	Red pine, eastern white pine, jack pine.
						Red pine------------	---	---	
						Jack pine-----------	---	---	
						Northern pin oak----	---	---	
SrB, SrC-------- Spencer	3L	Slight	Slight	Slight	Severe	Sugar maple---------	63	3	Eastern white pine, red pine, white spruce.
						Northern red oak----	70	5	
						American basswood---	67	4	
						Yellow birch--------	---	---	
						Quaking aspen-------	---	---	
						Black cherry--------	---	---	
						American elm--------	---	---	

See footnote at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
TrB------------- Tarr	8S	Slight	Moderate	Slight	Slight	Eastern white pine-- Red pine----------- Jack pine----------- Northern pin oak----	60 --- --- ---	8 --- --- ---	Red pine, eastern white pine, jack pine.
Ve-------------- Veedum	1W	Slight	Severe	Severe	Severe	White ash----------- Red maple----------- Quaking aspen-------	39 --- ---	1 --- ---	---
Vs: Veedum---------	1W	Slight	Severe	Severe	Severe	White ash----------- Red maple----------- Quaking aspen-------	39 --- ---	1 --- ---	---
Elm Lake-------	3W	Slight	Severe	Severe	Severe	Red maple----------- White ash----------- Quaking aspen-------	60 --- ---	3 --- ---	White spruce, red maple, white ash.
WeA------------- Withee	4W	Slight	Moderate	Moderate	Severe	Northern red oak---- Sugar maple--------- American basswood--- Yellow birch-------- White ash----------- Red maple-----------	69 64 --- --- 69 ---	4 3 --- --- 4 ---	White spruce, eastern white pine, red pine, white ash, red maple.
WkA: Withee---------	4W	Slight	Moderate	Moderate	Severe	Northern red oak---- Sugar maple--------- American basswood--- Yellow birch-------- White ash----------- Red maple-----------	69 64 --- --- 69 ---	4 3 --- --- 4 ---	White spruce, eastern white pine, red pine, white ash, red maple.
Kert-----------	4W	Slight	Slight	Moderate	Severe	Northern red oak---- Sugar maple--------- Swamp white oak----- Red maple-----------	65 --- --- ---	4 --- --- ---	White spruce, eastern white pine, red pine.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of the mean annual increment for fully stocked natural stands.

Table 8.--Woodland Equipment Use

(Only the soils suitable for the production of commercial trees are listed)

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
AbB: Aftad	Slight	Slight	Slight	Slight	Year round.
AgA: Almena	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
AnA:					
Au Gres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
Newson	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
Au: Auburndale	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Ba: Barronett	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
BlB: Bilson	Slight	Slight	Slight	Slight	Year round.
BoC: Boone	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
BoF: Boone	Moderate: too sandy, slope.	Severe: slope.	Moderate: slope, too sandy.	Moderate: too sandy, slope.	Year round.
BpF:					
Boone	Moderate: too sandy, slope.	Severe: slope.	Moderate: slope, too sandy.	Moderate: too sandy, slope.	Year round.
Elevasil	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Year round.
BrA: Brander	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Summer, fall, winter.
Ca:					
Capitola	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Marshfield	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Veedum	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
Cd: Citypoint	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
CmA: Comstock	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
CoC2: Council	Slight	Moderate: slope.	Slight	Slight	Year round.
CsD2:					
Council	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Summer, fall, winter.
Seaton	Moderate: slope.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope.	Summer, fall, winter.
CuB: Crystal Lake	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Summer, fall, winter.
Da: Dawsil	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
EaB: Eauclaire	Slight	Slight	Slight	Slight	Year round.
ElB: Elevasil	Slight	Slight	Slight	Slight	Year round.
ElC2: Elevasil	Slight	Moderate: slope.	Moderate: slope.	Slight	Year round.
ElD2: Elevasil	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Year round.
FeA:					
Fairchild	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
Elm Lake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
FfA: Fallcreek	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
FgA:					
Fallcreek	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Merrillan	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
FhB: Flambeau	Slight	Slight	Slight	Slight	Year round.
FhC: Flambeau	Slight	Moderate: slope.	Slight	Slight	Year round.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
FhD: Flambeau	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Year round.
FkB: Flambeau	Slight	Slight	Slight	Slight	Year round.
FlB:					
Flambeau	Slight	Slight	Slight	Slight	Year round.
Humbird	Slight	Slight	Slight	Slight	Year round.
FlC:					
Flambeau	Slight	Moderate: slope.	Slight	Slight	Year round.
Humbird	Slight	Moderate: slope.	Slight	Slight	Year round.
Fm: Fordum	Severe: wetness, low strength.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding, low strength.	Severe: wetness, low strength.	Winter.
FnB: Freeon	Slight	Slight	Slight	Slight	Year round.
FnC: Freeon	Slight	Moderate: slope.	Slight	Slight	Year round.
HeB: Hiles	Slight	Moderate: low strength.	Moderate: low strength.	Slight	Summer, fall, winter.
HuB: Humbird	Slight	Slight	Slight	Slight	Year round.
HuC: Humbird	Slight	Moderate: slope.	Slight	Slight	Year round.
HxB:					
Humbird	Slight	Slight	Slight	Slight	Year round.
Merrillan	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
IxA:					
Ironrun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
Ponycreek	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
IzB:					
Ironrun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
Ponycreek	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
Arbutus	Slight	Moderate: depth to rock.	Moderate: depth to rock.	Slight	Year round.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
KeA------------------ Kert	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Lk------------------- Loxley	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Lm:					
Loxley--------------	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Beseman-------------	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Winter.
Dawson--------------	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
LoB------------------ Loyal	Slight---------	Moderate: low strength.	Moderate: low strength.	Slight---------	Summer, fall, winter.
LoC------------------ Loyal	Slight---------	Moderate: slope, low strength.	Moderate: low strength.	Slight---------	Summer, fall, winter.
LsC:					
Loyal---------------	Slight---------	Moderate: low strength.	Moderate: low strength.	Slight---------	Summer, fall, winter.
Hiles---------------	Slight---------	Moderate: low strength.	Moderate: low strength.	Slight---------	Summer, fall, winter.
LuB------------------ Ludington	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
LuC------------------ Ludington	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
LxB:					
Ludington-----------	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
Fairchild-----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
LyD:					
Ludington-----------	Moderate: too sandy, slope.	Severe: slope.	Moderate: slope, too sandy.	Moderate: too sandy, slope.	Year round.
Humbird-------------	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Year round.
MaB------------------ Magnor	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
MbB------------------ Mahtomedi	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
MbC------------------ Mahtomedi	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
McA------------------ Maplehurst	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Me:					
Markey--------------	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Newson--------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
Mf------------------- Marshfield	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
MgB------------------ Menahga	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
MmA------------------ Merimod	Slight---------	Slight---------	Slight---------	Slight---------	Year round.
MnB------------------ Merit	Slight---------	Slight---------	Slight---------	Slight---------	Year round.
MoB:					
Merit---------------	Slight---------	Slight---------	Slight---------	Slight---------	Year round.
Gardenvale----------	Slight---------	Moderate: low strength.	Moderate: low strength.	Slight---------	Summer, fall, winter.
MpA------------------ Merrillan	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
MrA:					
Merrillan-----------	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Veedum--------------	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
MxA:					
Moppet--------------	Slight---------	Slight---------	Slight---------	Slight---------	Year round.
Fordum--------------	Severe: wetness, low strength.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding, low strength.	Severe: wetness, low strength.	Winter.
NeB------------------ Newood	Slight---------	Slight---------	Slight---------	Slight---------	Year round.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
NeC: Newood	Slight	Moderate: slope.	Slight	Slight	Year round.
NmC:					
Newood	Slight	Moderate: slope.	Slight	Slight	Year round.
Magnor	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Cathro	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
NoC: Northmound	Slight	Moderate: slope, depth to rock, too cobbly.	Moderate: depth to rock, too cobbly.	Moderate: too cobbly.	Year round.
NrF:					
Northmound	Moderate: slope.	Severe: slope.	Moderate: depth to rock, slope, too cobbly.	Moderate: too cobbly, slope.	Year round.
Rock outcrop	Moderate: slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Year round.
OeA: Oesterle	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
PeA:					
Pelkie	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
Winterfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Summer, winter.
PoA: Plover	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Pv:					
Ponycreek	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
Dawsil	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
PxA: Poskin	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Py: Psammaquents	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.

Table 8.--Woodland Equipment Use--Continued

Soil name and map symbol	Ratings for the most limiting seasons: Logging areas and skid trails	Log landings	Haul roads	Site preparation and planting	Preferred operating seasons
Rb: Rib	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
RkA: Rockdam	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
RoA, RoB: Rosholt	Slight	Slight	Slight	Slight	Year round.
RoC: Rosholt	Slight	Moderate: slope.	Slight	Slight	Year round.
RzB: Rozellville	Slight	Slight	Slight	Slight	Year round.
RzC: Rozellville	Slight	Moderate: slope.	Slight	Slight	Year round.
ScA: Simescreek	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
SrB, SrC: Spencer	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Summer, fall, winter.
TrB: Tarr	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Year round.
Ve: Veedum	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Vs:					
Veedum	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Winter.
Elm Lake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Winter.
WeA: Withee	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
WkA:					
Withee	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.
Kert	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Summer, winter.

Table 9.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that the soil was not rated or that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
AbB: Aftad	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red maple, red pine, white ash.	---
AgA: Almena	---	Nannyberry viburnum, redosier dogwood, silky dogwood, American cranberrybush, lilac, northern whitecedar.	White spruce	Silver maple, eastern white pine, red pine, white ash, red maple.	---
AnA:					
Au Gres	---	American cranberrybush, Amur maple, common ninebark, nannyberry viburnum.	White spruce, jack pine, Manchurian crabapple.	Norway spruce, green ash, eastern white pine.	Imperial Carolina poplar.
Newson	---	Common ninebark, American cranberrybush, silky dogwood, redosier dogwood, northern whitecedar, nannyberry viburnum.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---
Au: Auburndale	---	Nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark, American cranberrybush, northern whitecedar.	White spruce, balsam fir.	Green ash, red maple, white ash, silver maple.	---
Ba: Barronett	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
BlB--------------- Bilson	Manyflower cotoneaster.	Gray dogwood, silky dogwood, Siberian peashrub, American cranberrybush, Amur maple, lilac, northern whitecedar.	Norway spruce-----	Jack pine, red pine, eastern white pine.	---
BoC, BoF---------- Boone	Manyflower cotoneaster.	Siberian peashrub, northern whitecedar, lilac, silky dogwood, gray dogwood, Amur maple, American cranberrybush.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
BpF:					
Boone------------	Manyflower cotoneaster.	Siberian peashrub, northern whitecedar, lilac, silky dogwood, gray dogwood, Amur maple, American cranberrybush.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
Elevasil---------	---	Siberian peashrub, northern whitecedar, lilac, Amur maple, gray dogwood, silky dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
BrA--------------- Brander	Manyflower cotoneaster.	Silky dogwood, northern whitecedar, Amur maple, lilac, gray dogwood, Siberian peashrub, American cranberrybush.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
CmA--------------- Comstock	---	Nannyberry viburnum, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce------	Eastern white pine, red pine, white ash, red maple, silver maple.	---
CoC2-------------- Council	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
CsD2:					
Council	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
Seaton	---	Gray dogwood, redosier dogwood, lilac, Siberian peashrub.	Hackberry, northern whitecedar, Russian-olive, northern whitecedar, Amur maple, blue spruce.	Eastern white pine, green ash.	---
CuB: Crystal Lake	---	Gray dogwood, Amur maple, American cranberrybush, lilac, northern whitecedar.	Black Hills spruce, Norway spruce, white spruce.	Eastern white pine, red pine, white ash, red maple.	---
EaB: Eauclaire	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, silky dogwood, lilac, American cranberrybush, Amur maple, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
ElB, ElC2, ElD2: Elevasil	---	Siberian peashrub, northern whitecedar, lilac, Amur maple, gray dogwood, silky dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
FeA:					
Fairchild	---	Northern whitecedar, lilac, silky dogwood, American cranberrybush, nannyberry viburnum, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
Elm Lake	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
FfA: Fallcreek	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
FgA:					
Fallcreek	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
Merrillan	---	Nannyberry viburnum, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
FhB, FhC, FhD, FkB: Flambeau	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, silky dogwood, lilac, American cranberrybush, Amur maple, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
FlB, FlC:					
Flambeau	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, silky dogwood, lilac, American cranberrybush, Amur maple, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Humbird	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
FnB, FnC: Freeon	---	Siberian peashrub, redosier dogwood, lilac, American cranberrybush.	Northern whitecedar, blue spruce, white spruce.	Norway spruce, jack pine, eastern white pine, red pine, green ash.	---
HeB: Hiles	Manyflower cotoneaster.	Northern whitecedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Siberian peashrub, Norway spruce.	Eastern white pine, red pine, jack pine.	---
HuB, HuC: Humbird	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
HxB:					
Humbird	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Merrillan	---	Nannyberry viburnum, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
IxA:					
Ironrun	---	Common ninebark, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	White spruce, Norway spruce.	Eastern white pine, red pine, white ash, red maple.	---
Ponycreek.					
IzB:					
Ironrun	---	Common ninebark, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	White spruce, Norway spruce.	Eastern white pine, red pine, white ash, red maple.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
IzB: Ponycreek.					
Arbutus	---	Autumn-olive, lilac, white spruce, Amur privet.	Hawthorn	Red pine, eastern white pine, jack pine.	---
KeA: Kert	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
Lk: Loxley	---	Common ninebark, nannyberry viburnum, silky dogwood, lilac, American cranberrybush, gray dogwood.	Siberian crabapple, northern whitecedar.	Eastern white pine, green ash, Norway spruce.	Imperial Carolina poplar.
Lm:					
Loxley	---	Common ninebark, nannyberry viburnum, silky dogwood, lilac, American cranberrybush, gray dogwood.	Siberian crabapple, northern whitecedar.	Eastern white pine, green ash, Norway spruce.	Imperial Carolina poplar.
Beseman.					
Dawson.					
LoB, LoC: Loyal	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
LsB, LsC:					
Loyal	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
Hiles	Manyflower cotoneaster.	Northern whitecedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Siberian peashrub, Norway spruce.	Eastern white pine, red pine, jack pine.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
LuB, LuC----------Ludington	Manyflower cotoneaster.	Northern whitecedar, Amur maple, American cranberrybush, lilac, silky dogwood, gray dogwood, Siberian peashrub.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
LxB:					
Ludington--------	Manyflower cotoneaster.	Northern whitecedar, Amur maple, American cranberrybush, lilac, silky dogwood, gray dogwood, Siberian peashrub.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
Fairchild--------	---	Northern whitecedar, lilac, silky dogwood, American cranberrybush, nannyberry viburnum, redosier dogwood.	White spruce------	Eastern white pine, red pine, white ash, red maple, silver maple.	---
LyD:					
Ludington--------	Manyflower cotoneaster.	Northern whitecedar, Amur maple, American cranberrybush, lilac, silky dogwood, gray dogwood, Siberian peashrub.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
Humbird----------	Manyflower cotoneaster.	Northern whitecedar, Siberian peashrub, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
MbB, MbC----------Mahtomedi	Manyflower cotoneaster.	Gray dogwood, silky dogwood, Siberian peashrub, American cranberrybush, Amur maple, lilac, northern whitecedar.	Norway spruce-----	Jack pine, red pine, eastern white pine.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
McA: Maplehurst	---	White spruce, northern whitecedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, white ash, red maple.	---
Me: Markey.					
Newson	---	Common ninebark, American cranberrybush, silky dogwood, redosier dogwood, northern whitecedar, nannyberry viburnum.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---
Mf: Marshfield	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
MgB: Menahga	Manyflower cotoneaster.	Gray dogwood, silky dogwood, Siberian peashrub, American cranberrybush, Amur maple, lilac, northern whitecedar.	Norway spruce	Jack pine, red pine, eastern white pine.	---
MmA: Merimod	Siberian peashrub, lilac.	Northern whitecedar, Manchurian crabapple, hackberry.	Eastern white pine, jack pine, green ash, bur oak, honeylocust, Russian-olive.	---	---
MnB: Merit	Siberian peashrub, lilac.	Manchurian crabapple, hackberry.	Eastern white pine, jack pine, green ash, bur oak, honeylocust, Russian-olive.	Red maple	---
MoB:					
Merit	Siberian peashrub, lilac.	Manchurian crabapple, hackberry.	Eastern white pine, jack pine, green ash, bur oak, honeylocust, Russian-olive.	Red maple	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MoB:					
Gardenvale	Manyflower cotoneaster.	American cranberrybush, Siberian peashrub, Amur maple, lilac, silky dogwood.	Norway spruce, jack pine.	Eastern white pine, red pine.	---
MpA Merrillan	---	Nannyberry viburnum, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
MrA:					
Merrillan	---	Nannyberry viburnum, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
Veedum	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
MxA:					
Moppet	---	Northern whitecedar, lilac, redosier dogwood, silky dogwood, American cranberrybush, nannyberry viburnum.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
Fordum.					
NeB, NeC Newood	Manyflower cotoneaster.	Northern whitecedar, lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
NmC:					
Newood	Manyflower cotoneaster.	Northern whitecedar, lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Magnor.					
Cathro.					
NoC: Northmound	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
NrF:					
Northmound	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
Rock outcrop.					
OeA: Oesterle	---	Nannyberry viburnum, American cranberrybush, redosier dogwood, lilac, northern whitecedar, silky dogwood.	White spruce	Red maple, silver maple, white ash, red pine, eastern white pine.	---
PeA:					
Pelkie	---	Northern whitecedar, American cranberrybush, silky dogwood, common ninebark, lilac.	White spruce, Siberian crabapple.	Red pine, eastern white pine, green ash, Norway spruce.	Imperial Carolina poplar.
Winterfield	---	Lilac, Amur maple, silky dogwood, common ninebark, American cranberrybush, nannyberry viburnum.	White spruce, northern whitecedar, Siberian crabapple.	Eastern white pine, Norway spruce, green ash.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
PoA---------------Plover	---	Northern whitecedar, nannyberry viburnum, silky dogwood, American cranberrybush, redosier dogwood, lilac.	White spruce------	Eastern white pine, red maple, white ash, red pine, silver maple.	---
PxA---------------Poskin	---	Common ninebark, northern whitecedar, lilac, American cranberrybush, silky dogwood, redosier dogwood, nannyberry viburnum.	White spruce------	Eastern white pine, white ash, red maple, silver maple.	---
Rb----------------Rib	---	Northern whitecedar, redosier dogwood, American cranberrybush, silky dogwood, common ninebark, nannyberry viburnum.	White spruce, balsam fir.	Red maple, white ash, green ash.	Silver maple.
RkA---------------Rockdam	Manyflower cotoneaster.	Northern whitecedar, Amur maple, Siberian peashrub, gray dogwood, lilac, American cranberrybush, silky dogwood.	Red pine, Norway spruce.	Eastern white pine, jack pine.	---
RoA, RoB, RoC-----Rosholt	Manyflower cotoneaster.	Lilac, American cranberrybush, Amur maple, northern whitecedar, Siberian peashrub, gray dogwood, silky dogwood.	Norway spruce-----	Red pine, jack pine, eastern white pine.	---
RzB, RzC----------Rozellville	---	Northern whitecedar, lilac, American cranberrybush, Amur maple, gray dogwood.	White spruce, Norway spruce, Black Hills spruce.	Eastern white pine, red pine, white ash, red maple.	---
ScA---------------Simescreek	Manyflower cotoneaster.	Lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
SrB, SrC: Spencer	---	Gray dogwood, Amur maple, American cranberrybush, lilac, northern whitecedar.	Norway spruce, Black Hills spruce, white spruce.	Eastern white pine, red pine, red maple, white ash.	---
TrB: Tarr	Manyflower cotoneaster.	Northern whitecedar, lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Ve: Veedum	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
Vs: Veedum.					
Elm Lake	---	Northern whitecedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
WeA: Withee	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce, silver maple.	Eastern white pine, red pine, white ash, red maple.	---
WkA: Withee	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce, silver maple.	Eastern white pine, red pine, white ash, red maple.	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
WkA:					
Kert	---	Northern whitecedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---

Table 10.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbB: Aftad	Slight	Slight	Moderate: slope.	Slight	Slight.
AgA: Almena	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
AnA:					
Au Gres	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Newson	Severe: ponding, excess humus.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: too acid, ponding.
Au: Auburndale	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Ba: Barronett	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
BlB: Bilson	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
BoC: Boone	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: too sandy.	Severe: too acid, droughty.
BoF: Boone	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: too sandy, slope.	Severe: too acid, droughty, slope.
BpF:					
Boone	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: too sandy, slope.	Severe: too acid, droughty, slope.
Elevasil	Severe: slope, too acid.	Severe: slope, too acid.	Severe: slope, too acid.	Severe: slope.	Severe: too acid, slope.
BrA: Brander	Slight	Slight	Slight	Slight	Moderate: large stones.
Ca:					
Capitola	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ca:					
Marshfield	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding.	Severe: too acid, ponding.
Veedum	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
Cd Citypoint	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
CmA Comstock	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CoC2 Council	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
CsD2:					
Council	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CuB Crystal Lake	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
Da Dawsil	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
EaB Eauclaire	Moderate: small stones, wetness, percs slowly.	Moderate: wetness, too sandy, small stones.	Severe: small stones.	Moderate: too sandy.	Severe: droughty.
ElB Elevasil	Severe: too acid.	Severe: too acid.	Severe: too acid.	Slight	Severe: too acid.
ElC2 Elevasil	Severe: too acid.	Severe: too acid.	Severe: slope, too acid.	Slight	Severe: too acid.
ElD2 Elevasil	Severe: slope, too acid.	Severe: slope, too acid.	Severe: slope, too acid.	Moderate: slope.	Severe: too acid, slope.
FeA:					
Fairchild	Severe: wetness, too sandy, too acid.	Severe: wetness, too sandy, too acid.	Severe: too sandy, wetness, too acid.	Severe: wetness, too sandy.	Severe: too acid, wetness.
Elm Lake	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FfA: Fallcreek	Severe: wetness, too acid.	Severe: too acid.	Severe: wetness, too acid.	Moderate: wetness.	Severe: too acid.
FgA:					
Fallcreek	Severe: wetness, too acid.	Severe: too acid.	Severe: wetness, too acid.	Moderate: wetness.	Severe: too acid.
Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
FhB: Flambeau	Severe: too acid.	Severe: too acid.	Severe: too acid.	Moderate: wetness.	Severe: too acid.
FhC: Flambeau	Severe: too acid.	Severe: too acid.	Severe: slope, too acid.	Moderate: wetness.	Severe: too acid.
FhD: Flambeau	Severe: slope, too acid.	Severe: slope, too acid.	Severe: slope, too acid.	Moderate: wetness, slope.	Severe: too acid, slope.
FkB: Flambeau	Severe: too acid.	Severe: too acid.	Severe: too acid.	Moderate: wetness.	Severe: too acid.
FlB:					
Flambeau	Severe: too acid.	Severe: too acid.	Severe: too acid.	Moderate: wetness.	Severe: too acid.
Humbird	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, depth to rock.	Moderate: wetness.	Moderate: wetness, droughty.
FlC:					
Flambeau	Severe: too acid.	Severe: too acid.	Severe: slope, too acid.	Moderate: wetness.	Severe: too acid.
Humbird	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, droughty, slope.
Fm: Fordum	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
FnB: Freeon	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: large stones.
FnC: Freeon	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HeB------------------- Hiles	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, depth to rock.	Severe: erodes easily.	Moderate: wetness, depth to rock.
HuB------------------- Humbird	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, depth to rock.	Moderate: wetness.	Moderate: wetness, droughty.
HuC------------------- Humbird	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, droughty, slope.
HxB:					
Humbird--------------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, depth to rock.	Moderate: wetness.	Moderate: wetness, droughty.
Merrillan------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
IxA:					
Ironrun--------------	Severe: wetness, too sandy, too acid.	Severe: wetness, too sandy, too acid.	Severe: too sandy, wetness, too acid.	Severe: wetness, too sandy.	Severe: too acid, wetness, droughty.
Ponycreek------------	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
IzB:					
Ironrun--------------	Severe: wetness, too sandy, too acid.	Severe: wetness, too sandy, too acid.	Severe: too sandy, wetness, too acid.	Severe: wetness, too sandy.	Severe: too acid, wetness, droughty.
Ponycreek------------	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
Arbutus--------------	Severe: too acid.	Severe: too acid.	Severe: too acid.	Moderate: too sandy.	Severe: too acid.
KeA------------------- Kert	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, depth to rock.
Lk-------------------- Loxley	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Lm:					
Loxley	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
Beseman	Severe: ponding.	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding.	Severe: too acid, ponding, excess humus.
Dawson	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
LoB Loyal	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: large stones, wetness.
LoC Loyal	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, wetness, slope.
LsB:					
Loyal	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: large stones, wetness.
Hiles	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, depth to rock.	Severe: erodes easily.	Moderate: wetness, depth to rock.
LsC:					
Loyal	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, wetness, slope.
Hiles	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope, depth to rock.
LuB Ludington	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy.	Severe: too acid.
LuC Ludington	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: too sandy.	Severe: too acid.
LxB:					
Ludington	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy.	Severe: too acid.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LxB:					
Fairchild	Severe: wetness, too sandy, too acid.	Severe: wetness, too sandy, too acid.	Severe: too sandy, wetness, too acid.	Severe: wetness, too sandy.	Severe: too acid, wetness.
LyD:					
Ludington	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: slope, too sandy, too acid.	Severe: too sandy.	Severe: too acid, slope.
Humbird	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope.	Severe: slope.
MaB Magnor	Severe: wetness, too acid.	Severe: too acid.	Severe: wetness, too acid.	Moderate: wetness.	Severe: too acid.
MbB Mahtomedi	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope.	Moderate: too sandy.	Moderate: droughty.
MbC Mahtomedi	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
McA Maplehurst	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
Me:					
Markey	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Newson	Severe: ponding, excess humus.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: too acid, ponding.
Mf Marshfield	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding.	Severe: too acid, ponding.
MgB Menahga	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
MmA Merimod	Slight	Slight	Moderate: small stones.	Slight	Slight.
MnB Merit	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MoB:					
Merit	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MoB:					
Gardenvale	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MpA: Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MrA:					
Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Veedum	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
MxA:					
Moppet	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Fordum	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
NeB: Newood	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Moderate: large stones, droughty.
NeC: Newood	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
NmC:					
Newood	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
Magnor	Severe: wetness, too acid.	Severe: too acid.	Severe: wetness, too acid.	Moderate: wetness.	Severe: too acid.
Cathro	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
NoC: Northmound	Severe: too acid.	Severe: too acid.	Severe: large stones, slope, too acid.	Moderate: large stones.	Severe: too acid, large stones.
NrF:					
Northmound	Severe: slope, too acid.	Severe: slope, too acid.	Severe: large stones, slope, too acid.	Severe: slope.	Severe: too acid, large stones, slope.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OeA: Oesterle	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness, droughty.
PeA:					
Pelkie	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: droughty, flooding.
Winterfield	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pg: Pits	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
PoA: Plover	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Pv:					
Ponycreek	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
Dawsil	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
PxA: Poskin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Py: Psammaquents	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Rb: Rib	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
RkA: Rockdam	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy.	Severe: too acid, droughty.
RoA: Rosholt	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
RoB: Rosholt	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
RoC: Rosholt	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
RzB: Rozellville	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones.

Table 10.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RzC: Rozellville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
ScA: Simescreek	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
SrB: Spencer	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Moderate: large stones.
SrC: Spencer	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
TrB: Tarr	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy, too acid.	Severe: too sandy.	Severe: too acid.
Ve: Veedum	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding, too acid.	Severe: ponding.	Severe: too acid, ponding.
Vs:					
Veedum	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
Elm Lake	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
WeA: Withee	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
WkA:					
Withee	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
Kert	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, depth to rock.

Table 11.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
AbB: Aftad	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AgA: Almena	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AnA:										
Au Gres	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Newson	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Au: Auburndale	Good	Good	Fair	Fair	Good	Good	Good	Good	Fair	Good.
Ba: Barronett	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
BlB: Bilson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BoC: Boone	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BoF: Boone	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BpF:										
Boone	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Elevasil	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
BrA: Brander	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ca:										
Capitola	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Marshfield	Good	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Veedum	Fair	Good	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
Cd: Citypoint	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
CmA: Comstock	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CoC2: Council	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CsD2:										
Council	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Seaton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
CuB: Crystal Lake	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Da: Dawsil	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
EaB: Eauclaire	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ElB, ElC2: Elevasil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
ElD2: Elevasil	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
FeA:										
Fairchild	Poor	Fair	Good	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
Elm Lake	Poor	Poor	Fair	Fair	Fair	Poor	Good	Poor	Fair	Fair.
FfA: Fallcreek	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
FgA:										
Fallcreek	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Merrillan	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
FhB: Flambeau	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FhC: Flambeau	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FhD: Flambeau	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FkB: Flambeau	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FlB:										
Flambeau	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Humbird	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
FlC:										
Flambeau	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Humbird	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Fm: Fordum	Very poor.	Very poor.	Poor	Fair	Fair	Good	Good	Very poor.	Fair	Good.
FnB, FnC: Freeon	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
HeB---------------- Hiles	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HuB, HuC----------- Humbird	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
HxB:										
Humbird-----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Merrillan---------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
IxA:										
Ironrun-----------	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Ponycreek---------	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
IzB:										
Ironrun-----------	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Ponycreek---------	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Arbutus-----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
KeA---------------- Kert	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Lk----------------- Loxley	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Lm:										
Loxley------------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Beseman-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Very poor.	Very poor.	Good.
Dawson------------	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
LoB---------------- Loyal	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC---------------- Loyal	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LsB:										
Loyal-------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hiles-------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LsC:										
Loyal-------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hiles-------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
LuB---------------- Ludington	Very poor.	Fair	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
LuC---------------- Ludington	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LxB:										
Ludington---------	Very poor.	Fair	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Fairchild---------	Poor	Fair	Good	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
LyD:										
Ludington---------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Humbird-----------	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
MaB---------------- Magnor	Very poor.	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
MbB, MbC----------- Mahtomedi	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
McA---------------- Maplehurst	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Me:										
Markey------------	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Newson------------	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Mf----------------- Marshfield	Good	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
MgB---------------- Menahga	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MmA---------------- Merimod	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MnB---------------- Merit	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MoB:										
Merit-------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Gardenvale--------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MpA---------------- Merrillan	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MrA:										
Merrillan---------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Veedum------------	Fair	Good	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
MxA:										
Moppet	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
Fordum	Very poor.	Very poor.	Poor	Fair	Fair	Good	Good	Very poor.	Fair	Good.
NeB: Newood	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NeC: Newood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NmC:										
Newood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Magnor	Very poor.	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Cathro	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
NoC: Northmound	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
NrF:										
Northmound	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
OeA: Oesterle	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
PeA:										
Pelkie	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Winterfield	Poor	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Pg: Pits	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PoA: Plover	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Pv:										
Ponycreek	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Dawsil	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
PxA: Poskin	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Py: Psammaquents	Very poor.	Poor	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair.
Rb: Rib	Good	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

Table 11.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
RkA: Rockdam	Poor	Fair	Good	Fair	Good	Poor	Very poor.	Fair	Good	Very poor.
RoA, RoB: Rosholt	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RoC: Rosholt	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RzB, RzC: Rozellville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ScA: Simescreek	Poor	Poor	Good	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
SrB: Spencer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SrC: Spencer	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TrB: Tarr	Poor	Poor	Good	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ve: Veedum	Fair	Good	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
Vs:										
Veedum	Fair	Good	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
Elm Lake	Poor	Poor	Fair	Fair	Fair	Poor	Good	Poor	Fair	Fair.
WeA: Withee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WkA:										
Withee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Kert	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

Table 12.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbB: Aftad	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Slight.
AgA: Almena	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: large stones, wetness.
AnA:						
Au Gres	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Newson	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: too acid, ponding.
Au: Auburndale	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Ba: Barronett	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding.	Severe: ponding.
BlB: Bilson	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: droughty.
BoC: Boone	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: too acid, droughty.
BoF: Boone	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: too acid, droughty, slope.
BpF:						
Boone	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: too acid, droughty, slope.
Elevasil	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: too acid, slope.
BrA: Brander	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Slight	Severe: low strength, frost action.	Moderate: large stones.
Ca:						
Capitola	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ca:						
Marshfield	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding.
Veedum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding, excess humus.
Cd Citypoint	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
CmA Comstock	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
CoC2 Council	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
CsD2:						
Council	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
CuB Crystal Lake	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
Da Dawsil	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: too acid, ponding, excess humus.
EaB Eauclaire	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
ElB Elevasil	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Severe: too acid.
ElC2 Elevasil	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Severe: too acid.
ElD2 Elevasil	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: too acid, slope.
FeA:						
Fairchild	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too acid, wetness.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FeA:						
Elm Lake	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
FfA: Fallcreek	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Severe: too acid.
FgA:						
Fallcreek	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Severe: too acid.
Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
FhB: Flambeau	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Severe: too acid.
FhC: Flambeau	Severe: wetness.	Moderate: wetness, slope, shrink-swell.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: too acid.
FhD: Flambeau	Severe: wetness, slope.	Severe: slope, shrink-swell.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: too acid, slope.
FkB: Flambeau	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Severe: too acid.
FlB:						
Flambeau	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Severe: too acid.
Humbird	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
FlC:						
Flambeau	Severe: wetness.	Moderate: wetness, slope, shrink-swell.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: too acid.
Humbird	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, droughty, slope.
Fm: Fordum	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FnB--------------- Freeon	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
FnC--------------- Freeon	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
HeB--------------- Hiles	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: wetness, depth to rock.
HuB--------------- Humbird	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
HuC--------------- Humbird	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, droughty, slope.
HxB:						
Humbird----------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
Merrillan--------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
IxA:						
Ironrun----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too acid, wetness, droughty.
Ponycreek--------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: too acid, ponding, excess humus.
IzB:						
Ironrun----------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too acid, wetness, droughty.
Ponycreek--------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: too acid, ponding, excess humus.
Arbutus----------	Severe: depth to rock, cutbanks cave.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: too acid.
KeA--------------- Kert	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness, depth to rock.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Lk-----------------Loxley	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: too acid, ponding, excess humus.
Lm:						
Loxley------------	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: too acid, ponding, excess humus.
Beseman-----------	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: too acid, ponding, excess humus.
Dawson------------	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
LoB----------------Loyal	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: large stones, wetness.
LoC----------------Loyal	Severe: wetness.	Moderate: wetness, slope, shrink-swell.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, wetness, slope.
LsB:						
Loyal-------------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: large stones, wetness.
Hiles-------------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: wetness, depth to rock.
LsC:						
Loyal-------------	Severe: wetness.	Moderate: wetness, slope, shrink-swell.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, wetness, slope.
Hiles-------------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: shrink-swell, wetness, slope.	Moderate: wetness, slope, depth to rock.
LuB----------------Ludington	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: too acid.
LuC----------------Ludington	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Severe: too acid.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LxB:						
Ludington	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: too acid.
Fairchild	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too acid, wetness.
LyD:						
Ludington	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: too acid, slope.
Humbird	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
MaB Magnor	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Severe: too acid.
MbB Mahtomedi	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
MbC Mahtomedi	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
McA Maplehurst	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: large stones, wetness.
Me:						
Markey	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Newson	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: too acid, ponding.
Mf Marshfield	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding.
MgB Menahga	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
MmA Merimod	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
MnB Merit	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MoB:						
Merit	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
Gardenvale	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Slight	Moderate: low strength, frost action.	Slight.
MpA Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
MrA:						
Merrillan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Veedum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding, excess humus.
MxA:						
Moppet	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Fordum	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.
NeB Newood	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, droughty.
NeC Newood	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, droughty, slope.
NmC:						
Newood	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, droughty, slope.
Magnor	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Severe: too acid.
Cathro	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
NoC Northmound	Severe: depth to rock, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: too acid, large stones.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NrF:						
Northmound-------	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: too acid, large stones, slope.
Rock outcrop-----	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
OeA--------------- Oesterle	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones, wetness, droughty.
PeA:						
Pelkie-----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
Winterfield------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
Pg---------------- Pits	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
PoA--------------- Plover	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
Pv:						
Ponycreek--------	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: too acid, ponding, excess humus.
Dawsil-----------	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: too acid, ponding, excess humus.
PxA--------------- Poskin	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Py---------------- Psammaquents	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Rb---------------- Rib	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding.	Severe: ponding.
RkA--------------- Rockdam	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Severe: too acid, droughty.
RoA--------------- Rosholt	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: droughty.

Table 12.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RoB: Rosholt	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
RoC: Rosholt	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
RzB: Rozellville	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: shrink-swell, frost action.	Moderate: large stones.
RzC: Rozellville	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: large stones, slope.
ScA: Simescreek	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
SrB: Spencer	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Moderate: large stones.
SrC: Spencer	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: large stones, slope.
TrB: Tarr	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: too acid.
Ve: Veedum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding.
Vs:						
Veedum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: too acid, ponding, excess humus.
Elm Lake	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
WeA: Withee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones, wetness.
WkA:						
Withee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones, wetness.
Kert	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness, depth to rock.

Table 13.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbB----------------- Aftad	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
AgA----------------- Almena	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AnA:					
Au Gres------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Newson-------------	Severe: ponding, poor filter.	Severe: seepage, excess humus.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Au------------------ Auburndale	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Ba------------------ Barronett	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too sandy.	Severe: ponding.	Poor: ponding.
BlB----------------- Bilson	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BoC----------------- Boone	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, too sandy.
BoF----------------- Boone	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, too sandy.
BpF:					
Boone--------------	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, too sandy.
Elevasil-----------	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
BrA----------------- Brander	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ca:					
Capitola	Severe: ponding, percs slowly.	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: seepage, small stones, ponding.
Marshfield	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too acid.	Severe: ponding.	Poor: small stones, ponding.
Veedum	Severe: depth to rock, ponding, percs slowly.	Severe: depth to rock, excess humus, ponding.	Severe: depth to rock, ponding, too acid.	Severe: depth to rock, ponding.	Poor: depth to rock, ponding, too acid.
Cd: Citypoint	Severe: depth to rock, ponding, percs slowly.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, ponding, excess humus.
CmA: Comstock	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy, wetness.
CoC2: Council	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
CsD2:					
Council	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
CuB: Crystal Lake	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too sandy.	Moderate: wetness.	Poor: too sandy.
Da: Dawsil	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.
EaB: Eauclaire	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: small stones, wetness.
ElB: Elevasil	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
ElC2: Elevasil	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
ElD2: Elevasil	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FeA:					
Fairchild	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, seepage, too sandy.
Elm Lake	Severe: depth to rock, ponding, percs slowly.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, ponding, too sandy.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, seepage, too sandy.
FfA: Fallcreek	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Severe: wetness.	Poor: wetness.
FgA:					
Fallcreek	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Severe: wetness.	Poor: wetness.
Merrillan	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
FhB: Flambeau	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Moderate: wetness.	Fair: too clayey, small stones.
FhC: Flambeau	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too acid.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
FhD: Flambeau	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope, too acid.	Severe: slope.	Poor: slope.
FkB: Flambeau	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Moderate: wetness.	Fair: too clayey, small stones.
FlB:					
Flambeau	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Moderate: wetness.	Fair: too clayey, small stones.
Humbird	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
FlC:					
Flambeau	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too acid.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
Humbird	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Fm----------------- Fordum	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, small stones.
FnB---------------- Freeon	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
FnC---------------- Freeon	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
HeB---------------- Hiles	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too acid.	Severe: depth to rock.	Poor: depth to rock, too acid.
HuB---------------- Humbird	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
HuC---------------- Humbird	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
HxB:					
Humbird------------	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
Merrillan----------	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
IxA:					
Ironrun------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ponycreek----------	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
IzB:					
Ironrun------------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ponycreek----------	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
IzB:					
Arbutus	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, too sandy.
KeA Kert	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too acid.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
Lk Loxley	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.
Lm:					
Loxley	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.
Beseman	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus, too acid.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.
Dawson	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
LoB Loyal	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
LoC Loyal	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
LsB:					
Loyal	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
Hiles	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too acid.	Severe: depth to rock.	Poor: depth to rock, too acid.
LsC:					
Loyal	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
Hiles	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, too acid.	Severe: depth to rock.	Poor: depth to rock, too acid.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LuB----------------- Ludington	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, too sandy.
LuC----------------- Ludington	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, wetness.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, too sandy.
LxB:					
Ludington----------	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, seepage.	Poor: depth to rock, seepage, too sandy.
Fairchild----------	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, seepage, too sandy.
LyD:					
Ludington----------	Severe: depth to rock, wetness, percs slowly.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, too sandy.
Humbird------------	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
MaB----------------- Magnor	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Severe: wetness.	Poor: small stones, wetness.
MbB----------------- Mahtomedi	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MbC----------------- Mahtomedi	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
McA----------------- Maplehurst	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
Me:					
Markey-------------	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Newson-------------	Severe: ponding, poor filter.	Severe: seepage, excess humus.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Mf: Marshfield	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too acid.	Severe: ponding.	Poor: small stones, ponding.
MgB: Menahga	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
MmA: Merimod	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
MnB: Merit	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
MoB:					
Merit	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Gardenvale	Severe: poor filter.	Severe: seepage.	Severe: depth to rock, seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
MpA: Merrillan	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
MrA:					
Merrillan	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
Veedum	Severe: depth to rock, ponding, percs slowly.	Severe: depth to rock, excess humus, ponding.	Severe: depth to rock, ponding, too acid.	Severe: depth to rock, ponding.	Poor: depth to rock, ponding, too acid.
MxA:					
Moppet	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: thin layer.
Fordum	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, small stones.
NeB: Newood	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too sandy.	Moderate: wetness.	Poor: small stones.
NeC: Newood	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too sandy.	Moderate: wetness, slope.	Poor: small stones.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NmC:					
Newood	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too sandy.	Moderate: wetness, slope.	Poor: small stones.
Magnor	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too acid.	Severe: wetness.	Poor: small stones, wetness.
Cathro	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
NoC: Northmound	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock, large stones.
NrF:					
Northmound	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, large stones, slope.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
OeA: Oesterle	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
PeA:					
Pelkie	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
Winterfield	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Pg: Pits	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
PoA: Plover	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy, wetness.
Pv:					
Ponycreek	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Dawsil	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PxA: Poskin	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Py: Psammaquents	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Rb: Rib	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, small stones.
RkA: Rockdam	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
RoA, RoB: Rosholt	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
RoC: Rosholt	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
RzB: Rozellville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: large stones.	Slight	Poor: small stones.
RzC: Rozellville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope.	Poor: small stones.
ScA: Simescreek	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
SrB: Spencer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
SrC: Spencer	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, wetness.
TrB: Tarr	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Ve: Veedum	Severe: depth to rock, ponding, percs slowly.	Severe: depth to rock, ponding.	Severe: depth to rock, ponding, too acid.	Severe: depth to rock, ponding.	Poor: depth to rock, ponding, too acid.

Table 13.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Vs:					
Veedum	Severe: depth to rock, ponding, percs slowly.	Severe: depth to rock, excess humus, ponding.	Severe: depth to rock, ponding, too acid.	Severe: depth to rock, ponding.	Poor: depth to rock, ponding, too acid.
Elm Lake	Severe: depth to rock, ponding, percs slowly.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, ponding, too sandy.	Severe: depth to rock, seepage, ponding.	Poor: depth to rock, seepage, too sandy.
WeA Withee	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
WkA:					
Withee	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Kert	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too acid.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.

Table 14.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB: Aftad	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AgA: Almena	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
AnA:				
Au Gres	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Newson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Au: Auburndale	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, wetness.
Ba: Barronett	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BlB: Bilson	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer.
BoC: Boone	Poor: depth to rock.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones.
BoF: Boone	Poor: depth to rock, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones, slope.
BpF:				
Boone	Poor: depth to rock, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones, slope.
Elevasil	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BrA: Brander	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
Ca:				
Capitola	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ca:				
Marshfield	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Veedum	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too acid.
Cd: Citypoint	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
CmA: Comstock	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, thin layer.
CoC2: Council	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
CsD2:				
Council	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CuB: Crystal Lake	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
Da: Dawsil	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, area reclaim, wetness.
EaB: Eauclaire	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
ElB, ElC2: Elevasil	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ElD2: Elevasil	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
FeA:				
Fairchild	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
Elm Lake	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
FfA: Fallcreek	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FgA:				
Fallcreek	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Merrillan	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, too acid.
FhB, FhC: Flambeau	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
FhD: Flambeau	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
FkB: Flambeau	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
FlB:				
Flambeau	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones.
FlC:				
Flambeau	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, slope.
Fm: Fordum	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
FnB, FnC: Freeon	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
HeB: Hiles	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too acid.
HuB: Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones.
HuC: Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, slope.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HxB:				
Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones.
Merrillan	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, too acid.
IxA:				
Ironrun	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
Ponycreek	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
IzB:				
Ironrun	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
Ponycreek	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
Arbutus	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, small stones, too acid.
KeA Kert	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, thin layer.
Lk Loxley	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.
Lm:				
Loxley	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.
Beseman	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.
Dawson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LoB, LoC: Loyal	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LsB, LsC:				
Loyal	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Hiles	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too acid.
LuB, LuC: Ludington	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, too acid.
LxB:				
Ludington	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, too acid.
Fairchild	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
LyD:				
Ludington	Poor: depth to rock.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, too acid, slope.
Humbird	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MaB: Magnor	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MbB, MbC: Mahtomedi	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
McA: Maplehurst	Fair: wetness.	Probable	Probable	Poor: area reclaim.
Me:				
Markey	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Newson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Mf: Marshfield	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MgB: Menahga	Good	Probable	Improbable: too sandy.	Poor: too sandy.
MmA: Merimod	Fair: wetness.	Probable	Improbable: too sandy.	Fair: area reclaim, too clayey, small stones.
MnB: Merit	Good	Probable	Improbable: too sandy.	Fair: area reclaim, too clayey, small stones.
MoB:				
Merit	Good	Probable	Improbable: too sandy.	Fair: area reclaim, too clayey, small stones.
Gardenvale	Fair: depth to rock, thin layer.	Improbable: thin layer.	Improbable: too sandy.	Fair: small stones, thin layer.
MpA: Merrillan	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, too acid.
MrA:				
Merrillan	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness, too acid.
Veedum	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too acid.
MxA:				
Moppet	Fair: wetness.	Probable	Probable	Poor: area reclaim.
Fordum	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
NeB, NeC: Newood	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
NmC:				
Newood	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Magnor	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NmC:				
Cathro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
NoC Northmound	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, too acid.
NrF:				
Northmound	Poor: depth to rock, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, too acid, slope.
Rock outcrop	Poor: depth to rock.	Improbable: thin layer.	Improbable: thin layer.	Poor: depth to rock.
OeA Oesterle	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
PeA:				
Pelkie	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Winterfield	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Pg Pits	Good	Probable	Probable	Poor: too sandy.
PoA Plover	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
Pv:				
Ponycreek	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness, too acid.
Dawsil	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, area reclaim, wetness.
PxA Poskin	Fair: wetness.	Probable	Probable	Poor: area reclaim.
Py Psammaquents	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Rb Rib	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
RkA Rockdam	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, too acid.

Table 14.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RoA, RoB, RoC: Rosholt	Good	Probable	Probable	Poor: small stones, area reclaim.
RzB, RzC: Rozellville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
ScA: Simescreek	Good	Probable	Improbable: too sandy.	Poor: too sandy.
SrB, SrC: Spencer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
TrB: Tarr	Good	Probable	Improbable: too sandy.	Poor: too sandy, too acid.
Ve: Veedum	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too acid.
Vs:				
Veedum	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too acid.
Elm Lake	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
WeA: Withee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WkA:				
Withee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Kert	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, thin layer.

Table 15.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
AbB: Aftad	Moderate: seepage, slope.	Severe: piping.	Slope	Slope, wetness, soil blowing.	Erodes easily, wetness, soil blowing.	Erodes easily, rooting depth.
AgA: Almena	Moderate: seepage.	Severe: thin layer.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
AnA:						
Au Gres	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Newson	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
Au: Auburndale	Moderate: seepage.	Severe: thin layer, ponding.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
Ba: Barronett	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
BlB: Bilson	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
BoC, BoF: Boone	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, depth to rock, too sandy.	Slope, droughty, depth to rock.
BpF:						
Boone	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, depth to rock, too sandy.	Slope, droughty, depth to rock.
Elevasil	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
BrA: Brander	Severe: seepage.	Severe: seepage, piping.	Frost action, cutbanks cave.	Wetness, rooting depth, erodes easily.	Erodes easily, wetness, too sandy.	Erodes easily, rooting depth.
Ca:						
Capitola	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing, rooting depth.	Large stones, erodes easily, ponding.	Large stones, wetness, erodes easily.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ca:						
Marshfield	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action, too acid.	Ponding, rooting depth, too acid.	Erodes easily, ponding.	Wetness, erodes easily, rooting depth.
Veedum	Moderate: seepage, depth to rock.	Severe: thin layer, ponding.	Ponding, depth to rock, frost action.	Ponding, soil blowing, depth to rock.	Depth to rock, erodes easily, ponding.	Wetness, erodes easily, depth to rock.
Cd: Citypoint	Severe: seepage.	Severe: excess humus, ponding.	Ponding, percs slowly, depth to rock.	Ponding, percs slowly, depth to rock.	Depth to rock, ponding.	Wetness, depth to rock, rooting depth.
CmA: Comstock	Moderate: seepage.	Severe: piping.	Frost action, cutbanks cave.	Wetness, erodes easily.	Erodes easily, wetness, too sandy.	Wetness, erodes easily.
CoC2: Council	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
CsD2:						
Council	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Seaton	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
CuB: Crystal Lake	Moderate: seepage, slope.	Severe: piping.	Frost action, slope, cutbanks cave.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Da: Dawsil	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, too acid.	Ponding	Wetness.
EaB: Eauclaire	Severe: seepage.	Severe: piping.	Slope	Slope, wetness, droughty.	Wetness, soil blowing.	Droughty.
ElB: Elevasil	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Depth to rock, soil blowing.	Droughty, depth to rock.
ElC2, ElD2: Elevasil	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
FeA:						
Fairchild	Severe: seepage.	Severe: seepage, piping, wetness.	Depth to rock, cutbanks cave, too acid.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.
Elm Lake	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, depth to rock, cutbanks cave.	Ponding	Depth to rock, erodes easily, ponding.	Wetness, erodes easily.
FfA: Fallcreek	Slight	Severe: thin layer.	Frost action, too acid.	Wetness	Wetness	Wetness.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
FgA:						
Fallcreek	Slight	Severe: thin layer.	Frost action, too acid.	Wetness	Wetness	Wetness.
Merrillan	Moderate: seepage, depth to rock.	Severe: thin layer, wetness.	Percs slowly, depth to rock, frost action.	Wetness, droughty.	Depth to rock, wetness, soil blowing.	Wetness, droughty, depth to rock.
FhB Flambeau	Moderate: seepage, slope.	Severe: thin layer.	Slope, too acid.	Slope, wetness.	Wetness	Favorable.
FhC, FhD Flambeau	Severe: slope.	Severe: thin layer.	Slope, too acid.	Slope, wetness.	Slope, wetness.	Slope.
FkB Flambeau	Moderate: seepage, slope.	Severe: thin layer.	Slope, too acid.	Slope, wetness, soil blowing.	Wetness, soil blowing.	Favorable.
FlB:						
Flambeau	Moderate: seepage, slope.	Severe: thin layer.	Slope, too acid.	Slope, wetness.	Wetness	Favorable.
Humbird	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Depth to rock, wetness.	Droughty, depth to rock.
FlC:						
Flambeau	Severe: slope.	Severe: thin layer.	Slope, too acid.	Slope, wetness, soil blowing.	Slope, wetness, soil blowing.	Slope.
Humbird	Severe: slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Slope, depth to rock, wetness.	Slope, droughty, depth to rock.
Fm Fordum	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, frost action.	Ponding, droughty, flooding.	Erodes easily, ponding, too sandy.	Wetness, erodes easily, droughty.
FnB Freeon	Moderate: slope.	Severe: seepage, piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Large stones, erodes easily.	Large stones, erodes easily.
FnC Freeon	Severe: slope.	Severe: seepage, piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
HeB Hiles	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Depth to rock, slope, too acid.	Slope, wetness, depth to rock.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
HuB Humbird	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Depth to rock, wetness.	Droughty, depth to rock.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
HuC: Humbird	Severe: slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Slope, depth to rock, wetness.	Slope, droughty, depth to rock.
HxB:						
Humbird	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Depth to rock, wetness.	Droughty, depth to rock.
Merrillan	Moderate: seepage, depth to rock.	Severe: thin layer, wetness.	Percs slowly, depth to rock, frost action.	Wetness, droughty.	Depth to rock, wetness, soil blowing.	Wetness, droughty, depth to rock.
IxA:						
Ironrun	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave, too acid.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Ponycreek	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave, too acid.	Ponding, droughty, soil blowing.	Ponding, too sandy, soil blowing.	Wetness, droughty.
IzB:						
Ironrun	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave, too acid.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Ponycreek	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave, too acid.	Ponding, droughty, soil blowing.	Ponding, too sandy, soil blowing.	Wetness, droughty.
Arbutus	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Depth to rock, too sandy, soil blowing.	Droughty, depth to rock.
KeA: Kert	Moderate: seepage, depth to rock.	Severe: thin layer.	Depth to rock, frost action.	Wetness, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.
Lk: Loxley	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, too acid.	Ponding	Wetness.
Lm:						
Loxley	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, too acid.	Ponding	Wetness.
Beseman	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, rooting depth.	Ponding	Wetness, rooting depth.
Dawson	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, rooting depth.	Ponding	Wetness, rooting depth.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
LoB Loyal	Moderate: slope.	Moderate: piping, wetness.	Slope	Slope, wetness, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
LoC Loyal	Severe: slope.	Moderate: piping, wetness.	Slope	Slope, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
LsB:						
Loyal	Moderate: slope.	Moderate: piping, wetness.	Slope	Slope, wetness, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
Hiles	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Depth to rock, slope, too acid.	Slope, wetness, depth to rock.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
LsC:						
Loyal	Severe: slope.	Moderate: piping, wetness.	Slope	Slope, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Hiles	Severe: slope.	Severe: thin layer.	Depth to rock, slope, too acid.	Slope, wetness, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
LuB Ludington	Severe: seepage.	Severe: seepage, piping.	Depth to rock, slope, cutbanks cave.	Slope, wetness, droughty.	Depth to rock, wetness.	Droughty, depth to rock.
LuC Ludington	Severe: seepage, slope.	Severe: seepage, piping.	Depth to rock, slope, cutbanks cave.	Slope, wetness, droughty.	Slope, depth to rock, wetness.	Slope, droughty, depth to rock.
LxB:						
Ludington	Severe: seepage.	Severe: seepage, piping.	Depth to rock, slope, cutbanks cave.	Slope, wetness, droughty.	Depth to rock, wetness.	Droughty, depth to rock.
Fairchild	Severe: seepage.	Severe: seepage, piping, wetness.	Depth to rock, cutbanks cave, too acid.	Wetness, droughty, fast intake.	Depth to rock, wetness, too sandy.	Wetness, droughty, depth to rock.
LyD:						
Ludington	Severe: seepage, slope.	Severe: seepage, piping.	Depth to rock, slope, cutbanks cave.	Slope, wetness, droughty.	Slope, depth to rock, wetness.	Slope, droughty, depth to rock.
Humbird	Severe: slope.	Severe: piping.	Percs slowly, depth to rock, slope.	Slope, wetness, droughty.	Slope, depth to rock, wetness.	Slope, droughty, depth to rock.
MaB Magnor	Moderate: seepage.	Severe: piping.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
MbB Mahtomedi	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty, rooting depth.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MbC--------------- Mahtomedi	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy.	Slope, droughty, rooting depth.
McA--------------- Maplehurst	Severe: seepage.	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Me:						
Markey-----------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
Newson-----------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
Mf---------------- Marshfield	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action, too acid.	Ponding, rooting depth, too acid.	Erodes easily, ponding.	Wetness, erodes easily, rooting depth.
MgB--------------- Menahga	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
MmA--------------- Merimod	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave	Wetness, rooting depth.	Erodes easily, wetness, too sandy.	Erodes easily, rooting depth.
MnB--------------- Merit	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, rooting depth.	Erodes easily, too sandy.	Erodes easily, rooting depth.
MoB:						
Merit------------	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, rooting depth.	Erodes easily, too sandy.	Erodes easily, rooting depth.
Gardenvale-------	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, erodes easily.	Erodes easily, too sandy.	Erodes easily.
MpA--------------- Merrillan	Moderate: seepage, depth to rock.	Severe: thin layer, wetness.	Percs slowly, depth to rock, frost action.	Wetness, droughty.	Depth to rock, wetness, soil blowing.	Wetness, droughty, depth to rock.
MrA:						
Merrillan--------	Moderate: seepage, depth to rock.	Severe: thin layer, wetness.	Percs slowly, depth to rock, frost action.	Wetness, droughty.	Depth to rock, wetness, soil blowing.	Wetness, droughty, depth to rock.
Veedum-----------	Moderate: seepage, depth to rock.	Severe: thin layer, ponding.	Ponding, depth to rock, frost action.	Ponding, soil blowing, depth to rock.	Depth to rock, erodes easily, ponding.	Wetness, erodes easily, depth to rock.
MxA:						
Moppet-----------	Severe: seepage.	Severe: piping.	Flooding-------	Wetness, soil blowing, rooting depth.	Wetness, soil blowing.	Rooting depth.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MxA:						
Fordum	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, frost action.	Ponding, droughty, flooding.	Erodes easily, ponding, too sandy.	Wetness, erodes easily, droughty.
NeB Newood	Moderate: seepage, slope.	Severe: seepage, piping.	Percs slowly, slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy.	Droughty, rooting depth.
NeC Newood	Severe: slope.	Severe: seepage, piping.	Percs slowly, slope, cutbanks cave.	Slope, wetness, droughty.	Slope, wetness, too sandy.	Slope, droughty, rooting depth.
NmC:						
Newood	Severe: slope.	Severe: seepage, piping.	Percs slowly, slope, cutbanks cave.	Slope, wetness, droughty.	Slope, wetness, too sandy.	Slope, droughty, rooting depth.
Magnor	Moderate: seepage.	Severe: piping.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
Cathro	Severe: seepage.	Severe: piping, ponding.	Ponding, subsides, frost action.	Ponding	Ponding	Wetness.
NoC Northmound	Severe: slope.	Severe: seepage, piping, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
NrF:						
Northmound	Severe: slope.	Severe: seepage, piping, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop	Severe: depth to rock.	Slight	Deep to water	Depth to rock	Depth to rock	Depth to rock.
OeA Oesterle	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
PeA:						
Pelkie	Severe: seepage.	Severe: seepage, piping.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Winterfield	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Pg Pits	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
PoA Plover	Moderate: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Erodes easily, wetness, too sandy.	Wetness, erodes easily.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Pv:						
Ponycreek	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave, too acid.	Ponding, droughty, soil blowing.	Ponding, too sandy, soil blowing.	Wetness, droughty.
Dawsil	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, too acid.	Ponding	Wetness.
PxA Poskin	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, rooting depth, erodes easily.	Erodes easily, wetness, too sandy.	Wetness, erodes easily, rooting depth.
Py Psammaquents	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
Rb Rib	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action.	Ponding, rooting depth.	Erodes easily, ponding, too sandy.	Wetness, erodes easily, rooting depth.
RkA Rockdam	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave, too acid.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
RoA Rosholt	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
RoB Rosholt	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
RoC Rosholt	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
RzB Rozellville	Moderate: seepage, slope.	Moderate: large stones.	Deep to water	Slope, rooting depth, erodes easily.	Large stones, erodes easily.	Large stones, erodes easily.
RzC Rozellville	Severe: slope.	Moderate: large stones.	Deep to water	Slope, rooting depth, erodes easily.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
ScA Simescreek	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
SrB Spencer	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Frost action, slope.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
SrC Spencer	Severe: slope.	Moderate: thin layer, piping, wetness.	Frost action, slope.	Slope, wetness, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.

Table 15.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
TrB--------------- Tarr	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
Ve---------------- Veedum	Moderate: seepage, depth to rock.	Severe: thin layer, ponding.	Ponding, depth to rock, frost action.	Ponding, depth to rock.	Depth to rock, erodes easily, ponding.	Wetness, erodes easily, depth to rock.
Vs:						
Veedum-----------	Moderate: seepage, depth to rock.	Severe: thin layer, ponding.	Ponding, depth to rock, frost action.	Ponding, soil blowing, depth to rock.	Depth to rock, erodes easily, ponding.	Wetness, erodes easily, depth to rock.
Elm Lake---------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, depth to rock, cutbanks cave.	Ponding--------	Depth to rock, erodes easily, ponding.	Wetness, erodes easily.
WeA--------------- Withee	Moderate: seepage.	Moderate: piping, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
WkA:						
Withee-----------	Moderate: seepage.	Moderate: piping, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
Kert-------------	Moderate: seepage, depth to rock.	Severe: thin layer.	Depth to rock, frost action.	Wetness, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.

Table 16.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
AbB----------- Aftad	0-7	Very fine sandy loam.	ML, CL-ML, SM, SC-SM	A-4	0	0	95-100	90-100	75-95	45-65	<23	NP-6
	7-13	Very fine sandy loam, loam, loamy sand.	SM, SC-SM, ML, CL-ML	A-4, A-2-4	0	0	95-100	90-100	45-95	25-80	<23	NP-6
	13-43	Very fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4	0	0	95-100	90-100	65-95	35-80	18-26	NP-8
	43-60	Stratified sandy loam to silt loam.	SM, SC-SM, ML, CL-ML	A-4, A-2-4	0	0	95-100	90-100	65-95	25-90	<23	NP-6
AgA----------- Almena	0-9	Silt loam-----	CL	A-4, A-6	0	0-9	85-100	85-100	80-100	75-100	25-32	7-13
	9-19	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	0-9	85-100	85-100	80-100	75-100	21-32	4-13
	19-33	Silt loam-----	CL, ML	A-6, A-4	0	0-9	85-100	85-100	80-100	75-100	25-35	7-15
	33-45	Silt loam-----	CL	A-4, A-6	0	0-9	85-100	85-100	80-100	70-100	28-35	9-15
	45-60	Sandy loam, gravelly loam, gravelly sandy loam.	SM, SC, ML, CL	A-2, A-4, A-1	0-2	0-9	70-100	50-95	30-90	15-70	21-30	4-11
AnA:												
Au Gres------	0-13	Sand----------	SM, SP-SM, SP	A-2-4, A-3, A-1-b	0	0	95-100	75-100	35-70	0-15	---	NP
	13-27	Sand, loamy sand, coarse sand.	SP-SM, SM, SC-SM, SP	A-2-4, A-3, A-1-b	0	0	95-100	75-100	35-75	0-30	<25	NP-7
	27-61	Sand, coarse sand.	SP-SM, SM, SP	A-3, A-2-4, A-1-b	0	0	95-100	75-100	35-70	0-15	---	NP
Newson-------	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	NP
	4-21	Loamy sand, sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	80-100	75-100	45-75	3-30	---	NP
	21-64	Sand, loamy sand, coarse sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	80-100	75-100	45-75	3-30	---	NP
Au------------ Auburndale	0-7	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0-5	90-100	85-100	80-100	80-100	<35	2-15
	7-14	Silt loam, silt.	ML, CL-ML, CL	A-4, A-6	0	0-5	90-100	85-100	80-100	80-100	<30	NP-11
	14-41	Silt loam-----	CL	A-6	0	0-5	90-100	85-100	80-100	75-100	25-35	10-17
	41-53	Loam, sandy loam, gravelly sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2, A-1	0	0-5	55-100	50-90	40-85	20-80	20-30	4-11
	53-60	Sandy loam, gravelly sandy loam, loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0	0-5	55-100	50-90	40-85	20-80	<25	NP-7

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
Ba------------ Barronett	0-9	Silt loam-----	ML, CL, CL-ML	A-4	0	0-2	95-100	90-100	90-100	85-95	<26	NP-8
	9-15	Silt loam, silt.	ML, CL, CL-ML	A-4	0	0-2	95-100	90-100	85-100	85-95	<26	NP-8
	15-32	Silt loam, silty clay loam.	CL	A-6, A-4	0	0-2	95-100	90-100	90-100	85-100	28-35	9-15
	32-60	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	0-2	95-100	90-100	80-100	70-95	21-28	4-9
BlB----------- Bilson	0-8	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	15-25	NP-7
	8-32	Sandy loam, fine sandy loam, loam.	SM, SC, CL, ML	A-4, A-2-4	0	0	80-100	75-100	45-95	20-65	<28	NP-9
	32-60	Sand----------	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	5-25	---	NP
BoC----------- Boone	0-5	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0-9	80-100	75-100	40-80	5-35	---	NP
	5-37	Fine sand, coarse sand, channery sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0-9	55-100	50-100	20-75	1-35	---	NP
	37-60	Weathered bedrock.	---	---	---	---	---	---	20-75	1-35	---	---
BoF----------- Boone	0-2	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0-9	80-100	75-100	40-80	5-35	---	NP
	2-7	Sand, channery sand, loamy fine sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0-9	55-100	50-100	25-75	2-35	---	NP
	7-31	Fine sand, sand, channery sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0-9	55-100	50-100	20-75	1-35	---	NP
	31-60	Weathered bedrock.	---	---	---	---	---	---	20-75	1-35	---	---
BpF:												
Boone--------	0-3	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0-9	80-100	75-100	40-80	5-35	---	NP
	3-8	Sand, channery sand, loamy fine sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0-9	55-100	50-100	25-75	2-35	---	NP
	8-35	Fine sand, sand, channery sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0-9	55-100	50-100	20-75	1-35	---	NP
	35-60	Weathered bedrock.	---	---	---	---	---	---	20-75	1-35	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
BpF:												
Elevasil-----	0-3	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-9	80-100	75-100	45-80	20-45	18-25	3-7
	3-27	Sandy loam, loam, channery sandy loam.	SC, SC-SM, CL, CL-ML	A-4, A-2-4, A-1-b	0	0-9	80-100	50-100	30-80	15-55	21-28	4-9
	27-31	Loamy sand, loamy fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	15-70	4-35	<21	NP-4
	31-39	Sand, fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	10-60	2-20	<18	NP-3
	39-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
BrA----------- Brander	0-10	Silt loam-----	CL, CL-ML	A-4	0	0-9	95-100	90-100	85-95	80-90	20-30	4-11
	10-17	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	95-100	90-100	85-95	80-90	20-30	4-11
	17-22	Silt loam-----	CL	A-6	0	0-9	95-100	90-100	85-95	80-90	28-36	9-16
	22-32	Silt loam-----	CL	A-6	0	0-9	95-100	90-100	85-95	80-90	28-36	9-16
	32-35	Gravelly loam, sandy loam, very gravelly sandy loam.	ML, CL, GM, SC	A-4, A-2-4, A-1-b	0	0-9	50-100	45-100	25-95	15-80	<30	NP-11
	35-60	Stratified extremely gravelly coarse sand to sand.	GP, GP-GM, SM	A-3, A-1-a, A-1-b	0	0-9	40-100	25-95	10-70	2-25	---	NP
Ca:												
Capitola-----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	NP
	4-12	Silt loam, loam.	CL, CL-ML	A-4	0	0-15	80-100	75-100	60-100	50-90	23-26	6-8
	12-35	Silt loam, loam, sandy loam.	CL, ML, SM, SC	A-4, A-2-4	0-5	0-15	80-100	75-100	45-100	20-90	<28	NP-9
	35-39	Fine sandy loam, sandy loam, gravelly sandy loam.	SM, SC	A-4, A-1-b, A-2-4	0-10	0-25	65-100	55-95	35-85	15-50	<26	NP-8
	39-64	Fine sandy loam, sandy loam, gravelly loamy sand.	SM, SP-SM	A-4, A-1-b, A-2-4	0-10	0-25	65-100	55-95	20-85	8-50	<21	NP-4

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
Ca:												
Marshfield---	0-3	Silt loam-----	CL	A-4, A-6	0	0-8	90-100	85-100	70-100	60-100	25-35	7-15
	3-10	Silt loam, silt.	ML, CL-ML, CL	A-4, A-6	0-1	0-8	90-100	85-100	70-100	60-100	18-33	3-14
	10-26	Silt loam, silty clay loam.	CL	A-6, A-4, A-7-6	0-2	0-8	90-100	85-100	70-100	70-90	28-44	9-22
	26-34	Loam, clay loam, gravelly sandy loam.	CL, SC	A-6, A-4, A-7-6, A-2	0-3	0-15	55-100	50-95	40-90	25-75	28-44	9-22
	34-60	Loam, clay loam, gravelly sandy loam.	CL, ML, SC, SM	A-4, A-6, A-2	0-3	0-15	55-100	50-95	40-90	25-75	18-39	3-18
Veedum-------	0-3	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	3-7	Silt loam-----	CL, ML	A-4	0	0	95-100	95-100	70-100	65-85	15-30	NP-9
	7-18	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	18-37	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	37-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Cd------------ Citypoint	0-8	Mucky-peat----	PT	A-8	0	0	---	---	---	---	---	---
	8-28	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	28-33	Sand, sandy loam, clay.	SP, SM, SC-SM, CL	A-1, A-2-4, A-6	0	0	80-100	75-100	20-100	4-80	0-55	NP-30
	33-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
CmA----------- Comstock	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	0-2	95-100	95-100	90-100	85-100	20-35	3-15
	9-12	Silt loam-----	CL-ML, CL, ML	A-4	0	0-2	95-100	95-100	90-100	85-100	20-30	3-10
	12-20	Silt loam, silty clay loam.	CL	A-4, A-6	0	0-2	95-100	95-100	90-100	85-100	25-35	8-15
	20-36	Silt loam, silty clay loam.	CL	A-6, A-4	0	0-2	95-100	95-100	90-100	70-100	25-40	9-20
	36-41	Stratified silt to fine sand.	CL, ML, CL-ML	A-4	0	0-2	95-100	95-100	85-100	65-95	20-30	3-10
	41-60	Stratified silt to fine sand.	CL, ML, CL-ML	A-4	0	0-2	95-100	95-100	85-100	65-95	20-30	3-10
CoC2---------- Council	0-8	Loam----------	ML, SM	A-4	0	0	80-100	75-100	55-100	45-85	<20	NP-4
	8-42	Loam, silt loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4	0	0	80-100	75-100	50-100	35-85	20-28	4-9
	42-60	Sandy loam, loam, silt loam.	ML, CL, SM, SC	A-4, A-2	0	0	80-100	75-100	50-100	30-85	<28	NP-9

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
CsD2:												
Council------	0-7	Loam----------	ML, SM	A-4	0	0	80-100	75-100	55-100	45-85	<20	NP-4
	7-45	Loam, silt loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4	0	0	80-100	75-100	50-100	35-85	20-28	4-9
	45-60	Sandy loam, loam, silt loam.	ML, CL, SM, SC	A-4, A-2	0	0	80-100	75-100	50-100	30-85	<28	NP-9
Seaton-------	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	9-46	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
	46-60	Silt loam, silt.	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
CuB----------- Crystal Lake	0-9	Silt loam-----	CL-ML, CL, ML	A-4	0	0-2	98-100	97-100	85-100	80-100	18-30	3-11
	9-23	Silt loam, silt.	CL, ML, CL-ML	A-4	0	0-2	98-100	97-100	90-100	85-100	18-30	3-11
	23-31	Silt loam, silty clay loam.	CL	A-4, A-6	0	0-2	98-100	97-100	90-100	85-100	25-36	7-16
	31-42	Silt loam, silty clay loam.	CL	A-6, A-4	0	0-2	98-100	97-100	90-100	85-100	28-40	9-18
	42-60	Stratified silt loam to fine sand.	CL, CL-ML, ML	A-4	0	0-2	98-100	97-100	75-100	60-90	18-30	3-11
Da------------ Dawsil	0-7	Mucky peat----	PT	A-8	0	0	---	---	---	---	---	---
	7-31	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	31-60	Sand, coarse sand, loamy sand.	SC-SM, SM, SC, SP-SM	A-2, A-3, A-1	0	0	90-100	85-100	25-75	5-35	<20	NP-10
EaB----------- Eauclaire	0-2	Loamy sand----	SP-SM, SM	A-2-4, A-1-b	0	0-9	75-100	70-100	30-75	10-35	<20	NP-4
	2-4	Sand, gravelly loamy sand, fine sand.	SP, SM	A-2-4, A-3, A-1-b	0	0-9	75-100	70-100	20-85	3-35	<20	NP-4
	4-12	Loamy sand, gravelly sand, fine sand.	SP, SM	A-2-4, A-3, A-1-b	0	0-9	75-100	70-100	20-85	3-35	<20	NP-4
	12-34	Sand, gravelly loamy sand, fine sand.	SP, SM	A-2-4, A-3, A-1-b	0	0-9	75-100	70-100	20-85	3-35	<20	NP-4
	34-66	Sandy loam, sandy clay loam, gravelly loam.	SM, SC	A-4, A-2-4	0	0-9	75-100	70-95	40-75	20-45	15-25	3-9
	66-80	Sandy loam, gravelly fine sandy loam.	SM, SC	A-4, A-2-4	0	0-9	75-100	70-95	40-75	20-45	<25	NP-8

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
ElB----------- Elevasil	0-8	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-9	80-100	75-100	45-80	20-45	18-25	3-7
	8-26	Sandy loam, loam, channery sandy loam.	SC, SC-SM, CL, CL-ML	A-4, A-2-4, A-1-b	0	0-9	80-100	50-100	30-80	15-55	21-28	4-9
	26-30	Loamy sand, loamy fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	15-70	4-35	<21	NP-4
	30-38	Sand, fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	10-60	2-20	<18	NP-3
	38-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
ElC2---------- Elevasil	0-9	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-9	80-100	75-100	45-80	20-45	18-25	3-7
	9-24	Sandy loam, loam, channery sandy loam.	SC, SC-SM, CL, CL-ML	A-4, A-2-4, A-1-b	0	0-9	80-100	50-100	30-80	15-55	21-28	4-9
	24-28	Loamy sand, loamy fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	15-70	4-35	<21	NP-4
	28-39	Sand, fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	10-60	2-20	<18	NP-3
	39-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
ElD2---------- Elevasil	0-9	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-9	80-100	75-100	45-80	20-45	18-25	3-7
	9-18	Sandy loam, loam, channery sandy loam.	SC, SC-SM, CL, CL-ML	A-4, A-2-4, A-1-b	0	0-9	80-100	50-100	30-80	15-55	21-28	4-9
	18-26	Loamy sand, loamy fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	15-70	4-35	<21	NP-4
	26-36	Sand, fine sand, channery sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0-9	80-100	50-100	10-60	2-20	<18	NP-3
	36-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
FeA:												
Fairchild----	0-4	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	100	100	20-75	5-35	---	NP
	4-12	Sand, coarse sand, loamy fine sand.	SP-SM, SM	A-2, A-3, A-1, A-4	0	0	100	100	20-95	5-50	---	NP
	12-19	Sand, coarse sand, loamy fine sand.	SM, SP-SM	A-2, A-3, A-1, A-4	0	0	100	100	20-95	5-50	---	NP
	19-27	Sand, coarse sand, loamy fine sand.	SP-SM, SM	A-3, A-2, A-4, A-1	0	0	100	100	20-95	5-50	---	NP
	27-33	Clay loam, sandy loam, sandy clay loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	33-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Elm Lake-----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-24	Sand, loamy sand, coarse sand.	SP-SM, SM	A-2, A-3, A-1	0	0	80-100	75-100	30-75	5-35	---	NP
	24-36	Silty clay loam, loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-6, A-2, A-4	0	0	80-100	75-95	45-95	25-85	20-45	4-22
	36-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
FfA----------- Fallcreek	0-9	Loam----------	ML, CL-ML, CL	A-4	0	0-9	80-100	75-98	55-90	45-75	15-26	NP-8
	9-16	Loam, sandy loam.	CL, SC, ML, SM	A-4, A-2-4	0	0-9	80-100	75-98	50-90	25-75	18-28	3-9
	16-22	Sandy loam, loam.	CL, SC, SC-SM, CL-ML	A-2, A-4, A-6	0-1	0-9	80-100	75-98	55-90	30-75	23-32	6-13
	22-68	Loam, sandy loam.	CL, SC	A-4, A-6, A-2-4, A-2-6	0-1	0-9	80-100	75-98	55-90	30-75	25-35	7-15
	68-80	Loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-9	80-100	75-98	50-90	25-75	18-30	3-11
FgA:												
Fallcreek----	0-7	Loam----------	ML, CL-ML, CL	A-4	0	0-9	80-100	75-98	55-90	45-75	15-26	NP-8
	7-13	Loam, sandy loam.	CL, SC, ML, SM	A-4, A-2-4	0	0-9	80-100	75-98	50-90	25-75	18-28	3-9
	13-21	Sandy loam, loam.	CL, SC, SC-SM, CL-ML	A-2, A-4, A-6	0-1	0-9	80-100	75-98	55-90	30-75	23-32	6-13
	21-47	Loam, sandy loam.	CL, SC	A-4, A-6, A-2-4, A-2-6	0-1	0-9	80-100	75-98	55-90	30-75	25-35	7-15
	47-60	Loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-9	80-100	75-98	50-90	25-75	18-30	3-11

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
FgA:												
Merrillan----	0-3	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	15-23	2-6
	3-5	Fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	5-12	Sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	12-19	Sandy loam, fine sandy loam.	SC, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	21-28	4-9
	19-28	Clay loam, silty clay loam, clay.	CL, CH	A-7-6	0	0	80-100	75-100	65-95	50-85	43-65	21-40
	28-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
FhB----------- Flambeau	0-10	Loam----------	CL-ML, ML, CL	A-4	0	0-15	80-100	75-95	55-90	45-75	15-26	NP-8
	10-16	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	16-25	Sandy clay loam, sandy loam, clay loam.	CL, SC, SC-SM, CL-ML	A-4, A-2, A-6	0-1	0-15	80-100	75-95	55-90	30-75	23-32	6-13
	25-50	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	50-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11
FhC----------- Flambeau	0-9	Loam----------	CL-ML, ML, CL	A-4	0	0-15	80-100	75-95	55-90	45-75	15-26	NP-8
	9-24	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	24-42	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	42-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
FhD----------- Flambeau	0-7	Loam----------	CL-ML, ML, CL	A-4	0	0-15	80-100	75-95	55-90	45-75	15-26	NP-8
	7-12	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	12-21	Sandy clay loam, sandy loam, clay loam.	CL, SC, SC-SM, CL-ML	A-4, A-2, A-6	0-1	0-15	80-100	75-95	55-90	30-75	23-32	6-13
	21-46	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	46-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11
FkB----------- Flambeau	0-10	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-15	80-100	75-95	45-75	20-45	15-23	NP-6
	10-20	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	20-50	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	50-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11
FlB:												
Flambeau-----	0-9	Loam----------	CL-ML, ML, CL	A-4	0	0-15	80-100	75-95	55-90	45-75	15-26	NP-8
	9-18	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	18-42	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	42-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11
Humbird------	0-7	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	7-9	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	9-14	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	14-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	25-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
FlC:												
Flambeau-----	0-8	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0-15	80-100	75-95	45-75	20-45	15-23	NP-6
	8-18	Sandy loam, loam.	SM, SC, ML, CL	A-4, A-2-4	0	0-15	80-100	75-95	50-90	25-75	18-28	3-9
	18-48	Sandy loam, clay loam, loam.	CL, SC	A-4, A-2-4, A-6, A-2-6	0-1	0-15	80-100	75-95	55-90	30-75	25-35	7-15
	48-60	Fine sandy loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-2-4	0-1	0-15	80-100	75-95	50-90	25-75	18-30	3-11
Humbird------	0-7	Sandy loam----	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	7-9	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	9-15	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	15-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	25-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Fm------------ Fordum	0-9	Silt loam-----	ML, CL, SM, SC	A-4, A-6	0	0-15	80-100	75-100	55-100	45-85	20-35	3-15
	9-36	Silt loam, sandy loam, gravelly loam.	SM, SC, ML, CL	A-2, A-4, A-1	0	0-15	30-100	25-100	20-100	10-90	<30	3-10
	36-60	Sand, very gravelly loamy fine sand.	SP, SM, GP, SM	A-3, A-2, A-1	0	0-15	30-100	25-100	7-95	1-50	---	NP
FnB----------- Freeon	0-10	Silt loam-----	ML, CL, CL-ML	A-4	2-3	10-25	90-100	85-100	70-100	60-95	<30	NP-10
	10-23	Silt loam, silt.	ML, CL, CL-ML	A-4	1-5	10-25	90-100	85-100	70-100	60-95	<30	NP-10
	23-30	Sandy loam, loamy sand, gravelly loam.	SC, ML, CL, SP-SM	A-4, A-3, A-2, A-1	1-5	0-15	55-95	50-90	20-85	7-70	<30	NP-10
	30-52	Sandy loam, gravelly loam, fine sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	0-15	55-95	50-90	30-85	15-70	<25	NP-7
	52-60	Sandy loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	0-15	55-95	50-90	30-85	15-70	<25	NP-7

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
FnC----------- Freeon	0-9	Silt loam-----	ML, CL, CL-ML	A-4	2-3	10-25	90-100	85-100	70-100	60-95	<30	NP-10
	9-20	Silt loam, silt.	ML, CL, CL-ML	A-4	1-5	10-25	90-100	85-100	70-100	60-95	<30	NP-10
	20-35	Sandy loam, loamy sand, gravelly loam.	SC, ML, CL, SP-SM	A-4, A-3, A-2, A-1	1-5	0-15	55-95	50-90	20-85	7-70	<30	NP-10
	35-50	Sandy loam, gravelly loam, fine sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	0-15	55-95	50-90	30-85	15-70	<25	NP-7
	50-60	Sandy loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2, A-1	0-5	0-15	55-95	50-90	30-85	15-70	<25	NP-7
HeB----------- Hiles	0-9	Silt loam-----	CL, CL-ML	A-4	0	0	95-100	95-100	75-100	65-85	20-30	4-10
	9-19	Silt loam-----	CL	A-6	0	0	95-100	95-100	75-100	65-85	25-35	10-15
	19-29	Loam, sandy loam, silty clay loam.	CL, SC	A-6, A-2-6	0	0	80-100	75-100	50-95	25-75	25-40	10-20
	29-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
HuB----------- Humbird	0-8	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	8-11	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	11-22	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	22-32	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	32-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
HuC----------- Humbird	0-3	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	3-6	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	6-12	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	12-16	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	16-24	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	24-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
HxB:												
Humbird------	0-2	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	2-9	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	9-14	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	14-21	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	21-27	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	27-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Merrillan----	0-3	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	15-23	2-6
	3-10	Fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	10-15	Sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	15-22	Sandy loam, fine sandy loam.	SC, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	21-28	4-9
	22-33	Clay loam, silty clay loam, clay.	CL, CH	A-7-6	0	0	80-100	75-100	65-95	50-85	43-65	21-40
	33-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
IxA:												
Ironrun------	0-3	Sand----------	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	3-12	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	12-19	Sand, loamy sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-75	2-35	---	NP
	19-29	Sand, loamy sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-75	2-35	---	NP
	29-61	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
Ponycreek----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-6	Mucky sand----	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	6-28	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	28-64	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
IzB:												
Ironrun------	0-3	Sand----------	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	3-8	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	8-12	Sand, loamy sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-75	2-35	---	NP
	12-22	Sand, loamy sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-75	2-35	---	NP
	22-61	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
Ponycreek----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-6	Mucky sand----	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	6-22	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	22-64	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
Arbutus------	0-2	Loamy sand----	SM	A-2-4, A-1	0	0-5	80-100	75-100	35-75	15-35	0-20	NP-4
	2-5	Loamy sand, sand.	SM, SP	A-2-4, A-1, A-3	0	0-5	80-100	75-100	25-75	4-35	0-20	NP-4
	5-17	Loamy sand, sand.	SM, SP	A-2-4, A-1, A-3	0	0-5	80-100	75-100	25-75	4-35	0-20	NP-5
	17-25	Sand, loamy sand.	SM, SP	A-2-4, A-1, A-3	0	0-5	80-100	75-100	25-75	4-35	0-20	NP-4
	25-25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
KeA----------- Kert	0-9	Silt loam-----	CL, CL-ML	A-4	0	0	95-100	95-100	70-100	65-85	20-30	4-10
	9-22	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	22-34	Loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	34-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Lk------------ Loxley	0-6	Peat----------	PT	A-8	0	0	---	---	---	---	---	---
	6-60	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
Lm:												
Loxley-------	0-10	Peat----------	PT	A-8	0	0	---	---	---	---	---	---
	10-60	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
Beseman------	0-10	Peat----------	---	---	0	0	---	---	---	---	---	---
	10-29	Sapric material.	PT	A-8	0	0	---	---	---	---	---	---
	29-60	Loam, sandy loam.	CL, ML, SM, SC	A-2, A-4, A-6	---	0-2	75-100	65-100	40-95	25-75	15-30	NP-12
Dawson-------	0-10	Peat----------	PT	A-8	0	0	---	---	---	---	---	---
	10-42	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	42-60	Sand, gravelly sand, very gravelly very fine sand.	SP, SM, SC, GP	A-2, A-3, A-1, A-4	0	0	45-100	35-100	15-90	0-45	<20	NP-10

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
LoB----------- Loyal	0-9	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	9-14	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	14-20	Silt loam-----	CL, CL-ML	A-4, A-6	0	0-9	90-100	85-100	75-100	70-85	23-35	6-15
	20-24	Loam, sandy clay loam, sandy loam.	SC, CL	A-4, A-6, A-2	0-2	0-15	55-100	50-90	25-75	15-60	25-32	7-13
	24-45	Loam, sandy clay loam, sandy loam.	SC, CL	A-2, A-4, A-6	0-3	0-15	55-100	50-90	25-75	15-60	28-35	9-15
	45-60	Sandy loam, sandy clay loam, loam.	CL, SC	A-4, A-6, A-2	0-3	0-15	55-100	50-90	25-75	15-60	25-32	7-13
LoC----------- Loyal	0-9	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	9-12	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	12-18	Silt loam-----	CL, CL-ML	A-4, A-6	0	0-9	90-100	85-100	75-100	70-85	23-35	6-15
	18-24	Loam, sandy clay loam, sandy loam.	SC, CL	A-4, A-6, A-2	0-2	0-15	55-100	50-90	25-75	15-60	25-32	7-13
	24-42	Loam, sandy clay loam, sandy loam.	SC, CL	A-2, A-4, A-6	0-3	0-15	55-100	50-90	25-75	15-60	28-35	9-15
	42-60	Sandy loam, sandy clay loam, loam.	CL, SC	A-4, A-6, A-2	0-3	0-15	55-100	50-90	25-75	15-60	25-32	7-13
LsB:												
Loyal--------	0-9	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	9-13	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	13-25	Silt loam-----	CL, CL-ML	A-4, A-6	0	0-9	90-100	85-100	75-100	70-85	23-35	6-15
	25-33	Loam, sandy clay loam, sandy loam.	SC, CL	A-4, A-6, A-2	0-2	0-15	55-100	50-90	25-75	15-60	25-32	7-13
	33-50	Loam, sandy clay loam, sandy loam.	SC, CL	A-2, A-4, A-6	0-3	0-15	55-100	50-90	25-75	15-60	28-35	9-15
	50-60	Sandy loam, sandy clay loam, loam.	CL, SC	A-4, A-6, A-2	0-3	0-15	55-100	50-90	25-75	15-60	25-32	7-13
Hiles--------	0-8	Silt loam-----	CL, CL-ML	A-4	0	0	95-100	95-100	75-100	65-85	20-30	4-10
	8-13	Silt loam, silt.	CL, CL-ML	A-4	0	0	95-100	95-100	75-100	65-85	20-30	4-10
	13-17	Silt loam-----	CL	A-6	0	0	95-100	95-100	75-100	65-85	25-35	10-15
	17-23	Loam, sandy loam, silty clay loam.	CL, SC	A-6, A-2-6	0	0	80-100	75-100	50-95	25-75	25-40	10-20
	23-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
LsC:												
Loyal--------	0-7	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	7-10	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	70-85	21-26	4-8
	10-17	Silt loam-----	CL, CL-ML	A-4, A-6	0	0-9	90-100	85-100	75-100	70-85	23-35	6-15
	17-25	Loam, sandy clay loam, sandy loam.	SC, CL	A-4, A-6, A-2	0-2	0-15	55-100	50-90	25-75	15-60	25-32	7-13
	25-43	Loam, sandy clay loam, sandy loam.	SC, CL	A-2, A-4, A-6	0-3	0-15	55-100	50-90	25-75	15-60	28-35	9-15
	43-60	Sandy loam, sandy clay loam, loam.	CL, SC	A-4, A-6, A-2	0-3	0-15	55-100	50-90	25-75	15-60	25-32	7-13
Hiles--------	0-9	Silt loam-----	CL, CL-ML	A-4	0	0	95-100	95-100	75-100	65-85	20-30	4-10
	9-17	Silt loam, silt.	CL, CL-ML	A-4	0	0	95-100	95-100	75-100	65-85	20-30	4-10
	17-22	Silt loam-----	CL	A-6	0	0	95-100	95-100	75-100	65-85	25-35	10-15
	22-28	Loam, sandy loam, silty clay loam.	CL, SC	A-6, A-2-6	0	0	80-100	75-100	50-95	25-75	25-40	10-20
	28-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
LuB----------- Ludington	0-4	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	80-100	75-100	20-70	5-25	---	NP
	4-12	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	12-18	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	18-31	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	31-37	Loam, sandy clay loam, clay loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	37-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
LuC----------- Ludington	0-3	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	80-100	75-100	20-70	5-25	---	NP
	3-8	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	8-14	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	14-27	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	27-33	Loam, sandy clay loam, clay loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	33-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
LxB:												
Ludington----	0-4	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	80-100	75-100	20-70	5-25	---	NP
	4-11	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	11-16	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	16-33	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	33-39	Loam, sandy clay loam, clay loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	39-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Fairchild----	0-4	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	100	100	20-75	5-35	---	NP
	4-10	Sand, coarse sand, loamy fine sand.	SP-SM, SM	A-2, A-3, A-1, A-4	0	0	100	100	20-95	5-50	---	NP
	10-18	Sand, coarse sand, loamy fine sand.	SM, SP-SM	A-2, A-3, A-1, A-4	0	0	100	100	20-95	5-50	---	NP
	18-29	Sand, coarse sand, loamy fine sand.	SP-SM, SM	A-3, A-2, A-4, A-1	0	0	100	100	20-95	5-50	---	NP
	29-34	Clay loam, sandy loam, sandy clay loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	34-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
LyD:												
Ludington----	0-4	Sand----------	SM, SP-SM	A-2, A-3, A-1	0	0	80-100	75-100	20-70	5-25	---	NP
	4-12	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	12-17	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	17-28	Sand, coarse sand, loamy sand.	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	20-95	5-50	---	NP
	28-35	Loam, sandy clay loam, clay loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-7, A-2	0	0	80-100	75-95	45-90	20-80	20-45	4-21
	35-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
LyD:												
Humbird------	0-3	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	15-25	2-7
	3-5	Fine sandy loam, sandy loam.	SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	---	NP
	5-10	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	10-19	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	0	95-100	95-100	55-90	30-50	20-28	3-9
	19-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	60-100	50-95	43-66	21-39
	25-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
MaB----------- Magnor	0-9	Silt loam-----	CL, CL-ML, ML	A-4	2-3	2-9	90-100	85-100	70-100	60-100	<28	NP-9
	9-15	Silt loam, silt.	CL, CL-ML, ML	A-4	1-3	1-9	90-100	85-100	70-95	60-95	<28	NP-9
	15-21	Silt loam, silt.	CL, CL-ML, ML	A-4	0-5	0-9	90-100	85-100	70-85	60-85	<28	NP-9
	21-45	Gravelly sandy loam, fine sandy loam, loam.	ML, CL, SM, SC	A-2, A-4, A-1	0-5	0-15	55-100	50-90	40-85	20-70	<28	NP-9
	45-60	Sandy loam, loam, gravelly fine sandy loam.	ML, CL-ML, SM, SC-SM	A-2, A-4, A-1	0-5	0-15	55-100	50-90	40-85	20-70	<25	NP-7
MbB----------- Mahtomedi	0-4	Loamy sand----	SM, SC-SM	A-2, A-1	0	0-2	95-100	75-90	40-85	15-30	15-20	NP-4
	4-15	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	0-2	80-95	75-90	30-75	5-15	15-20	NP
	15-20	Sand, coarse sand, gravelly sand.	SP-SM, SM	A-2, A-3, A-1	0	0-10	70-95	50-90	30-75	5-15	15-20	NP
	20-61	Sand, coarse sand, gravelly sand.	SP, SM, SP-SM	A-2, A-3, A-1	0	0-10	55-95	50-90	30-70	2-15	15-20	NP
MbC----------- Mahtomedi	0-4	Loamy sand----	SM, SC-SM	A-2, A-1	0	0-2	95-100	75-90	40-85	15-30	15-20	NP-4
	4-6	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	0-2	80-95	75-90	30-75	5-15	15-20	NP
	6-33	Sand, coarse sand, gravelly sand.	SP-SM, SM	A-2, A-3, A-1	0	0-10	70-95	50-90	30-75	5-15	15-20	NP
	33-61	Sand, coarse sand, gravelly sand.	SP, SM, SP-SM	A-2, A-3, A-1	0	0-10	55-95	50-90	30-70	2-15	15-20	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
McA----------- Maplehurst	0-9	Silt loam-----	CL	A-4	0	0-9	95-100	90-100	90-100	85-100	23-27	7-9
	9-16	Silt loam, silt.	CL	A-6, A-4	0-1	0-9	95-100	90-100	90-100	85-95	23-30	7-11
	16-25	Silt loam-----	CL	A-4, A-6	0-1	0-9	95-100	90-100	90-100	85-95	25-32	7-13
	25-44	Silt loam-----	CL	A-4, A-6	0-1	0-9	95-100	90-100	90-100	85-95	28-34	9-14
	44-47	Sandy loam, gravelly loam, very gravelly sandy clay loam.	SM, GM, ML, CL-ML	A-4, A-2-4, A-1-b	0-3	0-15	50-100	45-100	25-95	15-80	<25	NP-7
	47-60	Stratified very gravelly coarse sand to sand.	SP, GM, GP, SM	A-1-a	0-3	0-15	45-100	40-95	10-65	2-25	---	NP
Me:												
Markey-------	0-27	Muck----------	PT	A-8	---	---	---	---	---	---	---	---
	27-60	Sand, fine sand, gravelly loamy sand.	SP, SM, SP-SM	A-2, A-3, A-1	0	0	95-100	60-100	30-75	0-30	---	NP
Newson-------	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	NP
	4-25	Loamy sand, sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	80-100	75-100	45-75	3-30	---	NP
	25-60	Sand, loamy sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	80-100	75-100	45-75	3-30	---	NP
Mf------------ Marshfield	0-9	Silt loam-----	CL	A-4, A-6	0	0-8	90-100	85-100	70-100	60-100	25-35	7-15
	9-14	Silt loam, silt.	ML, CL-ML, CL	A-4, A-6	0-1	0-8	90-100	85-100	70-100	60-100	18-33	3-14
	14-30	Silt loam, silty clay loam.	CL	A-6, A-4, A-7-6	0-2	0-8	90-100	85-100	70-100	70-90	28-44	9-22
	30-36	Loam, clay loam, gravelly sandy loam.	CL, SC	A-6, A-4, A-7-6, A-2	0-3	0-15	55-100	50-95	40-90	25-75	28-44	9-22
	36-60	Loam, clay loam, gravelly sandy loam.	CL, ML, SC, SM	A-4, A-6, A-2	0-3	0-15	55-100	50-95	40-90	25-75	18-39	3-18
MgB----------- Menahga	0-4	Loamy sand----	SM, SP-SM	A-2	0	0	100	85-100	60-80	10-30	---	NP
	4-24	Coarse sand, sand, loamy coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	80-100	30-75	0-10	---	NP
	24-61	Coarse sand, sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	80-100	30-75	0-10	---	NP
MmA----------- Merimod	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	23-30	6-11
	9-17	Silt loam-----	CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	28-34	9-14
	17-32	Loam, sandy loam, sandy clay loam.	CL, SC	A-4, A-6, A-2-4, A-2-6	0	0	80-100	75-100	45-95	20-80	28-34	9-14
	32-60	Sand, fine sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-85	5-35	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
MnB----------- Merit	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	23-30	6-11
	8-20	Silt loam-----	CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	28-34	9-14
	20-30	Loam, sandy loam, sandy clay loam.	CL, SC	A-4, A-6, A-2-4, A-2-6	0	0	80-100	75-100	45-95	20-80	28-34	9-14
	30-60	Sand, fine sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-85	5-35	---	NP
MoB:												
Merit--------	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	23-30	6-11
	9-12	Silt loam-----	CL	A-4, A-6	0	0	80-100	75-100	60-100	50-85	28-34	9-14
	12-30	Loam, sandy loam, sandy clay loam.	CL, SC	A-4, A-6, A-2-4, A-2-6	0	0	80-100	75-100	45-95	20-80	28-34	9-14
	30-60	Sand, fine sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-85	5-35	---	NP
Gardenvale---	0-8	Silt loam-----	CL	A-4	0	0	80-100	75-100	60-100	50-85	25-30	7-11
	8-26	Silt loam-----	CL	A-6	0	0	80-100	75-100	60-100	50-85	28-37	9-16
	26-30	Sandy loam, loam, sandy clay loam.	CL, SC	A-4, A-6	0	0	80-100	75-100	45-95	25-70	25-37	7-16
	30-50	Fine sand, sand.	SM, SP-SM	A-3, A-1-b, A-2-4	0	0	80-100	75-100	20-85	5-35	<21	NP-4
	50-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
MpA----------- Merrillan	0-9	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	15-23	2-6
	9-11	Fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	11-22	Sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	22-36	Clay loam, silty clay loam, clay.	CL, CH	A-7-6	0	0	80-100	75-100	65-95	50-85	43-65	21-40
	36-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
MrA:												
Merrillan----	0-3	Fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	15-23	2-6
	3-6	Fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	6-13	Sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	18-25	3-7
	13-21	Sandy loam, fine sandy loam.	SC, SC-SM	A-4, A-2-4	0	0	80-100	75-100	45-90	20-50	21-28	4-9
	21-30	Clay loam, silty clay loam, clay.	CL, CH	A-7-6	0	0	80-100	75-100	65-95	50-85	43-65	21-40
	30-60	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Veedum-------	0-5	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	5-7	Silt loam-----	CL, ML	A-4	0	0	95-100	95-100	70-100	65-85	15-30	NP-9
	7-20	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	20-26	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	26-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
MxA:												
Moppet-------	0-5	Fine sandy loam.	SC, SC-SM, CL, CL-ML	A-4, A-2-4	0	0	100	100	60-95	30-65	21-26	4-8
	5-35	Fine sandy loam, loam, silt loam.	ML, SM, SC, CL	A-4	0	0	100	100	75-100	40-85	18-28	3-9
	35-60	Gravelly sand, fine sand, loamy fine sand.	SM, SP-SM, SP	A-1-b, A-2-4, A-4	0	0-5	55-100	50-100	15-95	2-50	15-21	NP-4
Fordum-------	0-9	Silt loam-----	ML, CL, SM, SC	A-4, A-6	0	0-15	80-100	75-100	55-100	45-85	20-35	3-15
	9-28	Silt loam, sandy loam, gravelly loam.	SM, SC, ML, CL	A-2, A-4, A-1	0	0-15	30-100	25-100	20-100	10-90	<30	3-10
	28-60	Sand, very gravelly loamy fine sand.	SP, SM, GP, SM	A-3, A-2, A-1	0	0-15	30-100	25-100	7-95	1-50	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
NeB----------- Newood	0-9	Sandy loam----	SM, SC-SM, ML, CL-ML	A-2, A-4	2-3	0-15	80-100	75-100	40-85	20-55	<25	NP-7
	9-16	Gravelly sandy loam, gravelly loam, sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-1-b	1-3	0-15	70-100	65-100	40-90	20-75	<25	NP-7
	16-39	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	35-80	12-45	<25	NP-7
	39-62	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SC, SC-SM, GM	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<30	NP-10
	62-65	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<25	NP-7
NeC----------- Newood	0-8	Sandy loam----	SM, SC-SM, ML, CL-ML	A-2, A-4	2-3	0-15	80-100	75-100	40-85	20-55	<25	NP-7
	8-15	Gravelly sandy loam, gravelly loam, sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-1-b	1-3	0-15	70-100	65-100	40-90	20-75	<25	NP-7
	15-38	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	35-80	12-45	<25	NP-7
	38-61	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SC, SC-SM, GM	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<30	NP-10
	61-65	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<25	NP-7

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
NmC:												
Newood-------	0-4	Sandy loam----	SM, SC-SM, ML, CL-ML	A-2, A-4	2-3	0-15	80-100	75-100	40-85	20-55	<25	NP-7
	4-15	Gravelly sandy loam, gravelly loam, sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-1-b	1-3	0-15	70-100	65-100	40-90	20-75	<25	NP-7
	15-38	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	35-80	12-45	<25	NP-7
	38-63	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SC, SC-SM, GM	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<30	NP-10
	63-65	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, SC-SM, GM, GM-GC	A-2, A-4, A-1-b	0-2	0-15	60-100	55-95	45-80	20-45	<25	NP-7
Magnor-------	0-4	Silt loam-----	CL, CL-ML, ML	A-4	2-3	2-9	90-100	85-100	70-100	60-100	<28	NP-9
	4-9	Silt loam, silt.	CL, CL-ML, ML	A-4	1-3	1-9	90-100	85-100	70-95	60-95	<28	NP-9
	9-26	Silt loam, silt.	CL, CL-ML, ML	A-4	0-5	0-9	90-100	85-100	70-85	60-85	<28	NP-9
	26-60	Gravelly sandy loam, fine sandy loam, loam.	ML, CL, SM, SC	A-2, A-4, A-1	0-5	0-15	55-100	50-90	40-85	20-70	<28	NP-9
	60-65	Sandy loam, loam, gravelly fine sandy loam.	ML, CL-ML, SM, SC-SM	A-2, A-4, A-1	0-5	0-15	55-100	50-90	40-85	20-70	<25	NP-7
Cathro-------	0-4	Mucky peat----	PT	A-8	0	0	---	---	---	---	---	---
	4-30	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	30-60	Loam, silty clay loam, sandy loam.	SC-SM, CL-ML, SC, CL	A-4, A-6	0	0-5	80-100	65-100	60-100	35-90	20-40	4-20

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
NoC----------- Northmound	0-4	Flaggy silt loam.	ML, CL-ML	A-4	2-3	15-40	80-98	75-96	60-95	50-85	<25	NP-7
	4-8	Flaggy silt loam, sandy loam, very channery loam.	ML, CL-ML, SM, SC-SM	A-4, A-2-4	2-5	10-40	80-98	75-96	45-95	20-85	<25	NP-7
	8-24	Very flaggy silt loam, very channery sandy loam, flaggy loam.	ML, CL, GM, GC	A-4, A-2-4, A-1-b	2-10	30-60	55-80	50-75	30-75	15-65	<30	NP-9
	24-30	Very flaggy loam, very channery sandy loam, flaggy sandy loam.	ML, CL, GM, GC	A-4, A-2-4, A-1-b	5-20	30-60	55-80	50-75	30-70	15-65	<30	NP-9
	30-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
NrF:												
Northmound---	0-5	Flaggy silt loam.	ML, CL-ML	A-4	2-3	15-40	80-98	75-96	60-95	50-85	<25	NP-7
	5-11	Flaggy silt loam, sandy loam, very channery loam.	ML, CL-ML, SM, SC-SM	A-4, A-2-4	2-5	10-40	80-98	75-96	45-95	20-85	<25	NP-7
	11-24	Very flaggy silt loam, very channery sandy loam, flaggy loam.	ML, CL, GM, GC	A-4, A-2-4, A-1-b	2-10	30-60	55-80	50-75	30-75	15-65	<30	NP-9
	24-30	Very flaggy loam, very channery sandy loam, flaggy sandy loam.	ML, CL, GM, GC	A-4, A-2-4, A-1-b	5-20	30-60	55-80	50-75	30-70	15-65	<30	NP-9
	30-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop-	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
OeA----------- Oesterle	0-6	Loam----------	CL-ML, SC-SM, CL, SC	A-4	0	0-9	80-100	75-100	65-95	45-75	21-26	4-8
	6-12	Sandy loam, loam.	ML, CL, SM, SC	A-2, A-4, A-1	0	0-9	75-100	70-100	40-95	20-75	18-26	3-8
	12-27	Sandy loam, gravelly loam.	SM, SC, CL, ML	A-2, A-1, A-4	0	0-9	55-100	50-100	25-95	15-60	<28	NP-9
	27-61	Gravelly sand, loamy sand.	SM, SP, GM, GP	A-1, A-3, A-2	0	0-9	30-100	25-100	7-75	1-35	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
PeA:												
Pelkie-------	0-4	Loamy fine sand.	SM	A-2	0	0	100	100	50-95	15-35	---	NP
	4-60	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	0	100	100	50-80	5-35	---	NP
Winterfield--	0-7	Loamy fine sand.	SM, SC-SM	A-2-4, A-4	0	0	100	95-100	50-90	15-45	<25	NP-7
	7-31	Coarse sand, loamy sand, loamy fine sand.	SM, SP-SM, SC-SM, SP	A-2-4, A-3, A-4	0	0	100	95-100	50-90	2-45	<25	NP-7
	31-60	Sand, gravelly sand, loamy fine sand.	SM, SP-SM, SP	A-3, A-1-b, A-2-4	0	0	85-100	70-100	35-80	0-35	---	NP
Pg------------ Pits	0-60	Sand and gravel.	GP, SP, GP-GM, SP-SM	---	---	0-10	---	---	---	---	---	---
PoA----------- Plover	0-10	Very fine sandy loam.	ML, CL-ML	A-4	0	0	80-100	75-100	75-95	50-60	<25	3-6
	10-28	Fine sandy loam, sandy loam, silt loam.	SM, ML, SC-SM, CL-ML	A-4	0	0	80-100	75-100	70-100	40-75	<20	NP-5
	28-33	Fine sandy loam, sandy loam, loam.	SM, ML, CL-ML, SC-SM	A-4	0	0	80-100	75-100	70-100	40-70	<25	NP-7
	33-60	Stratified silt to sand.	ML, CL-ML, SC-SM, SM	A-4	0	0	80-100	75-100	55-100	35-75	<25	NP-7
Pv:												
Ponycreek----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-6	Mucky sand----	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	6-26	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
	26-64	Sand, coarse sand.	SM, SP-SM	A-1-b, A-3	0	0	80-100	75-100	20-70	2-25	---	NP
Dawsil-------	0-4	Mucky peat----	PT	A-8	0	0	---	---	---	---	---	---
	4-30	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	30-60	Sand, coarse sand, loamy sand.	SC-SM, SM, SC, SP-SM	A-2, A-3, A-1	0	0	90-100	85-100	25-75	5-35	<20	NP-10
PxA----------- Poskin	0-4	Silt loam-----	CL, CL-ML	A-4	0	0-4	95-100	90-100	80-100	70-95	20-30	5-10
	4-6	Silt loam-----	CL-ML	A-4	0	0-4	95-100	90-100	80-100	70-95	20-25	4-7
	6-25	Silt loam-----	CL	A-4, A-6	0	0-4	95-100	90-100	80-100	70-95	25-35	7-15
	25-28	Silt loam-----	CL	A-6, A-4	0	0-4	95-100	90-100	80-100	70-95	25-35	9-15
	28-31	Sandy loam, loam, gravelly sandy loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-1	0	0-10	50-100	45-100	30-100	10-90	<25	NP-7
	31-61	Gravelly sand, coarse sand, sand and gravel.	SP, SP-SM, GP, GP-GM	A-1, A-2, A-3	0	0-10	30-100	25-100	10-90	1-15	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
Py------------ Psammaquents	0-6	Sand----------	SM, SP-SM	A-3, A-1-b	0	0-3	90-100	85-100	25-75	5-35	---	NP
	6-60	Sand, loamy sand.	SM, SP-SM	A-3, A-1-b	0	0-3	90-100	85-100	25-75	5-35	---	NP
Rb------------ Rib	0-7	Silt loam-----	CL, CL-ML	A-4, A-6	0	0-9	95-100	90-100	90-100	85-100	20-30	4-11
	7-27	Silt loam, silty clay loam.	CL	A-6	0	0-9	95-100	90-100	90-100	85-100	30-40	10-20
	27-31	Loam, sandy loam, very gravelly sandy loam.	CL, ML, SC, SM	A-2, A-4, A-6, A-1	0	0-9	55-100	45-100	35-90	20-75	17-40	1-20
	31-60	Stratified very gravelly coarse sand to loamy sand.	SP, SP-SM, GP, GP-GM	A-2, A-3, A-1	0-1	0-9	45-95	40-95	25-55	2-10	---	NP
RkA----------- Rockdam	0-4	Sand----------	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	4-9	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	9-13	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	13-35	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
	35-61	Sand, coarse sand.	SM, SP-SM	A-3, A-1-b	0	0	80-100	75-100	20-70	2-25	---	NP
RoA----------- Rosholt	0-8	Sandy loam----	SM	A-2, A-4	0	0-3	80-100	75-100	45-90	20-50	<21	NP-4
	8-16	Fine sandy loam, gravelly loamy sand, silt loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1	0-1	0-3	55-100	50-100	20-100	7-90	<23	NP-6
	16-31	Fine sandy loam, sandy loam, gravelly loam.	SC, SM, CL, ML	A-2, A-4, A-1	0-1	0-3	55-100	50-100	30-95	15-80	<26	NP-8
	31-60	Stratified extremely gravelly sand to coarse sand.	GP, SP, SM, GM	A-1, A-2, A-3	0-5	0-25	30-100	25-100	7-70	1-25	---	NP

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
RoB----------- Rosholt	0-9	Sandy loam----	SM	A-2, A-4	0	0-3	80-100	75-100	45-90	20-50	<21	NP-4
	9-30	Fine sandy loam, sandy loam, gravelly loam.	SC, SM, CL, ML	A-2, A-4, A-1	0-1	0-3	55-100	50-100	30-95	15-80	<26	NP-8
	30-34	Gravelly loamy sand, extremely gravelly coarse sand, sand.	SM, GM, SP-SM, GP-GM	A-1, A-2, A-3	0-5	0-25	30-100	25-100	15-75	8-35	<23	NP-6
	34-60	Stratified extremely gravelly sand to coarse sand.	GP, SP, SM, GM	A-1, A-2, A-3	0-5	0-25	30-100	25-100	7-70	1-25	---	NP
RoC----------- Rosholt	0-8	Sandy loam----	SM	A-2, A-4	0	0-3	80-100	75-100	45-90	20-50	<21	NP-4
	8-28	Fine sandy loam, sandy loam, gravelly loam.	SC, SM, CL, ML	A-2, A-4, A-1	0-1	0-3	55-100	50-100	30-95	15-80	<26	NP-8
	28-60	Stratified extremely gravelly sand to coarse sand.	GP, SP, SM, GM	A-1, A-2, A-3	0-5	0-25	30-100	25-100	7-70	1-25	---	NP
RzB----------- Rozellville	0-9	Silt loam-----	CL, ML, CL-ML	A-4	0	0-9	80-100	75-100	60-100	50-85	18-30	3-11
	9-13	Silt loam, loam.	CL, ML, CL-ML	A-4	0	0-9	80-100	75-100	55-100	50-85	18-30	3-11
	13-17	Silt loam, clay loam, gravelly sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-9	80-100	75-100	45-100	20-85	21-34	4-14
	17-38	Loam, clay loam, gravelly sandy loam.	CL, SC	A-2-4, A-6, A-2-6	0-10	0-25	55-100	50-95	30-95	25-75	28-39	9-18
	38-60	Gravelly loam, cobbly loam, very gravelly sandy loam.	GC, GM-GC, SC, SC-SM	A-1, A-2, A-4, A-6	0-15	0-50	40-85	35-70	20-65	15-50	21-36	4-16
RzC----------- Rozellville	0-4	Silt loam-----	CL, ML, CL-ML	A-4	0	0-9	80-100	75-100	60-100	50-85	18-30	3-11
	4-14	Silt loam, clay loam, gravelly sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-9	80-100	75-100	45-100	20-85	21-34	4-14
	14-34	Loam, clay loam, gravelly sandy loam.	CL, SC	A-2-4, A-6, A-2-6	0-10	0-25	55-100	50-95	30-95	25-75	28-39	9-18
	34-60	Gravelly loam, cobbly loam, very gravelly sandy loam.	GC, GM-GC, SC, SC-SM	A-1, A-2, A-4, A-6	0-15	0-50	40-85	35-70	20-65	15-50	21-36	4-16

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
ScA----------- Simescreek	0-2	Sand----------	SM, SP-SM	A-1-b, A-3	0	0	95-100	90-100	20-70	5-25	---	NP
	2-32	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	95-100	90-100	20-70	1-10	---	NP
	32-60	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	95-100	90-100	20-70	1-10	---	NP
SrB----------- Spencer	0-10	Silt loam-----	CL, CL-ML	A-4	0	0-9	95-100	90-100	85-100	80-100	21-28	4-9
	10-35	Silt loam-----	CL	A-4, A-6	0	0-9	95-100	90-100	85-100	80-100	28-35	9-15
	35-43	Silt loam-----	CL	A-4, A-6	0	0-9	95-100	90-100	85-100	80-100	28-35	9-15
	43-60	Sandy loam, gravelly loam, loamy sand.	CL, CL-ML, SC, SP-SC	A-4, A-2-4, A-1-b	0-2	0-9	55-90	50-90	25-80	10-70	21-30	4-11
SrC----------- Spencer	0-9	Silt loam-----	CL, CL-ML	A-4	0	0-9	95-100	90-100	85-100	80-100	21-28	4-9
	9-11	Silt loam, silt.	CL, CL-ML	A-4	0	0-9	95-100	90-100	85-100	80-100	21-28	4-9
	11-33	Silt loam-----	CL	A-4, A-6	0	0-9	95-100	90-100	85-100	80-100	28-35	9-15
	33-42	Silt loam-----	CL	A-4, A-6	0	0-9	95-100	90-100	85-100	80-100	28-35	9-15
	42-60	Sandy loam, gravelly loam, loamy sand.	CL, CL-ML, SC, SP-SC	A-4, A-2-4, A-1-b	0-2	0-9	55-90	50-90	25-80	10-70	21-30	4-11
TrB----------- Tarr	0-8	Sand----------	SM, SP-SM	A-1, A-2, A-3	0	0	80-100	75-100	20-70	5-25	---	NP
	8-36	Sand, fine sand.	SP, SP-SM	A-1, A-3, A-2	0	0	80-100	75-100	45-80	1-10	---	NP
	36-60	Sand, fine sand.	SP, SP-SM	A-1, A-3, A-2	0	0	80-100	75-100	45-80	1-10	---	NP
Ve------------ Veedum	0-9	Silt loam-----	CL-ML, CL	A-4	0	0	95-100	95-100	70-100	65-85	20-30	4-10
	9-15	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	15-35	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	35-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Vs: Veedum-------	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-6	Silt loam-----	CL, ML	A-4	0	0	95-100	95-100	70-100	65-85	15-30	NP-9
	6-20	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	20-29	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	29-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 16.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
Vs:												
Elm Lake-----	0-4	Muck----------	PT	A-8	0	0	---	---	---	---	---	---
	4-30	Sand, loamy sand, coarse sand.	SP-SM, SM	A-2, A-3, A-1	0	0	80-100	75-100	30-75	5-35	---	NP
	30-38	Silty clay loam, loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-6, A-2, A-4	0	0	80-100	75-95	45-95	25-85	20-45	4-22
	38-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
WeA-----------	0-9	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	65-100	20-30	5-10
Withee	9-14	Silt loam, silt.	CL, CL-ML	A-4	0-2	0-9	90-100	85-100	75-100	65-100	20-30	5-10
	14-24	Silt loam-----	CL, CL-ML	A-4, A-6	0-3	0-9	90-100	85-100	75-100	65-100	20-35	5-15
	24-47	Loam, sandy clay loam, sandy loam.	CL, SC	A-6, A-7, A-2	0-3	0-15	55-100	50-90	40-80	15-60	25-45	10-25
	47-60	Loam, sandy loam, sandy clay loam.	CL, SC	A-6, A-7, A-2, A-4	0-3	0-15	55-100	50-90	40-80	20-60	20-45	7-25
WkA:												
Withee-------	0-10	Silt loam-----	CL, CL-ML	A-4	0	0-9	90-100	85-100	75-100	65-100	20-30	5-10
	10-17	Silt loam, silt.	CL, CL-ML	A-4	0-2	0-9	90-100	85-100	75-100	65-100	20-30	5-10
	17-35	Silt loam-----	CL, CL-ML	A-4, A-6	0-3	0-9	90-100	85-100	75-100	65-100	20-35	5-15
	35-44	Loam, sandy clay loam, sandy loam.	CL, SC	A-6, A-7, A-2	0-3	0-15	55-100	50-90	40-80	15-60	25-45	10-25
	44-60	Loam, sandy loam, sandy clay loam.	CL, SC	A-6, A-7, A-2, A-4	0-3	0-15	55-100	50-90	40-80	20-60	20-45	7-25
Kert---------	0-8	Silt loam-----	CL, CL-ML	A-4	0	0	95-100	95-100	70-100	65-85	20-30	4-10
	8-13	Silt loam, silt.	CL, ML, CL-ML	A-4	0	0	95-100	95-100	70-100	65-85	<30	NP-9
	13-21	Silt loam-----	CL	A-6	0	0	95-100	95-100	70-100	65-85	30-40	10-20
	21-31	Loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6, A-2-6	0	0	80-100	75-100	45-100	20-85	30-45	10-20
	31-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 17.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AbB-------------- Aftad	0-7	5-12	1.35-1.55	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	5	3	1-3
	7-13	3-12	1.45-1.70	0.6-2.0	0.09-0.19	4.5-6.5	Low----------	0.43			
	13-43	8-15	1.50-1.70	0.6-2.0	0.10-0.19	4.5-6.5	Low----------	0.43			
	43-60	1-12	1.50-1.75	0.6-2.0	0.05-0.20	5.1-6.5	Low----------	0.32			
AgA-------------- Almena	0-9	14-23	1.20-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	5	2-5
	9-19	10-23	1.30-1.60	0.6-2.0	0.20-0.24	4.5-6.0	Low----------	0.43			
	19-33	15-25	1.50-1.65	0.2-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	33-45	18-27	1.50-1.65	0.2-2.0	0.20-0.22	4.5-6.0	Moderate-----	0.43			
	45-60	10-20	1.70-1.80	0.2-2.0	0.07-0.16	5.1-6.5	Low----------	0.28			
AnA:											
Au Gres---------	0-13	0-8	1.30-1.55	6.0-60	0.07-0.10	3.6-7.3	Low----------	0.02	5	1	2-5
	13-27	1-15	1.50-1.70	6.0-60	0.06-0.09	4.5-7.3	Low----------	0.10			
	27-61	0-8	1.50-1.70	6.0-60	0.05-0.07	5.1-7.3	Low----------	0.10			
Newson----------	0-4	---	0.10-0.35	2.0-6.0	0.35-0.45	3.5-7.3	-------------	0.05	5	2	30-80
	4-21	1-4	1.70-1.80	6.0-20	0.05-0.11	3.5-5.5	Low----------	0.17			
	21-64	1-4	1.70-1.80	6.0-20	0.04-0.11	4.5-6.5	Low----------	0.15			
Au--------------- Auburndale	0-7	6-25	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	5	4-10
	7-14	6-20	1.35-1.60	0.6-2.0	0.20-0.24	4.5-6.0	Low----------	0.43			
	14-41	18-27	1.50-1.65	0.2-2.0	0.20-0.22	4.5-6.0	Moderate-----	0.43			
	41-53	8-20	1.50-1.70	0.2-2.0	0.08-0.22	4.5-6.0	Low----------	0.32			
	53-60	5-15	1.75-1.85	0.2-2.0	0.08-0.19	4.5-6.5	Low----------	0.28			
Ba--------------- Barronett	0-9	5-15	1.25-1.50	0.6-2.0	0.20-0.26	4.5-7.3	Low----------	0.37	5	5	4-10
	9-15	4-15	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43			
	15-32	18-25	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.43			
	32-60	10-18	1.40-1.70	0.2-0.6	0.16-0.22	4.5-7.8	Low----------	0.32			
BlB-------------- Bilson	0-8	5-15	1.45-1.65	0.6-2.0	0.14-0.16	5.1-7.3	Low----------	0.17	4	3	1-2
	8-32	6-18	1.40-1.70	0.6-6.0	0.10-0.17	5.1-6.5	Low----------	0.20			
	32-60	1-8	1.60-1.70	6.0-20	0.03-0.08	4.5-6.5	Low----------	0.15			
BoC-------------- Boone	0-5	2-3	1.55-1.65	6.0-20	0.07-0.10	3.5-7.3	Low----------	0.02	3	1	2-5
	5-37	0-3	1.55-1.70	6.0-20	0.02-0.11	4.5-6.5	Low----------	0.15			
	37-60	---	---	0.2-2.0	---	---	-------------	----			
BoF-------------- Boone	0-2	2-3	1.55-1.65	6.0-20	0.07-0.10	3.5-7.3	Low----------	0.02	3	1	2-5
	2-7	1-5	1.55-1.70	6.0-20	0.03-0.12	3.5-7.3	Low----------	0.15			
	7-31	0-3	1.55-1.70	6.0-20	0.02-0.11	4.5-6.5	Low----------	0.15			
	31-60	---	---	0.2-2.0	---	---	-------------	----			
BpF:											
Boone-----------	0-3	2-3	1.55-1.65	6.0-20	0.07-0.10	3.5-7.3	Low----------	0.02	3	1	2-5
	3-8	1-5	1.55-1.70	6.0-20	0.03-0.12	3.5-7.3	Low----------	0.15			
	8-35	0-3	1.55-1.70	6.0-20	0.02-0.11	4.5-6.5	Low----------	0.15			
	35-60	---	---	0.2-2.0	---	---	-------------	----			
Elevasil--------	0-3	8-13	1.40-1.60	0.6-6.0	0.10-0.16	3.5-7.3	Low----------	0.24	3	3	2-6
	3-27	10-17	1.45-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	27-31	2-10	1.50-1.70	2.0-20	0.03-0.10	4.5-6.5	Low----------	0.17			
	31-39	1-8	1.50-1.70	6.0-20	0.02-0.08	4.5-6.5	Low----------	0.15			
	39-60	---	---	0.2-2.0	---	---	-------------	----			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
BrA-------------- Brander	0-10	10-20	1.30-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	4	5	1-3
	10-17	10-20	1.35-1.60	0.6-2.0	0.16-0.22	4.5-6.5	Low----------	0.43			
	17-22	18-27	1.40-1.65	0.6-2.0	0.16-0.22	4.5-6.5	Moderate-----	0.43			
	22-32	18-27	1.40-1.65	0.6-2.0	0.16-0.22	4.5-6.5	Moderate-----	0.43			
	32-35	6-20	1.45-1.70	0.6-6.0	0.05-0.19	4.5-6.5	Low----------	0.24			
	35-60	1-6	1.55-1.80	6.0-60	0.01-0.07	4.5-6.5	Low----------	0.10			
Ca:											
Capitola--------	0-4	---	0.15-0.35	2.0-6.0	0.35-0.45	4.5-7.3	Low----------	0.37	5	2	50-80
	4-12	12-16	1.25-1.45	0.2-2.0	0.16-0.24	4.5-7.3	Low----------	0.37			
	12-35	8-17	1.35-1.60	0.2-2.0	0.09-0.22	4.5-7.3	Low----------	0.43			
	35-39	8-16	1.40-1.90	0.2-2.0	0.07-0.16	4.5-7.3	Low----------	0.28			
	39-64	5-10	1.70-1.90	0.2-0.6	0.05-0.16	5.1-7.8	Low----------	0.28			
Marshfield------	0-3	15-27	1.25-1.45	0.6-2.0	0.17-0.24	3.5-7.3	Moderate-----	0.32	5	6	4-10
	3-10	8-23	1.40-1.60	0.6-2.0	0.17-0.24	3.5-6.0	Low----------	0.43			
	10-26	18-35	1.40-1.60	0.6-2.0	0.14-0.22	3.5-6.0	Moderate-----	0.43			
	26-34	18-35	1.70-1.80	0.2-0.6	0.06-0.10	4.5-7.3	Moderate-----	0.32			
	34-60	8-30	1.80-1.95	0.2-0.6	0.05-0.10	4.5-7.3	Moderate-----	0.37			
Veedum----------	0-3	---	0.15-0.55	2.0-6.0	0.35-0.45	3.5-6.0	Low----------	0.37	3	2	20-50
	3-7	8-20	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Low----------	0.43			
	7-18	18-30	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Moderate-----	0.43			
	18-37	18-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-6.0	Moderate-----	0.37			
	37-60	---	---	0.00-0.6	---	---	-------------	----			
Cd--------------- Citypoint	0-8	---	0.20-0.35	0.2-6.0	0.55-0.65	3.6-5.0	-------------	----	2	5	65-85
	8-28	---	0.15-0.40	0.2-6.0	0.35-0.45	3.6-5.0	-------------	0.10			
	28-33	0-50	1.55-1.75	0.06-20	0.05-0.18	3.6-5.0	Moderate-----	0.15			
	33-60	---	---	0.00-0.6	---	---	-------------	----			
CmA-------------- Comstock	0-9	8-22	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	2-4
	9-12	8-20	1.40-1.65	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43			
	12-20	15-28	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	20-36	18-30	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	36-41	8-20	1.40-1.70	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.37			
	41-60	8-20	1.40-1.65	0.2-0.6	0.12-0.22	5.1-7.3	Low----------	0.37			
CoC2------------- Council	0-8	6-10	1.35-1.60	0.6-2.0	0.17-0.24	4.5-7.3	Low----------	0.32	5	5	1-2
	8-42	10-17	1.55-1.65	0.6-2.0	0.14-0.22	4.5-6.5	Low----------	0.32			
	42-60	6-17	1.55-1.65	0.6-2.0	0.12-0.20	5.1-7.3	Low----------	0.24			
CsD2:											
Council---------	0-7	6-10	1.35-1.60	0.6-2.0	0.17-0.24	4.5-7.3	Low----------	0.32	5	5	1-2
	7-45	10-17	1.55-1.65	0.6-2.0	0.14-0.22	4.5-6.5	Low----------	0.32			
	45-60	6-17	1.55-1.65	0.6-2.0	0.12-0.20	5.1-7.3	Low----------	0.24			
Seaton----------	0-9	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.49	5	5	1-3
	9-46	18-27	1.15-1.30	0.6-2.0	0.20-0.22	4.5-7.3	Moderate-----	0.37			
	46-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Moderate-----	0.37			
CuB-------------- Crystal Lake	0-9	8-20	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	2-4
	9-23	8-20	1.40-1.60	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.43			
	23-31	15-27	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	31-42	18-30	1.50-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	42-60	8-20	1.45-1.65	0.2-0.6	0.20-0.22	4.5-7.3	Low----------	0.37			
Da--------------- Dawsil	0-7	---	0.20-0.35	0.6-6.0	0.45-0.55	3.5-4.4	-------------	----	2	5	65-85
	7-31	---	0.15-0.40	0.2-6.0	0.35-0.45	3.5-4.4	-------------	0.10			
	31-60	0-10	1.55-1.70	6.0-60	0.03-0.10	3.5-6.5	Low----------	0.15			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
EaB-------------- Eauclaire	0-2	3-10	1.35-1.60	6.0-20	0.07-0.12	4.5-7.3	Low----------	0.10	5	2	2-5
	2-4	3-10	1.45-1.65	6.0-20	0.05-0.12	4.5-7.3	Low----------	0.15			
	4-12	3-10	1.45-1.70	6.0-20	0.04-0.11	4.5-6.0	Low----------	0.17			
	12-34	3-10	1.45-1.70	6.0-20	0.04-0.11	4.5-6.0	Low----------	0.15			
	34-66	8-17	1.40-1.70	0.2-2.0	0.09-0.18	4.5-6.0	Low----------	0.17			
	66-80	6-15	1.35-1.85	0.2-2.0	0.08-0.18	4.5-7.3	Low----------	0.28			
ElB-------------- Elevasil	0-8	8-13	1.40-1.60	0.6-6.0	0.10-0.16	3.5-7.3	Low----------	0.24	3	3	1-3
	8-26	10-17	1.45-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	26-30	2-10	1.50-1.70	2.0-20	0.03-0.10	4.5-6.5	Low----------	0.17			
	30-38	1-8	1.50-1.70	6.0-20	0.02-0.08	4.5-6.5	Low----------	0.15			
	38-60	---	---	0.2-2.0	---	---	-------------	----			
ElC2------------- Elevasil	0-9	8-13	1.40-1.60	0.6-6.0	0.10-0.16	3.5-7.3	Low----------	0.28	3	3	1-3
	9-24	10-17	1.45-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	24-28	2-10	1.50-1.70	2.0-20	0.03-0.10	4.5-6.5	Low----------	0.17			
	28-39	1-8	1.50-1.70	6.0-20	0.02-0.08	4.5-6.5	Low----------	0.15			
	39-60	---	---	0.2-2.0	---	---	-------------	----			
ElD2------------- Elevasil	0-9	8-13	1.40-1.60	0.6-6.0	0.10-0.16	3.5-7.3	Low----------	0.28	3	3	1-3
	9-18	10-17	1.45-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	18-26	2-10	1.50-1.70	2.0-20	0.03-0.10	4.5-6.5	Low----------	0.17			
	26-36	1-8	1.50-1.70	6.0-20	0.02-0.08	4.5-6.5	Low----------	0.15			
	36-60	---	---	0.2-2.0	---	---	-------------	----			
FeA:											
Fairchild-------	0-4	2-8	1.25-1.45	2.0-20	0.06-0.12	3.5-7.3	Low----------	0.02	3	1	2-5
	4-12	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	12-19	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	19-27	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	27-33	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	33-60	---	---	0.00-0.6	---	---	-------------	----			
Elm Lake--------	0-4	---	0.15-0.45	0.2-6.0	0.35-0.45	3.6-6.0	Low----------	0.10	3	2	50-80
	4-24	2-8	1.45-1.65	6.0-60	0.06-0.10	3.6-6.0	Low----------	0.15			
	24-36	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.6-5.5	Moderate-----	0.43			
	36-60	---	---	0.00-0.6	---	---	-------------	----			
FfA-------------- Fallcreek	0-9	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
	9-16	9-18	1.55-1.65	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.32			
	16-22	12-22	1.55-1.65	0.6-2.0	0.12-0.20	3.5-6.5	Low----------	0.24			
	22-68	15-25	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	68-80	8-20	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.37			
FgA:											
Fallcreek-------	0-7	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
	7-13	9-18	1.55-1.65	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.32			
	13-21	12-22	1.55-1.65	0.6-2.0	0.12-0.20	3.5-6.5	Low----------	0.24			
	21-47	15-25	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	47-60	8-20	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.37			
Merrillan-------	0-3	6-13	1.35-1.70	0.6-6.0	0.13-0.15	4.5-7.3	Low----------	0.28	3	3	1-3
	3-5	8-14	1.35-1.55	0.6-6.0	0.20-0.22	4.5-6.0	Low----------	0.24			
	5-12	8-14	1.35-1.65	0.6-6.0	0.10-0.12	4.5-6.0	Low----------	0.24			
	12-19	10-18	1.50-1.70	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	19-28	35-60	1.40-1.60	0.06-0.2	0.07-0.18	3.5-5.5	High---------	0.32			
	28-60	---	---	0.00-0.6	---	---	-------------	----			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
FhB--------------	0-10	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
Flambeau	10-16	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	16-25	15-25	1.55-1.65	0.6-2.0	0.12-0.20	3.5-6.5	Moderate-----	0.32			
	25-50	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	50-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
FhC--------------	0-9	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
Flambeau	9-24	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	24-42	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	42-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
FhD--------------	0-7	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
Flambeau	7-12	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	12-21	15-25	1.55-1.65	0.6-2.0	0.12-0.20	3.5-6.5	Moderate-----	0.32			
	21-46	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	46-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
FkB--------------	0-10	4-12	1.35-1.65	0.6-2.0	0.12-0.15	3.5-7.3	Low----------	0.24	5	3	2-3
Flambeau	10-20	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	20-50	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	50-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
FlB:											
Flambeau--------	0-9	6-15	1.35-1.55	0.6-2.0	0.19-0.22	3.5-7.3	Low----------	0.32	5	5	2-3
	9-18	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	18-42	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	42-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
Humbird---------	0-7	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.24	3	3	1-3
	7-9	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	9-14	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	14-25	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	25-60	---	---	0.00-0.6	---	---	-------------	----			
FlC:											
Flambeau--------	0-8	4-12	1.35-1.65	0.6-2.0	0.12-0.15	3.5-7.3	Low----------	0.24	5	3	2-3
	8-18	9-18	1.35-1.55	0.6-2.0	0.10-0.18	3.5-6.5	Low----------	0.24			
	18-48	18-30	1.55-1.70	0.6-2.0	0.12-0.20	4.5-6.5	Moderate-----	0.32			
	48-60	10-22	1.55-1.75	0.2-0.6	0.10-0.18	4.5-6.5	Low----------	0.32			
Humbird---------	0-7	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.24	3	3	1-3
	7-9	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	9-15	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	15-25	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	25-60	---	---	0.00-0.6	---	---	-------------	----			
Fm---------------	0-9	10-23	1.35-1.45	0.6-2.0	0.17-0.24	4.5-8.4	Low----------	0.32	4	8	4-12
Fordum	9-36	8-17	1.40-1.50	0.6-6.0	0.10-0.22	4.5-8.4	Low----------	0.37			
	36-60	2-5	1.55-1.70	6.0-60	0.04-0.10	5.6-8.4	Low----------	0.15			
FnB--------------	0-10	5-17	1.25-1.55	0.6-2.0	0.20-0.24	4.5-6.5	Low----------	0.37	5	5	1-3
Freeon	10-23	5-17	1.30-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43			
	23-30	7-17	1.70-1.80	0.06-0.6	0.08-0.18	4.5-6.5	Low----------	0.28			
	30-52	3-14	1.70-1.80	0.06-0.6	0.08-0.18	4.5-6.5	Low----------	0.28			
	52-60	3-14	1.80-1.95	0.00-0.06	0.0-0.04	5.1-7.3	Low----------	0.28			
FnC--------------	0-9	5-17	1.25-1.55	0.6-2.0	0.20-0.24	4.5-6.5	Low----------	0.37	5	5	1-3
Freeon	9-20	5-17	1.30-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.43			
	20-35	7-17	1.70-1.80	0.06-0.6	0.08-0.18	4.5-6.5	Low----------	0.28			
	35-50	3-14	1.70-1.80	0.06-0.6	0.08-0.18	4.5-6.5	Low----------	0.28			
	50-60	3-14	1.80-1.95	0.00-0.06	0.0-0.04	5.1-7.3	Low----------	0.28			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
HeB--------------	0-9	10-20	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	5	1-3
Hiles	9-19	20-27	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	19-29	20-35	1.55-1.70	0.2-2.0	0.13-0.18	3.5-5.5	Moderate-----	0.32			
	29-60	---	---	0.00-0.6	---	---	-------------	----			
HuB--------------	0-8	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.28	3	3	2-5
Humbird	8-11	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	11-22	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	22-32	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	32-60	---	---	0.00-0.6	---	---	-------------	----			
HuC--------------	0-3	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.28	3	3	2-5
Humbird	3-6	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	6-12	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	12-16	8-17	1.45-1.70	0.06-2.0	0.09-0.14	4.5-6.0	Low----------	0.15			
	16-24	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	24-60	---	---	0.00-0.6	---	---	-------------	----			
HxB:											
Humbird---------	0-2	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.28	3	3	2-5
	2-9	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	9-14	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	14-21	8-17	1.45-1.70	0.06-2.0	0.09-0.14	4.5-6.0	Low----------	0.15			
	21-27	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	27-60	---	---	0.00-0.6	---	---	-------------	----			
Merrillan-------	0-3	6-13	1.35-1.70	0.6-6.0	0.13-0.15	4.5-7.3	Low----------	0.28	3	3	2-6
	3-10	8-14	1.35-1.55	0.6-6.0	0.20-0.22	4.5-6.0	Low----------	0.24			
	10-15	8-14	1.35-1.65	0.6-6.0	0.10-0.12	4.5-6.0	Low----------	0.24			
	15-22	10-18	1.50-1.70	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	22-33	35-60	1.40-1.60	0.06-0.2	0.07-0.18	3.5-5.5	High---------	0.32			
	33-60	---	---	0.00-0.6	---	---	-------------	----			
IxA:											
Ironrun---------	0-3	2-7	1.35-1.60	6.0-20	0.06-0.09	3.5-7.3	Low----------	0.02	5	1	2-5
	3-12	2-5	1.50-1.65	6.0-60	0.05-0.08	3.5-7.3	Low----------	0.15			
	12-19	2-5	1.50-1.65	6.0-60	0.05-0.09	3.5-6.0	Low----------	0.15			
	19-29	2-5	1.50-1.65	6.0-60	0.05-0.09	3.5-6.0	Low----------	0.15			
	29-61	2-5	1.50-1.65	6.0-60	0.04-0.07	5.1-6.5	Low----------	0.15			
Ponycreek-------	0-4	---	0.30-0.50	0.2-6.0	0.35-0.45	3.5-6.5	-------------	0.05	5	2	20-70
	4-6	2-8	1.35-1.65	6.0-60	0.09-0.12	3.5-6.5	Low----------	0.15			
	6-28	2-8	1.50-1.70	6.0-60	0.06-0.11	3.5-6.5	Low----------	0.15			
	28-64	2-5	1.50-1.70	6.0-60	0.05-0.07	4.5-6.5	Low----------	0.15			
IzB:											
Ironrun---------	0-3	2-7	1.35-1.60	6.0-20	0.06-0.09	3.5-7.3	Low----------	0.02	5	1	2-5
	3-8	2-5	1.50-1.65	6.0-60	0.05-0.08	3.5-7.3	Low----------	0.15			
	8-12	2-5	1.50-1.65	6.0-60	0.05-0.09	3.5-6.0	Low----------	0.15			
	12-22	2-5	1.50-1.65	6.0-60	0.05-0.09	3.5-6.0	Low----------	0.15			
	22-61	2-5	1.50-1.65	6.0-60	0.04-0.07	5.1-6.5	Low----------	0.15			
Ponycreek-------	0-4	---	0.30-0.50	0.2-6.0	0.35-0.45	3.5-6.5	-------------	0.05	5	2	20-70
	4-6	2-8	1.35-1.65	6.0-60	0.09-0.12	3.5-6.5	Low----------	0.15			
	6-22	2-8	1.50-1.70	6.0-60	0.06-0.11	3.5-6.5	Low----------	0.15			
	22-64	2-5	1.50-1.70	6.0-60	0.05-0.07	4.5-6.5	Low----------	0.15			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
IzB:											
Arbutus---------	0-2	2-10	1.30-1.60	6.0-20	0.09-0.12	3.5-6.0	Low----------	0.10	2	2	2-7
	2-5	1-10	1.30-1.60	6.0-20	0.07-0.11	3.5-6.0	Low----------	0.17			
	5-17	1-10	1.45-1.65	6.0-20	0.07-0.11	3.5-6.0	Low----------	0.17			
	17-25	1-10	1.40-1.70	6.0-20	0.05-0.11	3.5-6.0	Low----------	0.15			
	25-25	---	---	0.01-20	---	---	-------------	----			
KeA-------------- Kert	0-9	10-20	1.40-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	5	2-4
	9-22	18-30	1.55-1.70	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	22-34	20-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-5.5	Moderate-----	0.37			
	34-60	---	---	0.00-0.6	---	---	-------------	----			
Lk--------------- Loxley	0-6	---	0.30-0.40	6.0-60	0.35-0.65	<4.5	-------------	----	3	7	70-90
	6-60	---	0.10-0.35	0.2-6.0	0.35-0.45	<4.5	-------------	----			
Lm:											
Loxley----------	0-10	---	0.30-0.40	6.0-60	0.35-0.65	<4.5	-------------	----	3	7	70-90
	10-60	---	0.10-0.35	0.2-6.0	0.35-0.45	<4.5	-------------	----			
Beseman---------	0-10	---	0.10-0.20	0.6-6.0	0.55-0.65	3.5-4.4	-------------	----	2	7	25-75
	10-29	---	0.10-0.25	0.6-6.0	0.55-0.65	3.5-4.4	-------------	----			
	29-60	10-27	1.55-1.95	0.2-0.6	0.11-0.18	3.5-7.3	Moderate-----	0.28			
Dawson----------	0-10	---	0.15-0.30	6.0-60	0.55-0.65	3.6-4.4	-------------	----	2	7	65-85
	10-42	---	0.15-0.40	0.2-6.0	0.35-0.45	3.6-4.4	-------------	----			
	42-60	0-10	1.55-1.75	6.0-20	0.03-0.10	4.5-6.5	Low----------	0.10			
LoB-------------- Loyal	0-9	10-16	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	9-14	10-16	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	14-20	12-25	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	20-24	15-22	1.70-1.80	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	24-45	18-25	1.75-1.90	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	45-60	15-22	1.80-1.95	0.2-0.6	0.04-0.12	4.5-6.0	Moderate-----	0.28			
LoC-------------- Loyal	0-9	10-16	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	9-12	10-16	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	12-18	12-25	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	18-24	15-22	1.70-1.80	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	24-42	18-25	1.75-1.90	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	42-60	15-22	1.80-1.95	0.2-0.6	0.04-0.12	4.5-6.0	Moderate-----	0.28			
LsB:											
Loyal-----------	0-9	10-16	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	9-13	10-16	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	13-25	12-25	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	25-33	15-22	1.70-1.80	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	33-50	18-25	1.75-1.90	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	50-60	15-22	1.80-1.95	0.2-0.6	0.04-0.12	4.5-6.0	Moderate-----	0.28			
Hiles-----------	0-8	10-20	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	5	1-3
	8-13	10-20	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	13-17	20-27	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	17-23	20-35	1.55-1.70	0.2-2.0	0.13-0.18	3.5-5.5	Moderate-----	0.32			
	23-60	---	---	0.00-0.6	---	---	-------------	----			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
LsC:											
Loyal-----------	0-7	10-16	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	7-10	10-16	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	10-17	12-25	1.55-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	17-25	15-22	1.70-1.80	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	25-43	18-25	1.75-1.90	0.2-0.6	0.06-0.16	4.5-6.0	Moderate-----	0.32			
	43-60	15-22	1.80-1.95	0.2-0.6	0.04-0.12	4.5-6.0	Moderate-----	0.28			
Hiles-----------	0-9	10-20	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	5	1-3
	9-17	10-20	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	17-22	20-27	1.45-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	22-28	20-35	1.55-1.70	0.2-2.0	0.13-0.18	3.5-5.5	Moderate-----	0.32			
	28-60	---	---	0.00-0.6	---	---	-------------	----			
LuB-------------- Ludington	0-4	2-4	1.35-1.55	2.0-6.0	0.04-0.09	3.5-7.3	Low----------	0.02	3	1	2-5
	4-12	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	12-18	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	18-31	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	31-37	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	37-60	---	---	0.00-0.6	---	---	-------------	----			
LuC-------------- Ludington	0-3	2-4	1.35-1.55	2.0-6.0	0.04-0.09	3.5-7.3	Low----------	0.02	3	1	2-5
	3-8	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	8-14	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	14-27	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	27-33	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	33-60	---	---	0.00-0.6	---	---	-------------	----			
LxB:											
Ludington-------	0-4	2-4	1.35-1.55	2.0-6.0	0.04-0.09	3.5-7.3	Low----------	0.02	3	1	2-5
	4-11	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	11-16	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	16-33	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	33-39	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	39-60	---	---	0.00-0.6	---	---	-------------	----			
Fairchild-------	0-4	2-8	1.25-1.45	2.0-20	0.06-0.12	3.5-7.3	Low----------	0.02	3	1	2-6
	4-10	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	10-18	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	18-29	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	29-34	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	34-60	---	---	0.00-0.6	---	---	-------------	----			
LyD:											
Ludington-------	0-4	2-4	1.35-1.55	2.0-6.0	0.04-0.09	3.5-7.3	Low----------	0.02	3	1	2-5
	4-12	1-6	1.35-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	12-17	2-8	1.45-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	17-28	2-8	1.50-1.65	6.0-60	0.06-0.10	3.5-6.0	Low----------	0.15			
	28-35	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.5-5.5	Moderate-----	0.32			
	35-60	---	---	0.00-0.6	---	---	-------------	----			
Humbird---------	0-3	6-13	1.35-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.28	3	3	2-5
	3-5	2-6	1.35-1.65	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.17			
	5-10	8-17	1.45-1.70	0.6-6.0	0.09-0.14	4.5-6.0	Low----------	0.24			
	10-19	8-17	1.45-1.70	0.06-2.0	0.09-0.14	4.5-6.0	Low----------	0.15			
	19-25	35-60	1.50-1.75	0.06-0.2	0.08-0.13	3.5-5.5	High---------	0.32			
	25-60	---	---	0.00-0.6	---	---	-------------	----			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MaB-------------- Magnor	0-9	7-17	1.35-1.55	0.6-2.0	0.18-0.24	3.5-7.3	Low-----------	0.37	5	5	1-3
	9-15	7-17	1.55-1.65	0.6-2.0	0.17-0.22	3.5-6.0	Low-----------	0.43			
	15-21	7-17	1.55-1.65	0.6-2.0	0.17-0.22	3.5-6.0	Low-----------	0.43			
	21-45	7-17	1.70-1.80	0.06-0.6	0.08-0.18	5.1-6.5	Low-----------	0.20			
	45-60	3-14	1.80-1.95	<0.06	0.0-0.04	5.1-6.5	Low-----------	0.28			
MbB-------------- Mahtomedi	0-4	2-15	1.40-1.60	6.0-60	0.10-0.12	5.1-6.5	Low-----------	0.10	5	2	1-2
	4-15	0-10	1.40-1.50	6.0-60	0.06-0.08	5.1-6.5	Low-----------	0.10			
	15-20	0-10	1.45-1.75	6.0-60	0.05-0.07	5.1-6.5	Low-----------	0.05			
	20-61	0-10	1.45-1.75	6.0-60	0.04-0.09	5.1-7.8	Low-----------	0.05			
MbC-------------- Mahtomedi	0-4	2-15	1.40-1.60	6.0-60	0.10-0.12	5.1-6.5	Low-----------	0.10	5	2	1-2
	4-6	0-10	1.40-1.50	6.0-60	0.06-0.08	5.1-6.5	Low-----------	0.10			
	6-33	0-10	1.45-1.75	6.0-60	0.05-0.07	5.1-6.5	Low-----------	0.05			
	33-61	0-10	1.45-1.75	6.0-60	0.04-0.09	5.1-7.8	Low-----------	0.05			
McA-------------- Maplehurst	0-9	13-17	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.37	4	5	1-3
	9-16	13-20	1.45-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Low-----------	0.43			
	16-25	15-22	1.45-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.43			
	25-44	18-24	1.45-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.43			
	44-47	2-15	1.40-1.75	0.6-6.0	0.08-0.19	4.5-6.5	Low-----------	0.24			
	47-60	0-3	1.65-1.85	6.0-60	0.01-0.07	4.5-6.5	Low-----------	0.10			
Me:											
Markey-----------	0-27	---	0.15-0.45	0.2-6.0	0.35-0.45	5.1-7.8	--------------	----	2	2	55-85
	27-60	0-10	1.40-1.65	6.0-60	0.03-0.08	5.6-8.4	Low-----------	0.10			
Newson-----------	0-4	---	0.10-0.35	2.0-6.0	0.35-0.45	3.5-7.3	--------------	0.05	5	2	30-80
	4-25	1-4	1.70-1.80	6.0-60	0.05-0.11	3.5-5.5	Low-----------	0.17			
	25-64	1-4	1.70-1.80	6.0-60	0.04-0.11	4.5-6.5	Low-----------	0.15			
Mf--------------- Marshfield	0-9	15-27	1.25-1.45	0.6-2.0	0.17-0.24	3.5-7.3	Low-----------	0.32	5	6	4-10
	9-14	8-23	1.40-1.60	0.6-2.0	0.17-0.24	3.5-6.0	Low-----------	0.43			
	14-30	18-35	1.40-1.60	0.6-2.0	0.14-0.22	3.5-6.0	Moderate-----	0.43			
	30-36	18-35	1.70-1.80	0.2-0.6	0.06-0.10	4.5-7.3	Moderate-----	0.32			
	36-60	8-30	1.80-1.95	0.2-0.6	0.05-0.10	4.5-7.3	Moderate-----	0.37			
MgB-------------- Menahga	0-4	2-10	1.20-1.50	6.0-60	0.10-0.12	4.5-6.5	Low-----------	0.10	5	2	1-3
	4-24	0-5	1.50-1.65	6.0-60	0.05-0.07	4.5-6.5	Low-----------	0.15			
	24-61	0-5	1.50-1.65	6.0-60	0.05-0.07	5.6-7.8	Low-----------	0.15			
MmA-------------- Merimod	0-9	12-20	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.32	4	5	2-3
	9-17	18-27	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.43			
	17-32	18-27	1.50-1.65	0.6-2.0	0.10-0.20	4.5-6.5	Moderate-----	0.32			
	32-60	1-6	1.65-1.85	6.0-20	0.03-0.07	4.5-6.5	Low-----------	0.15			
MnB-------------- Merit	0-8	12-20	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.32	4	5	2-3
	8-20	18-27	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.43			
	20-30	18-27	1.50-1.65	0.6-2.0	0.10-0.20	4.5-6.5	Moderate-----	0.32			
	30-60	1-6	1.65-1.85	6.0-20	0.03-0.07	4.5-6.5	Low-----------	0.15			
MoB:											
Merit------------	0-9	12-20	1.35-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.32	4	5	2-3
	9-12	18-27	1.40-1.65	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.43			
	12-30	18-27	1.50-1.65	0.6-2.0	0.10-0.20	4.5-6.5	Moderate-----	0.32			
	30-60	1-6	1.65-1.85	6.0-20	0.03-0.07	4.5-6.5	Low-----------	0.15			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MoB:											
Gardenvale------	0-8	14-20	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	4	5	2-4
	8-26	18-27	1.35-1.55	0.6-2.0	0.20-0.22	4.5-6.0	Moderate-----	0.43			
	26-30	14-27	1.55-1.65	0.6-2.0	0.16-0.22	4.5-6.0	Moderate-----	0.24			
	30-50	1-10	1.50-1.70	6.0-20	0.05-0.08	4.5-6.0	Low----------	0.15			
	50-60	---	---	0.2-2.0	---	---	-------------	----			
MpA------------- Merrillan	0-9	6-13	1.35-1.70	0.6-6.0	0.13-0.15	4.5-7.3	Low----------	0.28	3	3	1-3
	9-11	8-14	1.35-1.55	0.6-6.0	0.20-0.22	4.5-6.0	Low----------	0.24			
	11-22	8-14	1.35-1.65	0.6-6.0	0.10-0.12	4.5-6.0	Low----------	0.24			
	22-36	35-60	1.40-1.60	0.06-0.2	0.07-0.18	3.5-5.5	High---------	0.32			
	36-60	---	---	0.00-0.6	---	---	-------------	----			
MrA:											
Merrillan-------	0-3	6-13	1.35-1.70	0.6-6.0	0.13-0.15	4.5-7.3	Low----------	0.28	3	3	2-6
	3-6	8-14	1.35-1.55	0.6-6.0	0.20-0.22	4.5-6.0	Low----------	0.24			
	6-13	8-14	1.35-1.65	0.6-6.0	0.10-0.12	4.5-6.0	Low----------	0.24			
	13-21	10-18	1.50-1.70	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.24			
	21-30	35-60	1.40-1.60	0.06-0.2	0.07-0.18	3.5-5.5	High---------	0.32			
	30-60	---	---	0.00-0.6	---	---	-------------	----			
Veedum----------	0-5	---	0.15-0.55	2.0-6.0	0.35-0.45	3.5-6.0	Low----------	0.37	3	2	20-50
	5-7	8-20	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Low----------	0.43			
	7-20	18-30	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Low----------	0.43			
	20-26	18-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-6.0	Moderate-----	0.37			
	26-60	---	---	0.00-0.6	---	---	-------------	----			
MxA:											
Moppet----------	0-5	10-15	1.40-1.70	0.6-2.0	0.13-0.22	3.6-6.0	Low----------	0.28	4	3	2-3
	5-35	8-17	1.45-1.70	0.6-2.0	0.15-0.22	3.6-6.0	Low----------	0.24			
	35-60	2-10	1.60-1.75	6.0-20	0.03-0.09	3.6-6.5	Low----------	0.10			
Fordum----------	0-9	10-23	1.35-1.45	0.6-2.0	0.17-0.24	4.5-8.4	Low----------	0.32	4	8	4-12
	9-28	8-17	1.40-1.50	0.6-6.0	0.10-0.22	4.5-8.4	Low----------	0.37			
	28-60	2-5	1.55-1.70	6.0-60	0.04-0.10	5.6-8.4	Low----------	0.15			
NeB------------- Newood	0-9	6-15	1.35-1.70	0.6-2.0	0.12-0.18	4.5-7.3	Low----------	0.24	4	3	1-3
	9-16	6-15	1.35-1.70	0.6-2.0	0.09-0.19	4.5-6.0	Low----------	0.17			
	16-39	6-15	1.40-1.70	0.6-2.0	0.06-0.17	4.5-6.5	Low----------	0.20			
	39-62	10-17	1.80-2.05	0.06-0.2	0.08-0.10	4.5-6.5	Low----------	0.20			
	62-65	7-17	1.80-2.05	<0.06	0.0-0.04	5.1-6.5	Low----------	0.28			
NeC------------- Newood	0-8	6-15	1.35-1.70	0.6-2.0	0.12-0.18	4.5-7.3	Low----------	0.24	4	3	1-3
	8-15	6-15	1.35-1.70	0.6-2.0	0.09-0.19	4.5-6.0	Low----------	0.17			
	15-38	6-15	1.40-1.70	0.6-2.0	0.06-0.17	4.5-6.5	Low----------	0.20			
	38-61	10-17	1.80-2.05	0.06-0.2	0.08-0.10	4.5-6.5	Low----------	0.20			
	61-65	7-17	1.80-2.05	<0.06	0.0-0.04	5.1-6.5	Low----------	0.28			
NmC:											
Newood----------	0-4	6-15	1.35-1.70	0.6-2.0	0.12-0.18	4.5-7.3	Low----------	0.24	4	3	2-5
	4-15	6-15	1.35-1.70	0.6-2.0	0.09-0.19	4.5-6.0	Low----------	0.17			
	15-38	6-15	1.40-1.70	0.6-2.0	0.06-0.17	4.5-6.5	Low----------	0.20			
	38-63	10-17	1.80-2.05	0.06-0.2	0.08-0.10	4.5-6.5	Low----------	0.20			
	63-65	7-17	1.80-2.05	<0.06	0.0-0.04	5.1-6.5	Low----------	0.28			
Magnor----------	0-4	7-17	1.35-1.55	0.6-2.0	0.18-0.24	3.5-7.3	Low----------	0.37	5	5	2-6
	4-9	7-17	1.55-1.65	0.6-2.0	0.17-0.22	3.5-6.0	Low----------	0.43			
	9-26	7-17	1.55-1.65	0.6-2.0	0.17-0.22	3.5-6.0	Low----------	0.43			
	26-60	7-17	1.70-1.80	0.06-0.6	0.08-0.18	5.1-6.5	Low----------	0.20			
	60-65	3-14	1.80-1.95	<0.06	0.0-0.04	5.1-6.5	Low----------	0.28			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
NmC:											
Cathro----------	0-4	---	0.10-0.20	0.2-6.0	0.45-0.55	4.5-7.8	-------------	----	2	5	60-85
	4-30	---	0.15-0.30	0.2-6.0	0.35-0.45	4.5-7.8	-------------	0.24			
	30-60	10-30	1.50-1.70	0.2-2.0	0.11-0.22	5.6-8.4	Moderate-----	0.32			
NoC-------------- Northmound	0-4	5-15	1.30-1.55	0.6-2.0	0.17-0.23	3.5-6.5	Low----------	0.32	3	5	2-5
	4-8	5-15	1.40-1.70	0.6-2.0	0.09-0.21	3.5-6.5	Low----------	0.28			
	8-24	6-17	1.40-1.70	0.6-2.0	0.06-0.17	3.5-6.5	Low----------	0.32			
	24-30	6-17	1.40-1.70	0.6-2.0	0.06-0.14	3.5-6.5	Low----------	0.24			
	30-30	---	---	0.2-2.0	---	---	-------------	----			
NrF:											
Northmound------	0-5	5-15	1.30-1.55	0.6-2.0	0.17-0.23	3.5-6.5	Low----------	0.32	3	5	2-5
	5-11	5-15	1.40-1.70	0.6-2.0	0.09-0.21	3.5-6.5	Low----------	0.28			
	11-24	6-17	1.40-1.70	0.6-2.0	0.06-0.17	3.5-6.5	Low----------	0.32			
	24-30	6-17	1.40-1.70	0.6-2.0	0.06-0.14	3.5-6.5	Low----------	0.24			
	30-30	---	---	0.2-2.0	---	---	-------------	----			
Rock outcrop----	0-60	---	---	0.00-20	---	---	-------------	----	---	8	---
OeA-------------- Oesterle	0-6	10-15	1.35-1.55	0.6-2.0	0.16-0.24	4.5-6.5	Low----------	0.32	4	5	2-5
	6-12	8-15	1.40-1.70	0.6-6.0	0.09-0.20	4.5-6.5	Low----------	0.24			
	12-27	7-17	1.40-1.70	0.6-6.0	0.05-0.18	4.5-6.5	Low----------	0.24			
	27-61	1-6	1.50-1.75	6.0-60	0.01-0.07	5.1-6.5	Low----------	0.10			
PeA:											
Pelkie----------	0-4	5-12	1.30-1.55	6.0-20	0.08-0.12	4.5-6.5	Low----------	0.10	5	2	1-2
	4-60	0-10	1.25-1.65	6.0-20	0.05-0.09	4.5-6.5	Low----------	0.15			
Winterfield-----	0-7	0-15	0.90-1.50	2.0-20	0.10-0.12	5.6-7.8	Low----------	0.15	5	2	2-4
	7-31	0-15	1.45-1.60	6.0-20	0.06-0.11	5.6-7.8	Low----------	0.17			
	31-60	0-10	1.55-1.65	6.0-20	0.04-0.10	5.6-8.4	Low----------	0.10			
Pg--------------- Pits	0-60	0-2	---	6.0-60	0.02-0.07	---	-------------	0.02	5	---	---
PoA-------------- Plover	0-10	5-12	1.35-1.65	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	3	2-4
	10-28	5-18	1.40-1.70	0.6-2.0	0.15-0.19	4.5-6.0	Low----------	0.24			
	28-33	10-18	1.50-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.24			
	33-60	5-12	1.50-1.70	0.6-2.0	0.11-0.22	4.5-6.0	Low----------	0.24			
Pv:											
Ponycreek-------	0-4	---	0.30-0.50	0.2-6.0	0.35-0.45	3.5-6.5	-------------	0.05	5	2	20-70
	4-6	2-8	1.35-1.65	6.0-60	0.09-0.12	3.5-6.5	Low----------	0.15			
	6-26	2-8	1.50-1.70	6.0-60	0.06-0.11	3.5-6.5	Low----------	0.15			
	26-64	2-5	1.50-1.70	6.0-60	0.05-0.07	4.5-6.5	Low----------	0.15			
Dawsil----------	0-4	---	0.20-0.35	0.6-6.0	0.45-0.55	3.5-4.4	-------------	----	2	5	65-85
	4-30	---	0.15-0.40	0.2-6.0	0.35-0.45	3.5-4.4	-------------	0.10			
	30-60	0-10	1.55-1.70	6.0-60	0.03-0.10	3.5-6.5	Low----------	0.15			
PxA-------------- Poskin	0-4	13-17	1.35-1.55	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.37	4	5	2-5
	4-6	10-15	1.55-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Low----------	0.43			
	6-25	15-22	1.55-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.43			
	25-28	18-27	1.55-1.65	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.43			
	28-31	2-15	1.40-1.65	0.6-6.0	0.05-0.22	4.5-6.5	Low----------	0.24			
	31-61	0-3	1.75-1.85	6.0-60	0.02-0.07	4.5-6.5	Low----------	0.10			
Py--------------- Psammaquents	0-6	0-6	1.35-1.60	6.0-20	0.07-0.09	5.1-6.5	Low----------	0.02	5	8	1-10
	6-60	0-6	1.45-1.70	6.0-20	0.05-0.08	5.1-6.5	Low----------	0.15			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Rb--------------- Rib	0-7	10-20	1.25-1.35	0.6-2.0	0.22-0.28	5.1-7.3	Low----------	0.32	4	5	3-10
	7-27	18-30	1.45-1.55	0.6-2.0	0.18-0.22	5.1-7.3	Moderate-----	0.43			
	27-31	5-25	1.45-1.75	0.6-2.0	0.10-0.19	5.1-7.3	Low----------	0.32			
	31-60	1-6	1.75-1.85	6.0-60	0.02-0.06	5.6-7.8	Low----------	0.10			
RkA-------------- Rockdam	0-4	2-5	1.35-1.60	6.0-20	0.06-0.09	3.5-7.3	Low----------	0.02	5	1	2-5
	4-9	1-5	1.50-1.65	6.0-60	0.05-0.08	3.5-7.3	Low----------	0.15			
	9-13	1-5	1.50-1.65	6.0-60	0.04-0.07	3.5-6.0	Low----------	0.15			
	13-35	1-5	1.50-1.65	6.0-60	0.04-0.07	3.5-6.5	Low----------	0.15			
	35-61	1-5	1.50-1.65	6.0-60	0.04-0.07	4.5-6.5	Low----------	0.15			
RoA-------------- Rosholt	0-8	4-10	1.50-1.60	0.6-6.0	0.10-0.18	4.5-7.3	Low----------	0.24	4	3	1-3
	8-16	3-12	1.70-1.80	0.6-6.0	0.10-0.22	4.5-6.5	Low----------	0.24			
	16-31	6-15	1.65-1.75	0.6-6.0	0.09-0.19	4.5-6.5	Low----------	0.24			
	31-60	0-5	1.50-1.80	6.0-60	0.02-0.04	5.1-6.5	Low----------	0.10			
RoB-------------- Rosholt	0-9	4-10	1.50-1.60	0.6-6.0	0.10-0.18	4.5-7.3	Low----------	0.24	4	3	1-3
	9-30	6-15	1.65-1.75	0.6-6.0	0.09-0.19	4.5-6.5	Low----------	0.24			
	30-34	4-12	1.55-1.65	0.6-6.0	0.04-0.16	4.5-6.5	Low----------	0.10			
	34-60	0-5	1.50-1.80	6.0-60	0.02-0.04	5.1-6.5	Low----------	0.10			
RoC-------------- Rosholt	0-8	4-10	1.50-1.60	0.6-6.0	0.10-0.18	4.5-7.3	Low----------	0.24	4	3	1-3
	8-28	6-15	1.65-1.75	0.6-6.0	0.09-0.19	4.5-6.5	Low----------	0.24			
	28-60	0-5	1.50-1.80	6.0-60	0.02-0.04	5.1-6.5	Low----------	0.10			
RzB-------------- Rozellville	0-9	8-20	1.35-1.55	0.6-2.0	0.18-0.24	4.5-7.3	Low----------	0.37	4	5	2-3
	9-13	8-20	1.40-1.65	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.43			
	13-17	10-24	1.40-1.70	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.43			
	17-38	18-30	1.40-1.70	0.6-2.0	0.10-0.18	4.5-6.0	Moderate-----	0.32			
	38-60	10-27	1.40-1.75	0.6-2.0	0.02-0.16	4.5-6.0	Low----------	0.28			
RzC-------------- Rozellville	0-4	8-20	1.35-1.55	0.6-2.0	0.18-0.24	4.5-7.3	Low----------	0.37	4	5	2-5
	4-14	10-24	1.40-1.70	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.43			
	14-34	18-30	1.40-1.70	0.6-2.0	0.10-0.18	4.5-6.0	Moderate-----	0.32			
	34-60	10-27	1.40-1.75	0.6-2.0	0.02-0.16	4.5-6.0	Low----------	0.28			
ScA-------------- Simescreek	0-2	3-5	1.35-1.65	6.0-60	0.08-0.10	4.5-6.0	Low----------	0.02	5	1	1-3
	2-32	3-10	1.50-1.65	6.0-60	0.05-0.07	4.5-6.0	Low----------	0.15			
	32-60	1-5	1.50-1.65	6.0-60	0.03-0.05	5.1-6.5	Low----------	0.15			
SrB-------------- Spencer	0-10	9-17	1.20-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	2-4
	10-35	18-25	1.50-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	35-43	18-25	1.50-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	43-60	10-20	1.70-1.85	0.2-2.0	0.05-0.15	5.1-6.5	Low----------	0.28			
SrC-------------- Spencer	0-9	9-17	1.20-1.55	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	5	5	2-4
	9-11	9-17	1.30-1.60	0.6-2.0	0.20-0.24	4.5-6.0	Low----------	0.43			
	11-33	18-25	1.50-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	33-42	18-25	1.50-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	42-60	10-20	1.70-1.85	0.2-2.0	0.05-0.15	5.1-6.5	Low----------	0.28			
TrB-------------- Tarr	0-8	3-5	1.35-1.65	6.0-20	0.08-0.10	3.5-7.3	Low----------	0.02	5	1	1-3
	8-36	3-8	1.50-1.65	6.0-20	0.05-0.07	3.5-6.0	Low----------	0.15			
	36-60	3-8	1.50-1.65	6.0-20	0.05-0.07	4.5-6.5	Low----------	0.15			
Ve--------------- Veedum	0-9	10-20	1.40-1.55	0.6-2.0	0.22-0.24	3.5-6.0	Low----------	0.37	3	5	4-10
	9-15	18-30	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Moderate-----	0.43			
	15-35	18-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-6.0	Moderate-----	0.37			
	35-60	---	---	0.00-0.6	---	---	-------------	----			

Table 17.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Vs:											
Veedum----------	0-4	---	0.15-0.55	2.0-6.0	0.35-0.45	3.5-6.0	Low----------	0.37	3	2	20-50
	4-6	8-20	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Low----------	0.43			
	6-20	18-30	1.40-1.70	0.6-2.0	0.18-0.22	3.5-6.0	Moderate-----	0.43			
	20-29	18-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-6.0	Moderate-----	0.37			
	29-60	---	---	0.00-0.6	---	---	-------------	----			
Elm Lake--------	0-4	---	0.15-0.45	0.2-6.0	0.35-0.45	3.6-6.0	Low----------	0.10	3	2	50-80
	4-30	2-8	1.45-1.65	6.0-60	0.06-0.10	3.6-6.0	Low----------	0.15			
	30-38	10-35	1.45-1.70	0.2-2.0	0.10-0.19	3.6-5.5	Moderate-----	0.43			
	38-60	---	---	0.00-0.6	---	---	-------------	----			
WeA-------------- Withee	0-9	12-18	1.20-1.45	0.6-2.0	0.19-0.24	4.5-7.3	Low----------	0.37	5	5	3-4
	9-14	12-18	1.35-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	14-24	12-22	1.55-1.65	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43			
	24-47	18-25	1.70-1.80	0.6-2.0	0.05-0.10	4.5-5.5	Moderate-----	0.32			
	47-60	12-22	1.80-1.95	0.2-0.6	0.0-0.04	4.5-5.5	Low----------	0.32			
WkA:											
Withee----------	0-10	12-18	1.20-1.45	0.6-2.0	0.19-0.24	4.5-7.3	Low----------	0.37	5	5	3-4
	10-17	12-18	1.35-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43			
	17-35	12-22	1.55-1.65	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43			
	35-44	18-25	1.70-1.80	0.6-2.0	0.05-0.10	4.5-5.5	Moderate-----	0.32			
	44-60	12-22	1.80-1.95	0.2-0.6	0.0-0.04	4.5-5.5	Low----------	0.32			
Kert------------	0-8	10-20	1.40-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	5	2-4
	8-13	6-18	1.40-1.70	0.6-2.0	0.18-0.24	4.5-6.0	Low----------	0.43			
	13-21	18-30	1.55-1.70	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	21-31	20-35	1.55-1.70	0.2-2.0	0.15-0.20	3.5-5.5	Moderate-----	0.37			
	31-60	---	---	0.00-0.6	---	---	-------------	----			

Table 18.--Soil and Water Features

("Flooding" and "water table" and terms such as "occasional," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Total subsi-dence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness			Uncoated steel	Concrete
					Ft			In		In			
AbB------------- Aftad	B	None--------	---	---	2.5-3.5	Perched	Sep-Jun	>60	---	---	Moderate	Low------	Moderate.
AgA------------- Almena	C	None--------	---	---	1.0-3.0	Perched	Oct-Jun	>60	---	---	High-----	Low------	Moderate.
AnA:													
Au Gres--------	B	None--------	---	---	0.5-1.5	Apparent	Nov-May	>60	---	---	Moderate	Low------	Moderate.
Newson---------	A/D	None--------	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	Moderate	High-----	High.
Au-------------- Auburndale	B/D	None--------	---	---	+1-1.0	Perched	Sep-Jun	>60	---	---	High-----	High-----	Moderate.
Ba-------------- Barronett	B/D	None--------	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	---	High-----	Moderate	High.
BlB------------- Bilson	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	Moderate.
BoC, BoF-------- Boone	A	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	Moderate.
BpF:													
Boone----------	A	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	Moderate.
Elevasil-------	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
BrA------------- Brander	B	None--------	---	---	2.5-3.5	Apparent	Oct-May	>60	---	---	High-----	Moderate	Moderate.
Ca:													
Capitola-------	B/D	None--------	---	---	+1-1.0	Perched	Sep-Jun	>60	---	---	High-----	High-----	High.
Ca:													
Marshfield-----	B/D	None--------	---	---	+1-1.0	Perched	Sep-Jun	>60	---	---	High-----	Moderate	High.
Veedum---------	D	None--------	---	---	+1-1.0	Perched	Sep-Jun	20-40	Soft	---	High-----	High-----	High.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
Cd: Citypoint	A/D	None	---	---	+1-1.0	Perched	Oct-Jun	20-51	Soft	---	High	High	High.
CmA: Comstock	C	None	---	---	1.0-3.0	Perched	Sep-Jun	>60	---	---	High	Moderate	High.
CoC2: Council	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Low	Moderate.
CsD2:													
Council	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Low	Moderate.
Seaton	B	None	---	---	>6.0	---	---	>60	---	---	High	Low	Moderate.
CuB: Crystal Lake	B	None	---	---	2.5-3.5	Perched	Sep-Jun	>60	---	---	High	Low	High.
Da: Dawsil	A/D	None	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	30-36	High	High	High.
EaB: Eauclaire	A	None	---	---	1.5-3.5	Perched	Oct-May	>60	---	---	Low	Low	High.
ElB, ElC2, ElD2: Elevasil	B	None	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low	Moderate.
FeA:													
Fairchild	C	None	---	---	1.0-2.0	Perched	Oct-Jun	20-40	Soft	---	Moderate	High	High.
Elm Lake	A/D	None	---	---	+1-1.0	Perched	Oct-Jun	20-40	Soft	---	Moderate	High	High.
FfA: Fallcreek	C	None	---	---	1.0-3.0	Perched	Oct-Jun	>60	---	---	High	Low	High.
FgA:													
Fallcreek	C	None	---	---	1.0-3.0	Perched	Oct-Jun	>60	---	---	High	Low	High.
Merrillan	C	None	---	---	1.0-2.0	Perched	Sep-Jun	20-40	Soft	---	High	High	High.
FhB, FhC, FhD, FkB: Flambeau	B	None	---	---	1.5-3.5	Perched	Nov-May	>60	---	---	Moderate	Low	High.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Total subsidence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
FlB, FlC:													
Flambeau	B	None	---	---	1.5-3.5	Perched	Nov-May	>60	---	---	Moderate	Low	High.
Humbird	B	None	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	High	High.
Fm Fordum	D	Frequent	Brief or long.	Mar-Jun	+1-1.0	Apparent	Jan-Dec	>60	---	---	High	High	High.
FnB, FnC Freeon	C	None	---	---	2.0-3.5	Perched	Nov-May	>60	---	---	Moderate	Low	Moderate.
HeB Hiles	B	None	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	Moderate	High.
HuB, HuC Humbird	B	None	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	High	High.
HxB:													
Humbird	B	None	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	High	High.
Merrillan	C	None	---	---	1.0-2.0	Perched	Sep-Jun	20-40	Soft	---	High	High	High.
IxA:													
Ironrun	B	None	---	---	1.0-2.0	Apparent	Nov-Jun	>60	---	---	Moderate	Low	High.
Ponycreek	A/D	None	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	Moderate	High	High.
IzB:													
Ironrun	B	None	---	---	1.0-2.0	Apparent	Nov-Jun	>60	---	---	Moderate	Low	High.
Ponycreek	A/D	None	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	Moderate	High	High.
Arbutus	A	None	---	---	>6.0	---	---	20-40	Hard	---	Low	Low	High.
KeA Kert	C	None	---	---	1.0-3.0	Perched	Oct-May	20-40	Soft	---	High	High	High.
Lk Loxley	A/D	None	---	---	+1-1.0	Apparent	Oct-May	>60	---	50-55	High	High	High.
Lm:													
Loxley	A/D	None	---	---	+1-1.0	Apparent	Oct-May	>60	---	50-55	High	High	High.
Beseman	A/D	None	---	---	+2-0	Apparent	Jan-Dec	>60	---	12-36	High	High	High.
Dawson	A/D	None	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	30-36	High	High	High.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Total subsidence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
LoB, LoC-------- Loyal	C	None--------	---	---	1.5-3.5	Perched	Nov-May	>60	---	---	Moderate	Moderate	High.
LsB, LsC:													
Loyal----------	C	None--------	---	---	1.5-3.5	Perched	Nov-May	>60	---	---	Moderate	Moderate	High.
Hiles----------	B	None--------	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	Moderate	High.
LuB, LuC-------- Ludington	B	None--------	---	---	1.5-3.5	Perched	Oct-May	20-40	Soft	---	Low------	Moderate	High.
LxB:													
Ludington------	B	None--------	---	---	1.5-3.5	Perched	Oct-May	20-40	Soft	---	Low------	Moderate	High.
Fairchild------	C	None--------	---	---	1.0-2.0	Perched	Oct-Jun	20-40	Soft	---	Moderate	High-----	High.
LyD:													
Ludington------	B	None--------	---	---	1.5-3.5	Perched	Oct-May	20-40	Soft	---	Low------	Moderate	High.
Humbird--------	B	None--------	---	---	1.5-3.0	Perched	Oct-May	20-40	Soft	---	Moderate	High-----	High.
MaB------------- Magnor	C	None--------	---	---	1.0-3.0	Perched	Sep-Jun	>60	---	---	High-----	Low------	Moderate.
MbB, MbC-------- Mahtomedi	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	High.
McA------------- Maplehurst	C	None--------	---	---	1.0-3.0	Apparent	Oct-Jun	>60	---	---	High-----	Low------	Moderate.
Me:													
Markey---------	A/D	None--------	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	25-30	High-----	High-----	Low.
Newson---------	A/D	None--------	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	Moderate	High-----	High.
Mf-------------- Marshfield	B/D	None--------	---	---	+1-1.0	Perched	Sep-Jun	>60	---	---	High-----	Moderate	High.
MgB------------- Menahga	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	Moderate.
MmA------------- Merimod	B	None--------	---	---	3.5-6.0	Apparent	Oct-May	>60	---	---	Moderate	Low------	Moderate.
MnB------------- Merit	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	Moderate.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydro- logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard- ness	Total subsi- dence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
MoB:													
Merit	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Low	Moderate.
Gardenvale	B	None	---	---	>6.0	---	---	40-60	Soft	---	Moderate	Low	Moderate.
MpA Merrillan	C	None	---	---	1.0-2.0	Perched	Sep-Jun	20-40	Soft	---	High	High	High.
MrA:													
Merrillan	C	None	---	---	1.0-2.0	Perched	Sep-Jun	20-40	Soft	---	High	High	High.
Veedum	D	None	---	---	+1-1.0	Perched	Sep-Jun	20-40	Soft	---	High	High	High.
MxA:													
Moppet	B	Occasional	Very brief	Sep-Jun	2.5-3.5	Apparent	Sep-Jun	>60	---	---	Moderate	Moderate	Moderate.
Fordum	D	Frequent	Brief or long.	Mar-Jun	+1-1.0	Apparent	Jan-Dec	>60	---	---	High	High	High.
NeB, NeC Newood	C	None	---	---	2.5-3.5	Perched	Oct-May	>60	---	---	Moderate	Moderate	High.
NmC:													
Newood	C	None	---	---	2.5-3.5	Perched	Oct-May	>60	---	---	Moderate	Moderate	High.
Magnor	C	None	---	---	1.0-3.0	Perched	Sep-Jun	>60	---	---	High	Low	Moderate.
Cathro	A/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	19-22	High	High	Low.
NoC Northmound	B	None	---	---	>6.0	---	---	20-40	Hard	---	Moderate	Low	Moderate.
NrF:													
Northmound	B	None	---	---	>6.0	---	---	20-40	Hard	---	Moderate	Low	Moderate.
Rock outcrop	---	None	---	---	>6.0	---	---	0-4	Hard	---	---	---	---
OeA Oesterle	C	None	---	---	1.0-3.0	Apparent	Oct-Jun	>60	---	---	High	Low	Moderate.
PeA:													
Pelkie	A	Occasional	Very brief	Mar-May	2.5-3.5	Apparent	Nov-Jun	>60	---	---	Low	Low	Moderate.
Winterfield	A/D	Occasional	Brief	Nov-May	0.5-3.0	Apparent	Nov-May	>60	---	---	Moderate	Low	Low.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Total subsi-dence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
Pg-------------- Pits	A	None--------	---	---	>6.0	---	---	>60	---	---	---	---	---
PoA------------- Plover	C	None--------	---	---	1.0-3.0	Apparent	Oct-Jun	>60	---	---	High-----	Moderate	High.
Pv:													
Ponycreek------	A/D	None--------	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	Moderate	High-----	High.
Dawsil---------	A/D	None--------	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	30-36	High-----	High-----	High.
PxA------------- Poskin	C	None--------	---	---	1.0-3.0	Apparent	Oct-Jun	>60	---	---	High-----	Low------	Moderate.
Py-------------- Psammaquents	D	None--------	---	---	+2-1.0	Apparent	Jan-Dec	>60	---	---	Moderate	Moderate	Moderate.
Rb-------------- Rib	B/D	None--------	---	---	+1-1.0	Apparent	Oct-Jun	>60	---	---	High-----	High-----	High.
RkA------------- Rockdam	A	None--------	---	---	3.5-6.0	Apparent	Nov-May	>60	---	---	Low------	Low------	High.
RoA, RoB, RoC--- Rosholt	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	Moderate.
RzB, RzC-------- Rozellville	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
ScA------------- Simescreek	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	High.
SrB, SrC-------- Spencer	B	None--------	---	---	2.5-3.5	Perched	Oct-Jun	>60	---	---	High-----	Low------	High.
TrB------------- Tarr	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	High.
Ve-------------- Veedum	D	None--------	---	---	+1-1.0	Perched	Sep-Jun	20-40	Soft	---	High-----	High-----	High.
Vs:													
Veedum---------	D	None--------	---	---	+1-1.0	Perched	Sep-Jun	20-40	Soft	---	High-----	High-----	High.
Elm Lake-------	A/D	None--------	---	---	+1-1.0	Perched	Oct-Jun	20-40	Soft	---	Moderate	High-----	High.

Table 18.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Total subsi-dence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
WeA------------- Withee	C	None--------	---	---	1.0-3.0	Perched	Oct-Jun	>60	---	---	High-----	Low------	High.
WkA:													
Withee---------	C	None--------	---	---	1.0-3.0	Perched	Oct-Jun	>60	---	---	High-----	Low------	High.
Kert-----------	C	None--------	---	---	1.0-3.0	Perched	Oct-May	20-40	Soft	---	High-----	High-----	High.

Table 19.--Engineering Index Test Data

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name and location	Parent material	Report number	Horizon	Depth	Percentage passing sieve*-- No. 4	No. 10	No. 40	No. 200	Percentage smaller than*-- 0.05 mm	0.02 mm	0.005 mm	0.002 mm	LL	PI	Classification AASHTO	UN
				In									Pct			
Boone sand:	Siliceous sandy	S90WI-019-														
SE1/4NE1/4 sec.	residuum	036-3	Bw	6-22	99	99	84	8	7	6	4	3	---	NP	A-3(0)	SP-SM
6, T. 23 N.,	derived from	036-4	BC	22-30	---	100	81	6	6	5	4	2	---	NP	A-3(0)	SP-SM
R. 3 W.	the underlying															
	sandstone.															
Eauclaire loamy	Sandy alluvium	S92WI-019-														
sand:	underlain by	4-4	Bw1	15-24	93	90	69	13	10	6	4	3	---	NP	A-2-4(0)	SM
SE1/4NW1/4 sec.	loamy glacial	4-7	2Bt2	41-63	92	89	71	32	30	23	16	12	19.6	4.8	A-2-4(0)	SM-SC
9, T. 26 N.,	till.															
R. 4 W.																
Fallcreek loam:	Loamy glacial	S88WI-019-														
SW1/4SE1/4 sec.	till.	3-3	E/B	12-18	98	97	86	43	36	23	11	8	---	NP	A-4(2)	SM
6, T. 26 N.,		3-4	B/E	18-30	98	96	85	36	30	23	18	16	23.6	NP	A-4(0)	SM
R. 2 W.		3-8	C	57-60	88	84	66	26	23	15	9	8	---	NP	A-2-4(0)	SM
Flambeau loam:	Loamy glacial	S87WI-019-														
SW1/4NW1/4 sec.	till.	3-1	E/B	12-20	98	96	88	63	58	38	14	8	---	NP	A-4(6)	ML
19, T. 25 N.,		3-2	Bt	26-33	95	92	78	45	41	33	22	18	30.0	16.4	A-6(2)	SC
R. 2 W.		3-3	C	36-60	95	91	76	39	35	27	18	14	21.0	8.3	A-4(1)	SC
Flambeau loam:	Loamy glacial	S88WI-019-														
NW1/4NE1/4 sec.	till.	4-3	B/E	16-25	96	93	80	45	42	36	27	24	33.1	16.5	A-6(4)	SC
7, T. 26 N.,		4-4	Bt1	25-34	93	88	72	34	32	26	19	17	28.6	13.8	A-2-6(1)	SC
R. 2 W.		4-7	C	50-60	97	95	81	30	27	20	15	12	23.0	7.7	A-2-4(0)	SC
Freeon silt loam:	Loess or silty	S89WI-019-														
NW1/4NW1/4 sec.	alluvium	042-5	2Bt1	30-44	78	71	60	31	26	16	8	6	15.3	1.4	A-2-4(0)	SM
9, T. 29 N.,	underlain by	042-7	2Cd	52-60	85	80	68	36	30	20	11	8	16.1	3.1	A-4(0)	SM
R. 3 W.	dense loamy															
	glacial till.															
Ironrun sand:	Siliceous sandy	S90WI-019-														
SW1/4NW1/4 sec.	alluvium.	038-4	Bs	22-36	100	99	55	3	3	3	2	2	---	NP	A-3(0)	SP
34, T. 23 N.,		038-5	C	36-60	100	99	73	4	3	3	2	2	---	NP	A-3(0)	SP
R. 3 W.																

See footnote at end of table.

Table 19.--Engineering Index Test Data--Continued

Soil name and location	Parent material	Report number	Horizon	Depth	Percentage passing sieve*--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than*--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	LL	PI	Classification: AASHTO	UN
				In									Pct			
Loyal silt loam:	Loess or silty	S87WI-019-														
SW1/4SW1/4 sec.	alluvium	1-1	2Bt	24-36	94	92	80	48	45	37	26	21	31.5	16.6	A-6(5)	SC
22, T. 25 N.,	underlain by	1-2	2C	45-60	92	90	77	44	39	29	18	13	27.0	13.0	A-6(3)	SC
R. 1 W.	loamy glacial															
	till.															
Loyal silt loam:	Loess or silty	S87WI-019-														
NW1/4NW1/4 sec.	alluvium	2-1	2Bt	32-44	96	93	81	50	45	38	28	25	34.8	19.6	A-6(6)	SC
28, T. 25 N.,	underlain by	2-2	2C	54-60	93	91	80	43	39	30	20	18	26.5	11.1	A-6(2)	SC
R. 1 E.	loamy glacial															
	till.															
Loyal silt loam:	Loess or silty	S88WI-019-														
SW1/4SW1/4 sec.	alluvium	2-3	E/B	12-21	98	97	95	90	82	52	20	13	26.6	4.0	A-4(8)	ML
21, T. 26 N.,	underlain by	2-5	2Bt1	29-36	98	96	88	63	60	49	35	31	46.8	29.5	A-7-6(14)	CL
R. 1 W.	loamy glacial	2-8	2C1	47-58	92	90	78	39	35	24	12	9	21.6	7.0	A-4(1)	CL-ML
	till.															
Magnor silt loam:	Loess or silty	S89WI-019-														
SW1/4NW1/4 sec.	alluvium	043-4	2Bt	21-39	83	80	65	32	27	17	10	7	16.0	2.5	A-2-4(0)	SM
2, T. 29 N.,	underlain by	043-6	2Cd	45-60	88	81	66	33	26	17	10	7	14.0	1.0	A-2-4(0)	SM
R. 4 W.	dense loamy															
	glacial till.															
Marshfield silt	Loess or silty	S77WI-019-														
loam:	alluvium	2-1	2Btg	24-28	94	92	84	66	61	42	25	19	33.9	16.7	A-6(9)	CL
SW1/4NW1/4 sec.	underlain by	2-2	2Cg	34-60	92	89	79	54	50	41	27	22	35.7	20.0	A-6(8)	CL
34, T. 27 N.,	loamy glacial															
R. 1 E.	till.															
Ponycreek mucky	Siliceous sandy	S90WI-019-														
sand:	alluvium.	039-2	Bg	6-28	---	100	55	4	4	4	2	2	---	NP	A-3(0)	SP
SW1/4NW1/4 sec.		039-3	C	28-60	100	99	61	2	2	2	2	2	---	NP	A-3(0)	SP
34, T. 23 N.,																
R. 3 W.																
Rockdam sand:	Siliceous sandy	S90WI-019-														
SE1/4SW1/4 sec.	alluvium.	037-3	Bw	9-19	100	98	60	10	10	9	6	5	---	NP	A-2-4(0)	SP-SM
34, T. 23 N.,		037-5	C1	27-38	---	100	64	3	3	3	2	2	---	NP	A-3(0)	SP
R. 3 W.		037-6	C2	38-60	---	100	71	2	2	2	2	2	---	NP	A-3(0)	SP

See footnote at end of table.

Table 19.--Engineering Index Test Data--Continued

Soil name and location	Parent material	Report number	Horizon	Depth	Percentage passing sieve*-- No. 4	No. 10	No. 40	No. 200	Percentage smaller than*-- 0.05 mm	0.02 mm	0.005 mm	0.002 mm	LL	PI	Classification AASHTO	UN
				In									Pct			
Spencer silt loam: SW1/4NE1/4 sec. 4, T. 25 N., R. 2 W.	Loess or silty alluvium underlain by loamy glacial till.	S87WI-019-														
		4-1	B/E	22-43	100	100	100	93	75	41	21	18	29.3	4.9	A-4(8)	CL-ML
		4-2	2Bt	43-48	89	85	71	39	34	24	13	9	21.0	5.9	A-4(1)	SC
		4-3	2C	48-60	88	85	75	46	41	28	15	11	22.2	6.2	A-4(2)	SC
Spencer silt loam: SW1/4SW1/4 sec. 26, T. 29 N., R. 4 W.	Loess or silty alluvium underlain by loamy glacial till.	S89WI-019-														
		045-3	B/E	20-35	99	99	97	94	92	57	25	21	32.0	8.2	A-4(8)	ML
		045-5	2C	43-60	91	91	76	37	30	19	12	9	17.0	2.7	A-4(0)	SM
Withee silt loam: SE1/4NE1/4 sec. 34, T. 29 N., R. 1 W. (inclusion in a Loyal map unit)	Loess or silty alluvium underlain by loamy glacial till.	S77WI-019-														
		4-1	A, B	11-16	92	90	78	49	45	35	23	19	28.7	14.4	A-6(5)	SC
		4-2	2C	42-60	95	90	76	46	40	29	17	13	23.6	9.3	A-4(2)	SC
Withee silt loam: SE1/4SW1/4 sec. 21, T. 26 N., R. 1 W.	Loess or silty alluvium underlain by loamy glacial till.	S88WI-019-														
		1-3	E/B	12-20	98	98	95	88	84	49	23	17	32.2	9.6	A-4(8)	CL
		1-5	2Bt1	27-35	92	88	83	62	58	47	27	23	40.6	24.4	A-7-6(11)	CL
		1-8	2C	49-60	95	94	88	73	68	55	33	24	40.8	24.6	A-7-6(14)	CL

* Mechanical analysis according to the AASHTO designation T 88-57 (AASHTO, 1986). Results from this procedure can differ somewhat from the results obtained by the soil survey procedure of the Natural Resources Conservation Service (NRCS). In the AASHTO procedure, the fine material is analyzed by hydrometer method and the various grain-size fractions are calculated on the basis of all material up to and including that 3 inches in diameter. In the NRCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from the calculation of grain-size fraction. The mechanical analysis data used in this table are not suitable for use in naming textural classes of soils.

Table 20.--Classification of the Soils

Soil name	Family or higher taxonomic class
Aftad	Coarse-loamy, mixed Oxyaquic Glossoboralfs
Almena	Fine-silty, mixed Aquic Glossoboralfs
Arbutus	Sandy, siliceous, frigid Entic Haplorthods
Auburndale	Fine-silty, mixed, frigid Mollic Epiaqualfs
Au Gres	Sandy, mixed, frigid Typic Endoaquods
Barronett	Fine-silty, mixed, frigid Mollic Endoaqualfs
Beseman	Loamy, mixed, dysic Terric Borosaprists
Bilson	Coarse-loamy, siliceous, mesic Mollic Hapludalfs
Boone	Mesic, uncoated Typic Quartzipsamments
Brander	Fine-silty over sandy or sandy-skeletal, mixed Oxyaquic Glossoboralfs
Capitola	Coarse-loamy, mixed, frigid Mollic Epiaqualfs
Cathro	Loamy, mixed, euic Terric Borosaprists
Citypoint	Dysic Typic Borosaprists
Comstock	Fine-silty, mixed Aquic Glossoboralfs
Council	Coarse-loamy, mixed, mesic Typic Hapludalfs
Crystal Lake	Fine-silty, mixed Oxyaquic Glossoboralfs
Dawsil	Sandy or sandy-skeletal, siliceous, dysic Terric Borosaprists
Dawson	Sandy or sandy-skeletal, mixed, dysic Terric Borosaprists
Eauclaire	Sandy, mixed, frigid Oxyaquic Haplorthods
Elevasil	Coarse-loamy, siliceous, mesic Ultic Hapludalfs
Elm Lake	Sandy over loamy, siliceous, acid, frigid Humaqueptic Epiaquents
Fairchild	Sandy over loamy, siliceous, frigid Ultic Epiaquods
Fallcreek	Coarse-loamy, mixed Aquic Glossoboralfs
Flambeau	Fine-loamy, mixed Oxyaquic Glossoboralfs
Fordum	Coarse-loamy, mixed, nonacid, frigid Mollic Fluvaquents
Freeon	Coarse-loamy, mixed Oxyaquic Glossoboralfs
Gardenvale	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs
Hiles	Fine-loamy, mixed Oxyaquic Glossoboralfs
Humbird	Coarse-loamy over clayey, mixed, frigid Oxyaquic Haplorthods
Ironrun	Sandy, siliceous, frigid Typic Endoaquods
Kert	Fine-loamy, mixed Aquic Glossoboralfs
Loxley	Dysic Typic Borosaprists
Loyal	Fine-loamy, mixed Oxyaquic Glossoboralfs
Ludington	Sandy over loamy, siliceous, frigid Oxyaquic Haplorthods
Magnor	Coarse-loamy, mixed Aquic Glossoboralfs
Mahtomedi	Mixed, frigid Typic Udipsamments
Maplehurst	Fine-silty, mixed Aquic Glossoboralfs
Markey	Sandy or sandy-skeletal, mixed, euic Terric Borosaprists
Marshfield	Fine-loamy, mixed, frigid Mollic Epiaqualfs
Menahga	Mixed, frigid Typic Udipsamments
Merimod	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs
Merit	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs
Merrillan	Coarse-loamy over clayey, mixed, frigid Ultic Epiaquods
Moppet	Coarse-loamy, mixed, frigid Oxyaquic Dystrochrepts
Newood	Coarse-loamy, mixed, frigid Oxyaquic Haplorthods
Newson	Mixed, frigid Humaqueptic Psammaquents
Northmound	Loamy-skeletal, mixed Typic Glossoboralfs
Oesterle	Coarse-loamy, mixed Aquic Glossoboralfs
Pelkie	Mixed, frigid Oxyaquic Udipsamments
Plover	Coarse-loamy, mixed Aquic Glossoboralfs
Ponycreek	Siliceous, frigid Humaqueptic Psammaquents
Poskin	Fine-silty over sandy or sandy-skeletal, mixed Aquic Glossoboralfs
Psammaquents	Siliceous, frigid Typic Psammaquents
Rib	Fine-silty over sandy or sandy-skeletal, mixed, nonacid, frigid Mollic Endoaquepts
Rockdam	Sandy, siliceous, frigid Entic Haplorthods
Rosholt	Coarse-loamy, mixed Typic Glossoboralfs
Rozellville	Fine-loamy, mixed Typic Glossoboralfs
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
Simescreek	Frigid, uncoated Typic Quartzipsamments
Spencer	Fine-silty, mixed Oxyaquic Glossoboralfs
Tarr	Mesic, uncoated Typic Quartzipsamments

Table 20.--Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Veedum	Fine-loamy, mixed, acid, frigid Humic Epiaquepts
Winterfield	Mixed, frigid Aquic Udipsamments
Withee	Fine-loamy, mixed Aquic Glossoboralfs

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