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Natural Resources Conservation Service

Iowa Department of Agriculture and Land Stewardship

IOWA STATE UNIVERSITY
Iowa Agriculture and Home Economics Experiment Station

IOWA STATE UNIVERSITY
University Extension

In cooperation with Iowa Agriculture and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University; and Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship

Soil Survey of Iowa County, Iowa

Part I

How To Use This Soil Survey

This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the general soil map units, detailed soil map units, and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

On the **general soil map**, the survey area is divided into groups of soils called associations. 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 soil associations on the color-coded map legend, and then refer to the section **General Soil Map Units** in Part I for a general description of the soils in your area.

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** in Part III. 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. The **Contents** in Part I lists the map units and shows the page where each map unit is described.

The **Contents** in Part II shows which table has information on a specific land use or soil property for each detailed soil map unit. Also, see the **Contents** in Part I and Part II for other 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 (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2004. Soil names and descriptions were approved in 2005. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2004. The most current official data are available through the NRCS Web Soil Survey (http://soils.usda.gov).

This survey was made cooperatively by the Natural Resources Conservation Service; the Iowa Agriculture and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University; and the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship. The survey is part of the technical assistance furnished to the Iowa County Soil and Water Conservation District.

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

Cover: A typical rural landscape in Iowa County.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Foreword

Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

Soil surveys are designed for many different users. Farmers, foresters, and agronomists can use the surveys 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 surveys 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 surveys 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 too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

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

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State Conservationist
Natural Resources Conservation Service

Soil Survey of
Iowa County, Iowa

By Sam R. Steckly, Natural Resources Conservation Service

Fieldwork by Robert O. Dideriksen, Mark R. LaVan, Kevin K. Norwood, Sam R. Steckly, and Jason E. Steele, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the Iowa Agriculture and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University; and the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship

Iowa County is in the east-central part of Iowa (fig. 1). It has an area of 376,100 acres, or about 588 square miles. Marengo is the county seat. It is in the north-central part of the county, about 80 miles east of Des Moines.

This survey updates the survey of Iowa County published in 1967 (Highland and Dideriksen, 1967). It provides additional information and has larger maps, which show the soils in greater detail.

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

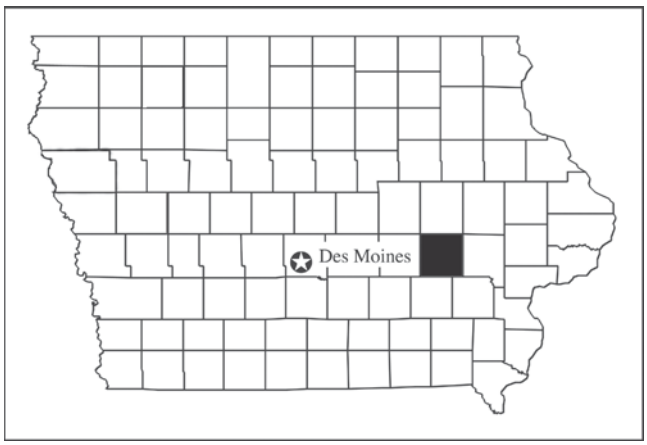

Figure 1.—Location of Iowa County in Iowa.

scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

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

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of an improved understanding of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Nature of the Survey Area

Steve Johnston, Iowa County District Conservationist, Natural Resources Conservation Service, helped prepare this section.

This section provides general information about the survey area. It describes history, industry, transportation facilities, recreation, agriculture, physiography, drainage, and climate.

History

Iowa County derives its name from the Ioway Indian tribe. The Iowa River runs through the northern part of the county.

The survey area, in the Missouri Territory, was part of the Louisiana Purchase of 1803. A treaty signed with the Sac and Fox Indians in 1833, known as the Black Hawk purchase, opened the way for legal settlement. Iowa County was settled soon afterwards and became a county in 1845. Marengo, the county seat, was established on August 13, 1845. The current county courthouse was built in 1892. According to the 2000 census, Marengo had a population of 2,535. Williamsburg, located on a bend in Old Man's Creek, was founded in 1854 by Welshman Richard Williams, who operated a stream sawmill north of the creek. Mr. Williams selected the town site because he thought that the Rock Island railroad route would pass through the area. Williamsburg is the largest city in the county, with 2,622 residents. The population of the county was 15,671 in 2000.

Industry

Industry in Iowa County is a mixture of agriculture, manufacturing, retail, and tourism. Manufacturing includes auto body parts, refrigerators and freezers, and corn planters and grain wagons. Agribusiness production includes a major seed corn producer. Many residents also commute to Iowa City (26 miles) or Cedar Rapids (45 miles) to work in manufacturing, in aviation equipment production, or at the University of Iowa. Per capita retail sales are above the State average. There is an outlet mall near Williamsburg, and several motels and restaurants are along Interstate 80. The Amana Colonies are a national historical landmark attracting more than 1 million visitors each year.

Transportation Facilities

Interstate 80 runs east to west through the center of Iowa County. It is the main east-to-west interstate highway through the United States. State Highway 21 runs north to south along the western edge of the county, linking Victor and Belle Plaine with Keokuk County and points south. Highway 151 runs southwest to northeast, linking Sigourney to the Amanas and Cedar Rapids. State Highway 6 runs east to west in the northern part of the county, linking Poweshiek County and Iowa City. Hard-surfaced county roads provide access from rural areas and small towns to Interstate 80 and the State highways. Nearly all rural residents live along farm-to-market roads surfaced with crushed limestone. Iowa County, with its numerous rivers and creeks,

has many bridges. In recent years, bridge replacement has lagged because of high costs. Many farm-to-market roads have been abandoned or closed.

Iowa County is served by two railroads. The Iowa Interstate Line runs from Omaha to Chicago along Highway 6 through Victor, Ladora, Marengo, South Amana, and Homestead. The Cedar Rapids-Iowa City Railroad runs from Cedar Rapids to Iowa City and passes through the Amanas. Trucking companies provide most of the freight service to Iowa County. Several trucking companies are located in the county, including two near Williamsburg. The Eastern Iowa Airport is south of Cedar Rapids, approximately 20 miles north of Amana. The county has no commercial bus service.

Recreation

The Iowa County Conservation Board manages 10 park and natural access areas in the county. The largest park is at Lake Iowa, about 10 miles west of Williamsburg (fig. 2). Lake Iowa is 94 acres of water surrounded by 500 acres of parkland. The lake was built in 1963. Several land treatment watershed projects have been completed by the Iowa County Soil and Water Conservation District and the Natural Resources Conservation Service. Other county recreational areas include the tri-county Fuller Wetland Access Area in the southeast corner of the county and the new Iowa River Gateway Park in Marengo.

The largest block of recreational land in the county is in the Iowa River Corridor. The Iowa River Corridor, established in 1995, follows the landmark flood of 1993 on the Iowa River. The Corridor includes approximately 50,000 acres of flood plain along 45 miles of river from the Amana Colonies to Tama. In Iowa County, almost 5,000 acres of the Corridor is enrolled in USDA Wetland Reserve programs. Overall, the U.S. Fish and Wildlife Service owns nearly 12,000 acres of wetlands and flood plains in the

Figure 2.—Lake Iowa, west of Williamsburg, is the largest constructed body of water in Iowa County. It was built in 1963.

Corridor. The Federal land is managed by the Iowa Department of Natural Resources. These areas provide recreational opportunities, including hunting, fishing, river access, and hiking. In 2004, the North American Bird Conservation Initiative dedicated the Iowa River Corridor Bird Conservation Area. The Corridor also includes roads that have been designated as Iowa Scenic Byways.

The Amana Colonies are on the National Register of Historical Places. They were settled in 1855 by a group of German-speaking European settlers who established a communal system of living. The colonies include more than 26,000 acres of cropland, pasture, and forestland. The Amana Colonies also provide recreational opportunities, such as the Amana Lily Pond (fig. 3), a 170-acre wetland formed by flooding from the Mill Race, located between Middle Amana and Main Amana. The Mill Race, built between 1865 and 1869, is a canal 7 miles long that provided water from the Iowa River to various mills throughout the colonies. The Mill Race is still in operation and is a National Historical Landmark. The Lily Pond nature trail follows the Mill Race from Main Amana to Middle Amana and circles the Lily Pond. The Iowa River nature trail, operated by the County Conservation Board, is located near Homestead and offers a trail through the hardwood forest to the bluffs along the Iowa River.

The Coralville Reservoir, operated by the U.S. Army Corps of Engineers and the Iowa Department of Natural Resources, is about 10 miles downstream from the Amana Colonies. The 5,430-acre lake offers boating, camping, and other recreational activities to area residents. The backwaters of the reservoir reach into Iowa County during periods when water levels are high.

Agriculture

About 85 percent of Iowa County is agricultural land, 8 percent is urban or built-up land, and 7 percent is woodland. The county has about 1,020 farms with an average size of 333 acres. The farms raise corn, soybeans, forage, and some small grain. In 2004, 204,000 acres was used for production of grain crops, including 115,000 acres of corn and 84,000 acres of soybeans; the remaining acreage was used for oats and wheat. Hay was produced on 22,000 acres. Land in the county enrolled in the Conservation Reserve Program includes more than 38,000 acres of cropland that has been taken out of production and seeded to a cover of mixed native grasses or cool-season grasses for the enhancement of wildlife habitat.

Livestock operations feature cow/calf herds, swine confinements, some cattle feedlots, and dairies. According to the 2002 Iowa Agricultural Census, 388 farms had 44,000 head of cattle, including 20,000 beef cows, and 101,000 hogs. There were 1,200 dairy cows. Herd numbers, particularly those of hogs, are declining; hog production has declined by two-thirds since 1992. Eighty producers are involved in production of sheep, chickens, eggs, and turkeys.

Physiography

Iowa County is a gently rolling to steep upland plain, deeply dissected in places by rivers and streams. The area immediately north of the Iowa River is characterized by an intricate pattern of deep valleys and ravines that have steep slopes. Small streams extend back into the uplands.

The bottom land along the Iowa River is nearly level. The alluvial terraces away from the river are nearly level to undulating.

Hills on either side of the flood plain rise 100 to 200 feet above the river. In places these hills are 50 to 100 feet above the level of the plain into which they merge.

The northern corner of Lenox Township, for the most part, has level or gently undulating topography that is characteristic of what has been called the Iowan drift plain.

Figure 3.—The Amana Lily Pond supplies water to the Mill Race, which generates energy for the woolen mill in Main Amana.

In a broad curve from east to west across the central part of the county is a more nearly level plain, 4 or 5 miles wide, called the divide. This plain, which represents the greatest part of the original prairie land of the county, separates the Iowa and English Rivers. The English River, its tributaries, and many small intermittent streams have cut steep valleys along this entire area. The slope in this area increases toward the stream channels.

Drainage

Streams and intermittent drainageways have dissected practically all parts of the county. The Iowa River extends from west to east through the northern part. Honey Creek, Big Bear Creek, and Little Bear Creek are the main tributaries flowing into the Iowa River from the south. Price Creek, which flows almost at right angles into the Iowa River, is the main tributary from the north. From Conroy eastward, the area is drained by Clear Creek. Hog Run joins Old Man's Creek west of Williamsburg to drain the area east of Williamsburg and Parnell. The southern part of the county is drained by the English River and its tributaries.

The drainage system is well developed and is adequate in most parts of the county. However, artificial drainage is needed in some depressed areas on uplands and in areas on bottom land that are above the ordinary level of overflow but that receive runoff from surrounding steep uplands.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Williamsburg in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 23.3 degrees F and the average daily minimum temperature is 14.4 degrees. The lowest temperature during the period of record is -31 degrees. In summer, the average temperature is 72.5 degrees and the average daily maximum temperature is 83.5 degrees. The highest temperature during the period of record is 105 degrees.

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

The total annual precipitation is 36.66 inches. Of this total, 25.76 inches, or about 70 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 12.65 inches.

The average seasonal snowfall is about 31 inches. On the average, 49 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.

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Williamsburg, Iowa)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	28.6	10.4	19.5	56	-21	3	1.08	0.57	1.52	3	9.0
February---	35.0	16.5	25.7	65	-18	17	1.03	.38	1.63	3	6.3
March------	47.6	27.5	37.6	80	0	104	2.12	.85	3.39	5	3.5
April------	61.4	37.9	49.7	86	16	316	3.44	1.79	4.91	6	1.9
May--------	72.5	49.8	61.1	90	31	656	4.71	2.19	7.03	8	.0
June-------	81.7	59.7	70.7	95	43	921	4.72	2.63	6.80	7	.0
July-------	85.4	63.8	74.6	99	48	1,073	4.35	1.85	6.71	6	.0
August-----	83.3	61.3	72.3	97	46	1,000	4.76	2.13	7.18	6	.0
September--	76.1	52.5	64.3	94	32	726	3.78	2.06	5.53	6	.0
October----	64.3	40.6	52.4	87	20	394	2.59	1.06	3.96	5	.4
November---	47.1	28.4	37.7	73	3	95	2.60	.91	4.30	5	2.5
December---	33.3	16.2	24.7	61	-14	11	1.48	.59	2.28	4	7.5
Yearly:											
Average---	59.7	38.7	49.2	---	---	---	---	---	---	---	---
Extreme---	105	-31	---	99	-23	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,316	36.66	28.22	43.86	64	31.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Williamsburg, Iowa)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 17	Apr. 24	May 11
2 years in 10 later than--	Apr. 13	Apr. 20	May 7
5 years in 10 later than--	Apr. 5	Apr. 12	Apr. 28
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 15	Oct. 5	Sept. 23
2 years in 10 earlier than--	Oct. 20	Oct. 10	Sept. 27
5 years in 10 earlier than--	Oct. 30	Oct. 19	Oct. 6

Table 3.--Growing Season

(Recorded in the period 1971-2000 at Williamsburg, Iowa)

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	190	169	143
8 years in 10	195	176	150
5 years in 10	206	188	162
2 years in 10	216	200	174
1 year in 10	222	207	181

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

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

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

1—Otley-Mahaska-Shelby Association (fig. 4)

Extent of the association in the survey area: 20 percent

Component Description

Otley
Extent: 60 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Mahaska
Extent: 13 percent of the association
Position on the landscape: Flats on uplands
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None

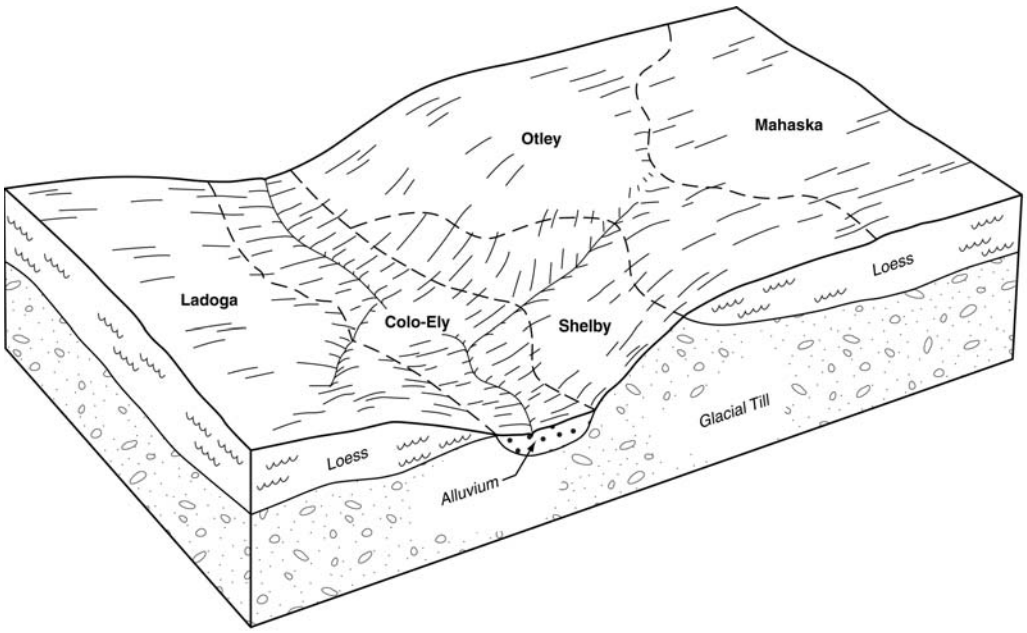

Figure 4.—Typical pattern of soils and parent material in the Otley-Mahaska-Shelby association.

Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.0 inches
Content of organic matter in the upper 10 inches: 4.8 percent

Shelby
Extent: 12 percent of the association
Position on the landscape: Side slopes and shoulders
Slope range: 5 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Soils of Minor Extent

Ladoga
Extent: 5 percent of the association

Colo
Extent: 5 percent of the association

Ely
Extent: 5 percent of the association

2—Colo-Nevin-Nodaway Association (fig. 5)

Extent of the association in the survey area: 16 percent

Component Description

Colo
Extent: 37 percent of the association
Position on the landscape: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Nevin
Extent: 17 percent of the association
Position on the landscape: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)

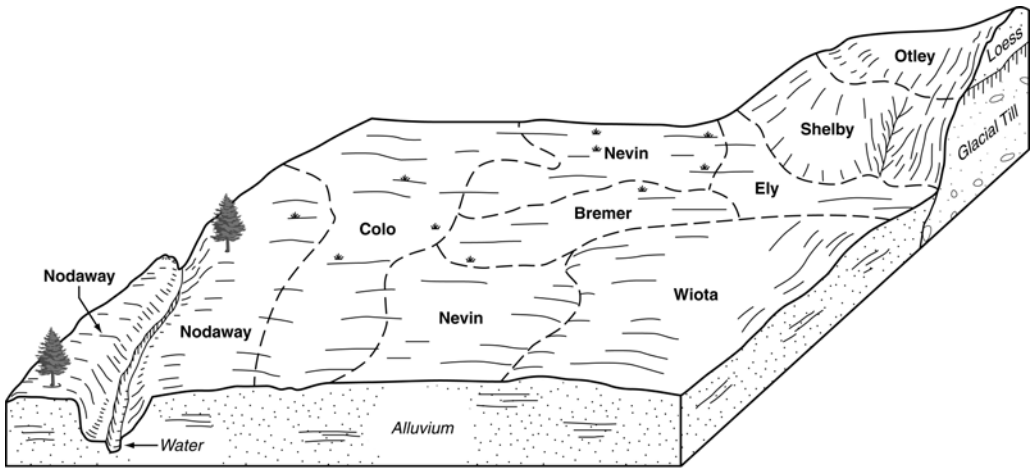

Figure 5.—Typical pattern of soils and parent material in the Colo-Nevin-Nodaway association.

Ponding: None
Available water capacity to a depth of 60 inches: 12.3 inches
Content of organic matter in the upper 10 inches: 4.8 percent

Nodaway
Extent: 16 percent of the association
Position on the landscape: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Soils of Minor Extent

Amana
Extent: 13 percent of the association

Bremer
Extent: 9 percent of the association

Wiota
Extent: 8 percent of the association

3—Tama-Downs Association

Extent of the association in the survey area: 11 percent

Component Description

Tama
Extent: 42 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Downs
Extent: 28 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Soils of Minor Extent

Gara
Extent: 8 percent of the association

Colo
Extent: 8 percent of the association

Sparta
Extent: 7 percent of the association

Ely
Extent: 7 percent of the association

4—Ladoga-Clinton-Lindley Association

Extent of the association in the survey area: 33 percent

Component Description

Ladoga
Extent: 30 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Clinton
Extent: 27 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Lindley
Extent: 16 percent of the association
Position on the landscape: Side slopes and shoulders
Slope range: 9 to 40 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Soils of Minor Extent

Gara
Extent: 11 percent of the association

Otley
Extent: 6 percent of the association

Colo
Extent: 5 percent of the association

Ely
Extent: 5 percent of the association

5—Fayette-Downs Association (fig. 6)

Extent of the association in the survey area: 17 percent

Component Description

Fayette
Extent: 51 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes; treads and risers on stream terraces
Slope range: 2 to 40 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Downs
Extent: 18 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None

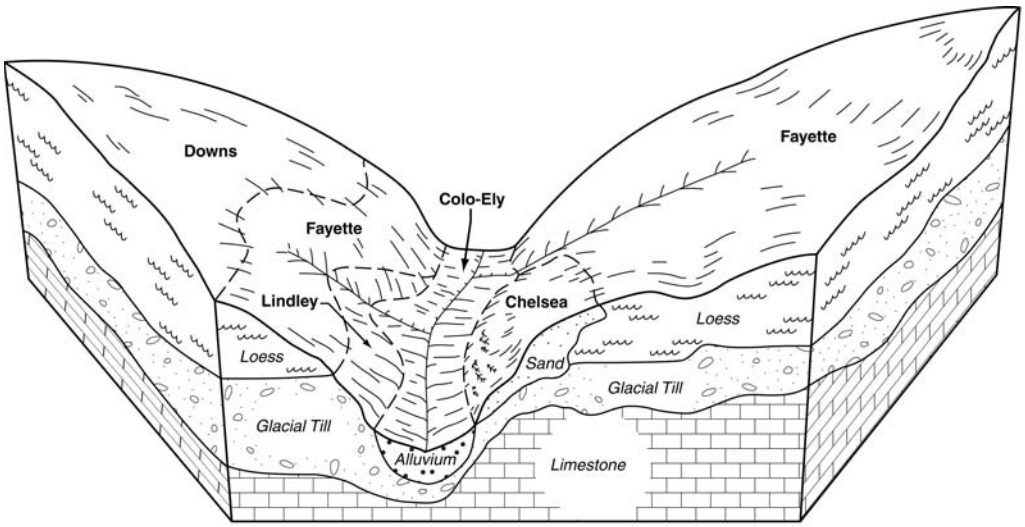

Figure 6.—Typical pattern of soils and parent material in the Fayette-Downs association.

Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Soils of Minor Extent

Lindley
Extent: 9 percent of the association

Chelsea
Extent: 8 percent of the association

Tell
Extent: 6 percent of the association

Colo
Extent: 4 percent of the association

Ely
Extent: 4 percent of the association

6—Dinsdale-Kenyon-Bassett Association

Extent of the association in the survey area: 3 percent

Component Description

Dinsdale
Extent: 33 percent of the association
Position on the landscape: Ridgetops and shoulders
Slope range: 2 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess and the underlying subglacial till
Flooding: None

Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Kenyon
Extent: 22 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 2 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.3 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Bassett
Extent: 21 percent of the association
Position on the landscape: Ridgetops, shoulders, and side slopes
Slope range: 5 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Soils of Minor Extent

Sparta
Extent: 10 percent of the association

Waukee
Extent: 7 percent of the association

Hayfield
Extent: 7 percent of the association

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 minor components that belong to taxonomic classes other than those of the major soils.

Most minor 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, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components 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 minor components 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 lists some of the principal soil properties that should 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, Otley silty clay loam, 9 to 14 percent slopes, moderately eroded, is a phase of the Otley series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Colo-Ely complex, 2 to 5 percent slopes, is an example.

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

The table "Acreage and Proportionate Extent of the Soils" in Part II lists the map units in this survey area. Other tables provided in Part II 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.

5B—Ackmore-Colo complex, 2 to 5 percent slopes

Component Description

Ackmore and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Upland drainageways
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 2.8 percent

Colo and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Upland drainageways
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Flooding: None
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 10 to 20 percent of the unit

Colo, frequently flooded, and similar soils
Extent: 0 to 10 percent of the unit

7—Wiota silty clay loam, 0 to 2 percent slopes, rarely flooded

Component Description

Wiota, rarely flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 3.5 percent

7B—Wiota silty clay loam, 2 to 5 percent slopes, rarely flooded

Component Description

Wiota, rarely flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 3.5 percent

8B—Judson silty clay loam, 2 to 5 percent slopes

Component Description

Judson and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Footslopes and alluvial fans
Slope range: 2 to 5 percent

Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty colluvium
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 4.3 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

24C2—Shelby loam, 5 to 9 percent slopes, moderately eroded

Component Description

Shelby, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Shoulders and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Otley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Adair, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

24D2—Shelby loam, 9 to 14 percent slopes, moderately eroded

Component Description

Shelby, moderately eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None

Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Otley and similar soils
Extent: 5 to 15 percent of the unit

Shelby soils that are only slightly eroded
Extent: 5 to 15 percent of the unit

Adair, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

24D3—Shelby clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Shelby, severely eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Adair, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Otley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

24E2—Shelby loam, 14 to 18 percent slopes, moderately eroded

Component Description

Shelby, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Adair, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Otley, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

24E3—Shelby clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Shelby, severely eroded, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Otley, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

41—Sparta loamy fine sand, 0 to 2 percent slopes

Component Description

Sparta and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

41B—Sparta loamy fine sand, 2 to 5 percent slopes

Component Description

Sparta and similar soils
Extent: 100 percent of the unit
Landscape position: Upland summits; treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

41C—Sparta loamy fine sand, 5 to 9 percent slopes

Component Description

Sparta and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Upland side slopes; risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Chelsea and similar soils
Extent: 5 to 15 percent of the unit

Pillot and similar soils
Extent: 0 to 10 percent of the unit

41D—Sparta loamy fine sand, 9 to 14 percent slopes

Component Description

Sparta and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Upland side slopes; risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Loamy fine sand

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Dickinson and similar soils
Extent: 5 to 15 percent of the unit

Tama and similar soils
Extent: 5 to 15 percent of the unit

Chelsea and similar soils
Extent: 0 to 10 percent of the unit

43—Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded

Component Description

Bremer, rarely flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 6.0 percent

51—Vesser silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Vesser, occasionally flooded, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium

Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Nevin, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

54—Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Zook, occasionally flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 6.0 percent

54+—Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Zook, occasionally flooded, overwash, and similar soils
Extent: 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)

Ponding: None
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 3.5 percent

63C—Chelsea loamy fine sand, 2 to 9 percent slopes

Component Description

Chelsea and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Summits and shoulders
Slope range: 2 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 5 to 15 percent of the unit

63E—Chelsea loamy fine sand, 9 to 18 percent slopes

Component Description

Chelsea and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 18 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 0 to 10 percent of the unit

63G—Chelsea loamy fine sand, 18 to 40 percent slopes

Component Description

Chelsea and similar soils
Extent: 90 to 100 percent of the unit

Landscape position: Side slopes
Slope range: 18 to 40 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 0 to 10 percent of the unit

65D2—Lindley loam, 9 to 14 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Keswick, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

65D3—Lindley clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Lindley, severely eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent

Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.1 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Clinton, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

65E2—Lindley loam, 14 to 18 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Keswick, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

65E3—Lindley clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Lindley, severely eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent

Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.1 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

65F—Lindley loam, 18 to 25 percent slopes

Component Description

Lindley and similar soils
Extent: 100 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.4 inches
Content of organic matter in the upper 10 inches: 1.2 percent

65F2—Lindley loam, 18 to 25 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Keswick, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

65F3—Lindley clay loam, 18 to 25 percent slopes, severely eroded

Component Description

Lindley, severely eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.1 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

65G—Lindley loam, 25 to 40 percent slopes

Component Description

Lindley and similar soils
Extent: 100 percent of the unit
Landscape position: Side slopes
Slope range: 25 to 40 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.4 inches
Content of organic matter in the upper 10 inches: 1.2 percent

75—Givin silt loam, 0 to 2 percent slopes

Component Description

Givin and similar soils
Extent: 90 to 100 percent of the unit

Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ladoga and similar soils
Extent: 0 to 10 percent of the unit

76B—Ladoga silt loam, 2 to 5 percent slopes

Component Description

Ladoga and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Givin and similar soils
Extent: 0 to 10 percent of the unit

76C—Ladoga silt loam, 5 to 9 percent slopes

Component Description

Ladoga and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)

Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ladoga, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

76C2—Ladoga silt loam, 5 to 9 percent slopes, moderately eroded

Component Description

Ladoga, moderately eroded, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Summits and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

76D—Ladoga silt loam, 9 to 14 percent slopes

Component Description

Ladoga and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Ladoga, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

76D2—Ladoga silt loam, 9 to 14 percent slopes, moderately eroded

Component Description

Ladoga, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes (fig. 7)
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)

Figure 7.—Terraces reduce the length of slopes in areas of Ladoga silt loam, 9 to 14 percent slopes, moderately eroded, and thus reduce the hazard of sheet and rill erosion. They also improve water quality.

Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 15 percent of the unit

76D3—Ladoga silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Ladoga, severely eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Armstrong, severely eroded, and similar soils
Extent: 0 to 15 percent of the unit

Gara, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ladoga, moderately eroded, and similar soils
Extent: 0 to 15 percent of the unit

76E2—Ladoga silt loam, 14 to 18 percent slopes, moderately eroded

Component Description

Ladoga, moderately eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)

Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 15 percent of the unit

Gara, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ladoga, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

76E3—Ladoga silty clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Ladoga, severely eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Gara, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ladoga, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

80B—Clinton silt loam, 2 to 5 percent slopes

Component Description

Clinton and similar soils
Extent: 100 percent of the unit
Landscape position: Summits and ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)

Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.2 percent

80C—Clinton silt loam, 5 to 9 percent slopes

Component Description

Clinton and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Ridgetops, shoulders, and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

80C2—Clinton silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Clinton, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops, shoulders, and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Clinton soils that are only slightly eroded
Extent: 10 to 20 percent of the unit

80D—Clinton silt loam, 9 to 14 percent slopes

Component Description

Clinton and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Keswick and similar soils
Extent: 0 to 10 percent of the unit

80D2—Clinton silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Clinton, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Clinton, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Lindley, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

80D3—Clinton silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Clinton, severely eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.0 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

80E2—Clinton silty clay loam, 14 to 18 percent slopes, moderately eroded

Component Description

Clinton, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Lindley, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

80E3—Clinton silty clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Clinton, severely eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.0 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

80F2—Clinton silty clay loam, 18 to 25 percent slopes, moderately eroded

Component Description

Clinton, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

83B—Kenyon loam, 2 to 5 percent slopes

Component Description

Kenyon and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Ridgetops and summits
Slope range: 2 to 5 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: More than 6.7 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.3 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Dinsdale and similar soils
Extent: 20 to 30 percent of the unit

83C—Kenyon loam, 5 to 9 percent slopes

Component Description

Kenyon and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.3 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Dinsdale and similar soils
Extent: 5 to 15 percent of the unit

Kenyon, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

83C2—Kenyon loam, 5 to 9 percent slopes, moderately eroded

Component Description

Kenyon, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Dinsdale, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

83D2—Kenyon loam, 9 to 14 percent slopes, moderately eroded

Component Description

Kenyon, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Kenyon soils that are only slightly eroded
Extent: 10 to 20 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

88—Nevin silty clay loam, 0 to 2 percent slopes, rarely flooded

Component Description

Nevin, rarely flooded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.3 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Minor Dissimilar Components

Bremer, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

93D2—Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded

Component Description

Shelby, moderately eroded, and similar soils
Extent: 45 to 55 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Adair, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol weathered from glacial till
Flooding: None

Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Otley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

93D3—Shelby-Adair complex, 9 to 14 percent slopes, severely eroded

Component Description

Shelby, severely eroded, and similar soils
Extent: 45 to 55 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Adair, severely eroded, and similar soils
Extent: 25 to 35 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol weathered from glacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Shelby, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Otley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

93E2—Shelby-Adair complex, 14 to 18 percent slopes, moderately eroded

Component Description

Shelby, moderately eroded, and similar soils
Extent: 55 to 65 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Adair, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol weathered from glacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

119—Muscatine silty clay loam, 0 to 2 percent slopes

Component Description

Muscatine and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess

Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.2 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Minor Dissimilar Components

Garwin and similar soils
Extent: 0 to 10 percent of the unit

120B—Tama silty clay loam, 2 to 5 percent slopes

Component Description

Tama and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Osco and similar soils
Extent: 0 to 10 percent of the unit

120C—Tama silty clay loam, 5 to 9 percent slopes

Component Description

Tama and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Osco and similar soils
Extent: 5 to 15 percent of the unit

Tama, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

120C2—Tama silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 65 to 85 percent of the unit
Landscape position: Side slopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Tama soils that are only slightly eroded
Extent: 10 to 20 percent of the unit

Osco, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

120D2—Tama silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Tama, slightly eroded, and similar soils
Extent: 0 to 10 percent of the unit

Tama, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

120D3—Tama silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Tama, severely eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Tama, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit

120E2—Tama silty clay loam, 14 to 18 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Tama, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Shelby, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

122—Sperry silt loam, 0 to 1 percent slopes, depressional

Component Description

Sperry and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Shallow upland depressions
Slope range: 0 to 1 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Months in which ponding does not occur: January, December
Deepest ponding: 0.5 foot (February, March, April, May, June, July, August, September, October, November)
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Taintor and similar soils
Extent: 0 to 10 percent of the unit

133—Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Colo, occasionally flooded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Flood plains (fig. 8)
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Minor Dissimilar Components

Colo, occasionally flooded, overwash, and similar soils
Extent: 0 to 10 percent of the unit

Nodaway, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

Figure 8.—A constructed wetland in an area of Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded.

133+—Colo silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Colo, occasionally flooded, overwash, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Minor Dissimilar Components

Ackmore, occasionally flooded, and similar soils
Extent: 5 to 15 percent of the unit

162B—Downs silt loam, 2 to 5 percent slopes

Component Description

Downs and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Greenbush and similar soils
Extent: 0 to 10 percent of the unit

162C—Downs silt loam, 5 to 9 percent slopes

Component Description

Downs and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Greenbush and similar soils
Extent: 5 to 15 percent of the unit

Downs, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

162C2—Downs silt loam, 5 to 9 percent slopes, moderately eroded

Component Description

Downs, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops and shoulders

Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Greenbush, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Downs soils that are only slightly eroded
Extent: 0 to 10 percent of the unit

162D2—Downs silt loam, 9 to 14 percent slopes, moderately eroded

Component Description

Downs, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Greenbush, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

162D3—Downs silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Downs, severely eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Downs, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Greenbush, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

162E2—Downs silt loam, 14 to 18 percent slopes, moderately eroded

Component Description

Downs, moderately eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Greenbush, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Downs, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Gara, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

162E3—Downs silty clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Downs, severely eroded, and similar soils
Extent: 70 to 80 percent of the unit

Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Downs, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Greenbush, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Gara, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

163B—Fayette silt loam, 2 to 5 percent slopes

Component Description

Fayette and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Rozetta and similar soils
Extent: 0 to 10 percent of the unit

163C—Fayette silt loam, 5 to 9 percent slopes

Component Description

Fayette and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained

Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Rozetta and similar soils
Extent: 5 to 15 percent of the unit

163C2—Fayette silt loam, 5 to 9 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Rozetta, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Fayette soils that are only slightly eroded
Extent: 0 to 10 percent of the unit

163D—Fayette silt loam, 9 to 14 percent slopes

Component Description

Fayette and similar soils
Extent: 75 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Rozetta and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

163D2—Fayette silt loam, 9 to 14 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 60 to 70 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette soils that are only slightly eroded
Extent: 5 to 15 percent of the unit

Keswick, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

163D3—Fayette silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Fayette, severely eroded, and similar soils
Extent: 55 to 65 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

Keswick, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

163E—Fayette silt loam, 14 to 18 percent slopes

Component Description

Fayette and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Lindley and similar soils
Extent: 5 to 15 percent of the unit

Rozetta and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

163E2—Fayette silt loam, 14 to 18 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Fayette, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

163E3—Fayette silty clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Fayette, severely eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 0 to 15 percent of the unit

163F—Fayette silt loam, 18 to 25 percent slopes

Component Description

Fayette and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Lindley and similar soils
Extent: 5 to 15 percent of the unit

Rozetta and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

163F2—Fayette silt loam, 18 to 25 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

163F3—Fayette silty clay loam, 18 to 25 percent slopes, severely eroded

Component Description

Fayette, severely eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Rozetta, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

163G—Fayette silt loam, 25 to 40 percent slopes

Component Description

Fayette and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 25 to 40 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Minor Dissimilar Components

Lindley and similar soils
Extent: 5 to 15 percent of the unit

Rozetta and similar soils
Extent: 0 to 10 percent of the unit

165—Stronghurst silt loam, 0 to 2 percent slopes

Component Description

Stronghurst and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 1.8 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 0 to 10 percent of the unit

171C2—Bassett loam, 5 to 9 percent slopes, moderately eroded

Component Description

Bassett, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Bassett soils that are only slightly eroded
Extent: 5 to 15 percent of the unit

Waubeek, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

171D2—Bassett loam, 9 to 14 percent slopes, moderately eroded

Component Description

Bassett, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Bassett soils that are only slightly eroded
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Waubeek, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

171D3—Bassett loam, 9 to 14 percent slopes, severely eroded

Component Description

Bassett, severely eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Bassett, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

171E2—Bassett loam, 14 to 18 percent slopes, moderately eroded

Component Description

Bassett, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Bassett, slightly eroded, and similar soils
Extent: 0 to 10 percent of the unit

Bassett, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Waubeek, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

171E3—Bassett loam, 14 to 18 percent slopes, severely eroded

Component Description

Bassett, severely eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy sediments and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Bassett, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

172—Wabash silty clay, 0 to 2 percent slopes, occasionally flooded

Component Description

Wabash, occasionally flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 6.2 inches
Content of organic matter in the upper 10 inches: 3.0 percent

175—Dickinson fine sandy loam, 0 to 2 percent slopes

Component Description

Dickinson and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Sandy alluvial deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.7 inches
Content of organic matter in the upper 10 inches: 1.4 percent

175B—Dickinson fine sandy loam, 2 to 5 percent slopes

Component Description

Dickinson and similar soils
Extent: 90 to 100 percent of the unit

Landscape position: Treads and risers on stream terraces; ridgetops and shoulders on uplands
Slope range: 2 to 5 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Sandy alluvial deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.7 inches
Content of organic matter in the upper 10 inches: 1.4 percent

Minor Dissimilar Components

Pillot and similar soils
Extent: 0 to 10 percent of the unit

175C—Dickinson fine sandy loam, 5 to 9 percent slopes

Component Description

Dickinson and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Sandy alluvial deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.7 inches
Content of organic matter in the upper 10 inches: 1.4 percent

Minor Dissimilar Components

Sparta and similar soils
Extent: 5 to 15 percent of the unit

Pillot and similar soils
Extent: 0 to 10 percent of the unit

178—Waukee loam, 0 to 2 percent slopes

Component Description

Waukee and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loamy alluvium over sandy and gravelly alluvium
Flooding: None

Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.6 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Dickinson and similar soils
Extent: 5 to 15 percent of the unit

178B—Waukee loam, 2 to 5 percent slopes

Component Description

Waukee and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loamy alluvium over sandy and gravelly alluvium
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.6 inches
Content of organic matter in the upper 10 inches: 3.5 percent

178C—Waukee loam, 5 to 9 percent slopes

Component Description

Waukee and similar soils
Extent: 100 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loamy alluvium over sandy and gravelly alluvium
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.6 inches
Content of organic matter in the upper 10 inches: 3.5 percent

179D2—Gara loam, 9 to 14 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent

Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Minor Dissimilar Components

Ladoga, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Armstrong, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

179D3—Gara clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Gara, severely eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Gara, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ladoga, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Armstrong, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

179E2—Gara loam, 14 to 18 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Gara, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ladoga, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

179E3—Gara clay loam, 14 to 18 percent slopes, severely eroded

Component Description

Gara, severely eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Gara, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Armstrong, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ladoga, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

179F2—Gara loam, 18 to 25 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Minor Dissimilar Components

Gara, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

179F3—Gara clay loam, 18 to 25 percent slopes, severely eroded

Component Description

Gara, severely eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Gara, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

180—Keomah silt loam, 0 to 2 percent slopes

Component Description

Keomah and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Minor Dissimilar Components

Clinton and similar soils
Extent: 0 to 10 percent of the unit

192D2—Adair silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Adair, moderately eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol weathered from glacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Shelby, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

Otley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

192D3—Adair clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Adair, severely eroded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol weathered from glacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Adair, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

Otley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Shelby, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

220—Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Nodaway, occasionally flooded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Minor Dissimilar Components

Ackmore, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

Colo, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

Lawson, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

279—Taintor silty clay loam, 0 to 2 percent slopes

Component Description

Taintor and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 5.3 percent

Minor Dissimilar Components

Mahaska and similar soils
Extent: 0 to 10 percent of the unit

Sperry and similar soils
Extent: 0 to 10 percent of the unit

280—Mahaska silty clay loam, 0 to 2 percent slopes

Component Description

Mahaska and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Upland flats (fig. 9)
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.0 inches
Content of organic matter in the upper 10 inches: 4.8 percent

Figure 9.—Somewhat poorly drained areas of Mahaska silty clay loam, 0 to 2 percent slopes, are well suited to intensive row cropping.

Minor Dissimilar Components

Taintor and similar soils
Extent: 0 to 10 percent of the unit

281B—Otley silty clay loam, 2 to 5 percent slopes

Component Description

Otley and similar soils
Extent: 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

281C—Otley silty clay loam, 5 to 9 percent slopes

Component Description

Otley and similar soils
Extent: 80 to 100 percent of the unit
Landscape position: Shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Otley, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

281C2—Otley silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Otley, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Otley, slightly eroded, and similar soils
Extent: 0 to 10 percent of the unit

Otley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

281D2—Otley silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Otley, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Adair, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Otley, slightly eroded, and similar soils
Extent: 0 to 10 percent of the unit

Otley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

281D3—Otley silty clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Otley, severely eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Otley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Adair, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Shelby, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

281E2—Otley silty clay loam, 14 to 18 percent slopes, moderately eroded

Component Description

Otley, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Otley, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Shelby, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

291—Atterberry silt loam, 0 to 2 percent slopes

Component Description

Atterberry and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Upland flats
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)

Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Walford and similar soils
Extent: 5 to 15 percent of the unit

293C—Fayette-Chelsea-Tell complex, 5 to 9 percent slopes

Component Description

Fayette and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Chelsea and similar soils
Extent: 25 to 40 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Tell and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

293D—Fayette-Chelsea-Tell complex, 9 to 14 percent slopes

Component Description

Fayette and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Chelsea and similar soils
Extent: 25 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Tell and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

293D2—Fayette-Chelsea-Tell complex, 9 to 14 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes

Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Chelsea, moderately eroded, and similar soils
Extent: 25 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.3 percent

Tell, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.3 inches
Content of organic matter in the upper 10 inches: 1.2 percent

293E—Fayette-Chelsea-Tell complex, 14 to 18 percent slopes

Component Description

Fayette and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Chelsea and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Tell and similar soils
Extent: 20 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

293E2—Fayette-Chelsea-Tell complex, 14 to 18 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Chelsea, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loamy fine sand

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.3 percent

Tell, moderately eroded, and similar soils
Extent: 20 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.3 inches
Content of organic matter in the upper 10 inches: 1.2 percent

293G—Fayette-Chelsea-Tell complex, 18 to 40 percent slopes

Component Description

Fayette and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 40 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Chelsea and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 40 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sands
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 4.4 inches
Content of organic matter in the upper 10 inches: 0.4 percent

Tell and similar soils
Extent: 20 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 40 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

353B—Tell silt loam, 2 to 5 percent slopes

Component Description

Tell and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 5 to 15 percent of the unit

Chelsea and similar soils
Extent: 0 to 10 percent of the unit

353C—Tell silt loam, 5 to 9 percent slopes

Component Description

Tell and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 8.1 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Minor Dissimilar Components

Fayette and similar soils
Extent: 5 to 15 percent of the unit

353C2—Tell silt loam, 5 to 9 percent slopes, moderately eroded

Component Description

Tell, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.3 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

353D2—Tell silt loam, 9 to 14 percent slopes, moderately eroded

Component Description

Tell, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over eolian sand
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 7.3 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

377B—Dinsdale silty clay loam, 2 to 5 percent slopes

Component Description

Dinsdale and similar soils
Extent: 100 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 4.0 percent

377C—Dinsdale silty clay loam, 5 to 9 percent slopes

Component Description

Dinsdale and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Shoulders and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess over subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Minor Dissimilar Components

Pillot and similar soils
Extent: 5 to 15 percent of the unit

Kenyon and similar soils
Extent: 0 to 10 percent of the unit

420—Tama silty clay loam, terrace, 0 to 2 percent slopes

Component Description

Tama, terrace, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on steam terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

420B—Tama silty clay loam, terrace, 2 to 5 percent slopes

Component Description

Tama, terrace, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads and risers on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

422—Amana silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Amana, occasionally flooded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Minor Dissimilar Components

Nodaway, occasionally flooded, and similar soils
Extent: 5 to 15 percent of the unit

424D2—Lindley-Keswick complex, 9 to 14 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 45 to 55 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Keswick, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Clinton, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

424E2—Lindley-Keswick complex, 14 to 18 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes (fig. 10)
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)

Figure 10.—A constructed pond surrounded by pasture in an area of Lindley-Keswick complex, 14 to 18 percent slopes, moderately eroded.

Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Keswick, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Keswick, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 0 to 15 percent of the unit

424E3—Lindley-Keswick complex, 14 to 18 percent slopes, severely eroded

Component Description

Lindley, severely eroded, and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.1 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Keswick, severely eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.8 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Clinton, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

424F2—Lindley-Keswick complex, 18 to 25 percent slopes, moderately eroded

Component Description

Lindley, moderately eroded, and similar soils
Extent: 60 to 70 percent of the unit

Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Keswick, moderately eroded, and similar soils
Extent: 20 to 30 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

425D2—Keswick silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Keswick, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Lindley, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

425D3—Keswick clay loam, 9 to 14 percent slopes, severely eroded

Component Description

Keswick, severely eroded, and similar soils
Extent: 55 to 65 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 8.8 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Keswick, moderately eroded, and similar soils
Extent: 10 to 20 percent of the unit

Clinton, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Lindley, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

428B—Ely silty clay loam, 2 to 5 percent slopes

Component Description

Ely and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Footslopes and alluvial fans
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty colluvium
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None

Available water capacity to a depth of 60 inches: 12.3 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Minor Dissimilar Components

Colo and similar soils
Extent: 0 to 10 percent of the unit

430—Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Ackmore, occasionally flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.0 percent

450—Pillot silt loam, 0 to 2 percent slopes

Component Description

Pillot and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 3.3 percent

450B—Pillot silt loam, 2 to 5 percent slopes

Component Description

Pillot and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Summits on uplands; risers on stream terraces

Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 3.3 percent

Minor Dissimilar Components

Tama and similar soils
Extent: 5 to 15 percent of the unit

450C—Pillot silt loam, 5 to 9 percent slopes

Component Description

Pillot and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Shoulders and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 3.3 percent

Minor Dissimilar Components

Tama and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

453—Tuskeego silt loam, 0 to 2 percent slopes, rarely flooded

Component Description

Tuskeego, rarely flooded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December

Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Minor Dissimilar Components

Bremer, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

Vesser, occasionally flooded, and similar soils
Extent: 5 to 15 percent of the unit

Nevin, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

462B—Downs silt loam, terrace, 2 to 5 percent slopes

Component Description

Downs, terrace, and similar soils
Extent: 85 to 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Tama, terrace, and similar soils
Extent: 5 to 15 percent of the unit

463B—Fayette silt loam, terrace, 2 to 5 percent slopes

Component Description

Fayette, terrace, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None

Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 1.5 percent

463C2—Fayette silt loam, terrace, 5 to 9 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, slightly eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

463D2—Fayette silt loam, terrace, 9 to 14 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, severely eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

463D3—Fayette silty clay loam, terrace, 9 to 14 percent slopes, severely eroded

Component Description

Fayette, severely eroded, terrace, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, terrace, and similar soils
Extent: 15 to 25 percent of the unit

463E2—Fayette silt loam, terrace, 14 to 18 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, severely eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

463E3—Fayette silty clay loam, terrace, 14 to 18 percent slopes, severely eroded

Component Description

Fayette, severely eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit

Landscape position: Risers on stream terraces
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

463F2—Fayette silt loam, terrace, 18 to 25 percent slopes, moderately eroded

Component Description

Fayette, moderately eroded, terrace, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Fayette, severely eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

Fayette, slightly eroded, terrace, and similar soils
Extent: 0 to 10 percent of the unit

463F3—Fayette silty clay loam, terrace, 18 to 25 percent slopes, severely eroded

Component Description

Fayette, severely eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained

Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Fayette, moderately eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

484—Lawson silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Lawson, occasionally flooded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 10.1 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Minor Dissimilar Components

Ackmore, occasionally flooded, and similar soils
Extent: 5 to 15 percent of the unit

Amana, occasionally flooded, and similar soils
Extent: 5 to 15 percent of the unit

587—Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Chequest, occasionally flooded, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Flood plains (fig. 11)
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Months in which flooding does not occur: January, December

Figure 11.—A constructed wetland west of Middle Amana in an area of Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded. Wetlands enhance wildlife habitat, improve water quality, and provide recreational opportunities.

Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Amana, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

587+—Chequest silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Chequest, occasionally flooded, overwash, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium

Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 10.8 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Minor Dissimilar Components

Chequest, occasionally flooded, and similar soils
Extent: 0 to 10 percent of the unit

626—Hayfield silt loam, 0 to 2 percent slopes

Component Description

Hayfield and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Upland flats; treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loamy sediments over sandy and gravelly outwash
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 7.0 inches
Content of organic matter in the upper 10 inches: 2.9 percent

Minor Dissimilar Components

Udolpho and similar soils
Extent: 5 to 15 percent of the unit

663D2—Seaton silt loam, 9 to 14 percent slopes, moderately eroded

Component Description

Seaton, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 12.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Timula, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Seaton soils that are only slightly eroded
Extent: 0 to 10 percent of the unit

663E2—Seaton silt loam, 14 to 18 percent slopes, moderately eroded

Component Description

Seaton, moderately eroded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Timula, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Seaton, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

663E3—Seaton silt loam, 14 to 18 percent slopes, severely eroded

Component Description

Seaton, severely eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.7 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Minor Dissimilar Components

Seaton, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Timula, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

663F2—Seaton silt loam, 18 to 25 percent slopes, moderately eroded

Component Description

Seaton, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Seaton soils that are only slightly eroded
Extent: 5 to 15 percent of the unit

Timula, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

687—Watkins silt loam, 0 to 2 percent slopes, rarely flooded

Component Description

Watkins, rarely flooded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.1 inches
Content of organic matter in the upper 10 inches: 2.7 percent

Minor Dissimilar Components

Koszta, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

687B—Watkins silt loam, 2 to 5 percent slopes, rarely flooded

Component Description

Watkins, rarely flooded, and similar soils
Extent: 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.1 inches
Content of organic matter in the upper 10 inches: 2.7 percent

688—Koszta silt loam, 0 to 2 percent slopes, rarely flooded

Component Description

Koszta, rarely flooded, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 10.8 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Watkins, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

771B—Waubeek silt loam, 2 to 5 percent slopes

Component Description

Waubeek and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Minor Dissimilar Components

Atterberry and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

771C2—Waubeek silt loam, 5 to 9 percent slopes, moderately eroded

Component Description

Waubeek, moderately eroded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Shoulders and side slopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 0 to 10 percent of the unit

Waubeek soils that are only slightly eroded
Extent: 0 to 10 percent of the unit

792D2—Armstrong silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Armstrong, moderately eroded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Gara, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Armstrong, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Ladoga, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

876B—Ladoga silt loam, terrace, 2 to 5 percent slopes

Component Description

Ladoga, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Givin, terrace, and similar soils
Extent: 5 to 15 percent of the unit

876C—Ladoga silt loam, terrace, 5 to 9 percent slopes

Component Description

Ladoga, terrace, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ladoga, moderately eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

Otley, terrace, and similar soils
Extent: 5 to 15 percent of the unit

876C2—Ladoga silt loam, terrace, 5 to 9 percent slopes, moderately eroded

Component Description

Ladoga, moderately eroded, terrace, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ladoga, slightly eroded, terrace, and similar soils
Extent: 5 to 15 percent of the unit

Otley, moderately eroded, terrace, and similar soils
Extent: 0 to 10 percent of the unit

876D2—Ladoga silt loam, terrace, 9 to 14 percent slopes, moderately eroded

Component Description

Ladoga, moderately eroded, terrace, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ely and similar soils
Extent: 5 to 15 percent of the unit

881B—Otley silty clay loam, terrace, 2 to 5 percent slopes

Component Description

Otley, terrace, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 2.0 feet (April)
Deepest depth to wet zone: 5.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Mahaska, terrace, and similar soils
Extent: 0 to 10 percent of the unit

911B—Colo-Ely complex, 2 to 5 percent slopes

Component Description

Colo and similar soils
Extent: 50 to 60 percent of the unit
Landscape position: Upland drainageways (fig. 12)
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Flooding: None
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Ely and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Footslopes of upland drainageways (fig. 12)
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty colluvium
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.3 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Minor Dissimilar Components

Colo, frequently flooded, and similar soils
Extent: 0 to 10 percent of the unit

Judson and similar soils
Extent: 0 to 10 percent of the unit

993D2—Gara-Armstrong complex, 9 to 14 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes (fig. 13)
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None

Figure 12.—Drop structures, grassed waterways, and contour farming help to prevent further erosion in an area of Colo-Ely complex, 2 to 5 percent slopes.

Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Armstrong, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes (fig. 13)
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Ladoga, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Figure 13.—Growing hay in this area of Gara-Armstrong complex, 9 to 14 percent slopes, moderately eroded, helps to control erosion by providing a protective cover of vegetation. It also provides nitrogen to the soil and improves tilth for the next growing season.

Gara, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

993E2—Gara-Armstrong complex, 14 to 18 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 40 to 50 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Armstrong, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes

Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Armstrong, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

Ely and similar soils
Extent: 0 to 10 percent of the unit

Gara, severely eroded, and similar soils
Extent: 0 to 10 percent of the unit

993F2—Gara-Armstrong complex, 18 to 25 percent slopes, moderately eroded

Component Description

Gara, moderately eroded, and similar soils
Extent: 60 to 70 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Subglacial till
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Armstrong, moderately eroded, and similar soils
Extent: 20 to 30 percent of the unit
Landscape position: Side slopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Red paleosol and the underlying subglacial till
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April, October)
Deepest depth to wet zone: More than 6.7 feet (January, February, July, August, September)
Ponding: None

Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Minor Dissimilar Components

Gara, severely eroded, and similar soils
Extent: 5 to 15 percent of the unit

1160—Walford silt loam, terrace, 0 to 2 percent slopes

Component Description

Walford, terrace, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 1 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Minor Dissimilar Components

Atterberry, terrace, and similar soils
Extent: 0 to 10 percent of the unit

1220—Nodaway silt loam, 0 to 2 percent slopes, channeled, frequently flooded

Component Description

Nodaway, frequently flooded, channeled, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Minor Dissimilar Components

Amana, frequently flooded, channeled, and similar soils
Extent: 5 to 15 percent of the unit

Aquents, frequently flooded, channeled, ponded, and similar soils
Extent: 0 to 10 percent of the unit

Colo, frequently flooded, channeled, and similar soils
Extent: 0 to 10 percent of the unit

Klum, frequently flooded, channeled, and similar soils
Extent: 0 to 10 percent of the unit

1291—Atterberry silt loam, terrace, 0 to 2 percent slopes

Component Description

Atterberry, terrace, and similar soils
Extent: 90 to 100 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Minor Dissimilar Components

Downs, terrace, and similar soils
Extent: 0 to 10 percent of the unit

1354—Aquents, ponded

Component Description

Aquents, ponded, and similar soils
Extent: 100 percent of the unit
Landscape position: Flood plains (fig. 14)
Slope range: 0 to 1 percent
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Parent material: Alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Months in which ponding does not occur: January, December
Deepest ponding: 0.5 foot (February, March, April, May, June, July, August, September, October, November)

Figure 14.—An area of Aquents, ponded, along the Iowa River.

1442B—Tama-Sparta-Pillot complex, 2 to 5 percent slopes

Component Description

Tama and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Sparta and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind

Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Pillot and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Ridgetops
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Dickinson and similar soils
Extent: 0 to 10 percent of the unit

1442C—Tama-Sparta-Pillot complex, 5 to 9 percent slopes

Component Description

Tama and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Sparta and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.2 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Pillot and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Minor Dissimilar Components

Dickinson and similar soils
Extent: 0 to 10 percent of the unit

1442C2—Tama-Sparta-Pillot complex, 5 to 9 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Sparta, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.0 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Pillot, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Ridgetops and shoulders
Slope range: 5 to 9 percent

Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.4 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Dickinson, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

1442D2—Tama-Sparta-Pillot complex, 9 to 14 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Sparta, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.0 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Pillot, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits

Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 8.4 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Dickinson, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

1442E2—Tama-Sparta-Pillot complex, 14 to 18 percent slopes, moderately eroded

Component Description

Tama, moderately eroded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Sparta, moderately eroded, and similar soils
Extent: 30 to 40 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Sandy outwash deposits reworked by wind
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None
Available water capacity to a depth of 60 inches: 5.0 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Pillot, moderately eroded, and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Side slopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess over sandy deposits
Flooding: None
Depth to wet zone: More than 6.7 feet all year
Ponding: None

Available water capacity to a depth of 60 inches: 8.4 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Dickinson, moderately eroded, and similar soils
Extent: 0 to 10 percent of the unit

1540—Quiver-Zook-Klum complex, 0 to 2 percent slopes, frequently flooded (fig. 15)

Component Description

Quiver, frequently flooded, and similar soils
Extent: 35 to 45 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Zook, frequently flooded, and similar soils
Extent: 25 to 35 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: At the surface (April)
Deepest depth to wet zone: 3.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Klum, frequently flooded, and similar soils
Extent: 10 to 20 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Sandy alluvium

Figure 15.—Flooding in an area of Quiver-Zook-Klum complex, 0 to 2 percent slopes, frequently flooded, along the Iowa River.

Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 9.7 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Minor Dissimilar Components

Aquents, frequently flooded, ponded, and similar soils
Extent: 5 to 15 percent of the unit

Nodaway, frequently flooded, and similar soils
Extent: 0 to 10 percent of the unit

2219—Ella silt loam, 0 to 2 percent slopes, rarely flooded

Component Description

Ella, rarely flooded, and similar soils
Extent: 65 to 75 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Jackson, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

Koszta, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

Tell, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

Wiota, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

2219B—Ella silt loam, 2 to 5 percent slopes, rarely flooded

Component Description

Ella, rarely flooded, and similar soils
Extent: 70 to 80 percent of the unit
Landscape position: Treads on stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Minor Dissimilar Components

Jackson, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

Tell, rarely flooded, and similar soils
Extent: 5 to 15 percent of the unit

Wiota, rarely flooded, and similar soils
Extent: 0 to 10 percent of the unit

2219C2—Ella silt loam, 5 to 9 percent slopes, moderately eroded, rarely flooded

Component Description

Ella, moderately eroded, and similar soils
Extent: 75 to 85 percent of the unit
Landscape position: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Rare (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Minor Dissimilar Components

Jackson, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

Tell, moderately eroded, and similar soils
Extent: 5 to 15 percent of the unit

2422—Amana-Nodaway-Lawson complex, 0 to 2 percent slopes, occasionally flooded

Component Description

Amana, occasionally flooded, and similar soils
Extent: 45 to 55 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Nodaway, occasionally flooded, and similar soils
Extent: 25 to 35 percent of the unit
Landscape position: Flood plains

Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Lawson, occasionally flooded, and similar soils
Extent: 15 to 25 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Occasional (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 10.1 inches
Content of organic matter in the upper 10 inches: 5.0 percent

4946—Udorthents-Interstate highway complex, 0 to 5 percent slopes

Component Description

Udorthents and similar soils
Extent: 60 to 70 percent of the unit
Slope range: 0 to 5 percent
Depth to restrictive feature: Very deep (more than 60 inches)
Parent material: Loamy deposits
Flooding: None
Ponding: None

Interstate highway
Extent: 25 to 35 percent of the unit
Slope range: 0 to 5 percent
Flooding: None
Ponding: None

Minor Dissimilar Components

Aquents, ponded, and similar soils
Extent: 0 to 10 percent of the unit

5010—Pits, sand and gravel

Component Description

Pits, sand and gravel
Definition: This map unit consists of areas from which sand and gravel have been removed.
Extent: 100 percent of the unit
Ponding: None

5040—Udorthents, loamy

Component Description

Udorthents and similar soils
Extent: 100 percent of the unit
Texture of the surface layer: Variable
Parent material: Loamy deposits
Flooding: None
Ponding: None

6220—Nodaway silt loam, 0 to 2 percent slopes, frequently flooded

Component Description

Nodaway, frequently flooded, and similar soils
Extent: 80 to 90 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 4.0 feet (April)
Deepest depth to wet zone: 6.5 feet (August, September, October)
Ponding: None
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Minor Dissimilar Components

Klum, frequently flooded, and similar soils
Extent: 5 to 15 percent of the unit

Aquents, frequently flooded, ponded, and similar soils
Extent: 0 to 10 percent of the unit

6422—Amana silt loam, 0 to 2 percent slopes, frequently flooded

Component Description

Amana, frequently flooded, and similar soils
Extent: 85 to 95 percent of the unit
Landscape position: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Months in which flooding does not occur: January, December
Highest frequency of flooding: Frequent (February, March, April, May, June, July, August, September, October, November)
Shallowest depth to wet zone: 1.0 foot (April)
Deepest depth to wet zone: 4.0 feet (September)
Ponding: None
Available water capacity to a depth of 60 inches: 12.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Minor Dissimilar Components

Nodaway, frequently flooded, and similar soils
Extent: 5 to 15 percent of the unit

AW—Animal waste lagoon

- This map unit consists of shallow ponds constructed to hold animal waste from farm feedlots.

SL—Sewage lagoon

- This map unit consists of shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid waste.

W—Water

- This map unit consists of natural bodies of water.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). 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. 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 Mollisol.

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 Udoll (*Ud*, meaning humid, plus *oll*, from Mollisol).

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 Hapludolls (*Hapl*, meaning minimal horizonation, plus *udoll*, the suborder of the Mollisols 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 Hapludolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, superactive, mesic Typic Hapludolls.

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.

The table “Classification of the Soils” in Part II of this publication indicates the order, suborder, great group, subgroup, and family of the soil series in the survey area.

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" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 2003). 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.

Ackmore Series

Typical Pedon

Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 370 feet south and 2,560 feet west of the northeast corner of sec. 8, T. 79 N., R. 10 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 40 minutes 21.6 seconds N. and long. 92 degrees 02 minutes 10.3 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common fine and medium roots throughout; common very fine constricted tubular pores; slightly acid; abrupt smooth boundary.

C1—8 to 19 inches; stratified very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam; massive with weak thin alluvial stratification; friable; common very fine and fine roots throughout; common very fine tubular pores; neutral; clear smooth boundary.

C2—19 to 31 inches; stratified very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam; massive with weak thin alluvial stratification; friable; few very fine roots throughout; common very fine tubular pores; common fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral; clear smooth boundary.

Ab1—31 to 44 inches; black (10YR 2/1) silt loam; moderate fine and medium granular structure; friable; few fine roots throughout; common very fine tubular pores; slightly acid; gradual smooth boundary.

Ab2—44 to 59 inches; black (10YR 2/1) silty clay loam; moderate fine granular structure; friable; few fine roots throughout; common very fine tubular pores; slightly acid; gradual smooth boundary.

Ab3—59 to 66 inches; very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) silty clay loam; weak fine and medium subangular blocky structure; friable; common very fine tubular pores; slightly acid; clear smooth boundary.

Cg—66 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; common very fine tubular pores; common medium prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Depth to buried soil: 20 to 36 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

C horizon:
Hue—10YR
Value—2 to 5
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

Ab horizon:
Hue—10YR
Value—2 to 4
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

Cg horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

Adair Series

Typical Pedon

Adair silty clay loam, 9 to 14 percent slopes, moderately eroded, in a CRP field; in Iowa County, Iowa; 600 feet east and 2,520 feet south of the northwest corner of sec. 27, T. 78 N., R. 12 W.; USGS Millersburg topographic quadrangle; lat. 41 degrees 31 minutes 55.6 seconds N. and long. 92 degrees 14 minutes 13.6 seconds W., NAD 83:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine and medium roots; common very fine tubular pores; slightly acid; clear smooth boundary.

A—6 to 9 inches; about 80 percent very dark grayish brown (10YR 3/2) silty clay loam and 20 percent brown (10YR 4/3) mixings; grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; many fine roots; common very fine tubular pores; slightly acid; clear smooth boundary.

2Bt1—9 to 15 inches; brown (7.5YR 4/4) clay; moderate fine subangular blocky structure; firm; common very fine roots; common very fine tubular pores; common distinct brown (7.5YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt2—15 to 24 inches; brown (7.5YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; common distinct brown (7.5YR 4/3) clay films on faces of peds; common medium distinct grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; clear smooth boundary.

2Bt3—24 to 36 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few very fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; common medium prominent grayish brown (2.5Y 5/2) redoximorphic depletions; moderately acid; clear smooth boundary.

2Bt4—36 to 50 inches; strong brown (7.5YR 5/6) clay loam; weak medium prismatic structure parting to weak and moderate medium subangular blocky; firm; few very fine roots; few very fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; many medium prominent gray (2.5Y 5/1) redoximorphic depletions; slightly acid; clear smooth boundary.
2BC—50 to 59 inches; strong brown (7.5YR 5/6) clay loam; weak fine and medium prismatic structure; firm; few distinct brown (7.5YR 4/4) clay films on faces of peds; common medium prominent grayish brown (2.5Y 5/2) redoximorphic depletions; slightly acid; gradual smooth boundary.
2C—59 to 80 inches; brown (10YR 5/4) clay loam; massive; firm; common medium prominent gray (2.5Y 5/1) redoximorphic depletions; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Other features: Some pedons have a BA horizon as much as 5 inches thick. A stone line may be at the top of the 2Bt horizon or at the base of the A or BA horizon.

Ap or A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—clay loam, loam, silty clay loam, or silt loam
Reaction—slightly acid or moderately acid

2Bt horizon (upper part):
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—clay loam, clay, or (less commonly) silty clay
Reaction—moderately acid or slightly acid

2Bt horizon (lower part):
Hue—5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—clay loam
Reaction—moderately acid or slightly acid

2BC horizon:
Hue—2.5YR to 2.5Y
Value—3 to 5
Chroma—2 to 6
Texture—clay loam
Reaction—slightly acid to slightly alkaline

2C horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 6
Texture—clay loam
Reaction—slightly acid to slightly alkaline

Taxadjunct features: The representative pedons for the moderately eroded and severely eroded phases of the Adair series in this survey area (map units 24C2, 24D2, 24D3, 93D2, 93D3, 93E2, 192D2, 192D3, 281D2, and 281D3) are taxadjuncts because the surface layer does not meet the thickness requirements

for Mollisols. These pedons are classified as fine, smectitic, mesic Aquertic Hapludalfs.

Amana Series

Typical Pedon

Amana silt loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 2,500 feet north and 1,200 feet west of the southeast corner of sec. 25, T. 81 N., R. 10 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 47 minutes 07 seconds N. and long. 91 degrees 57 minutes 01 second W., NAD 83:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) dry; weak fine subangular blocky structure; friable; common fine roots; common fine tubular pores; neutral; gradual smooth boundary.

A—8 to 16 inches; very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) dry; weak fine subangular blocky structure; friable; common very fine roots; common fine tubular pores; neutral; gradual smooth boundary.

Bg1—16 to 24 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine subangular blocky structure; friable; few very fine roots; few very fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; neutral; gradual smooth boundary.

Bg2—24 to 48 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few fine irregular masses of iron-manganese; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; common fine faint light brownish gray (10YR 6/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

BCg—48 to 63 inches; grayish brown (10YR 5/2) silty clay loam; weak fine subangular blocky structure; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—63 to 80 inches; light grayish brown (10YR 6/2) silt loam; massive; friable; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

Bg horizon:
- Hue—10YR or 2.5Y
- Value—4 or 5
- Chroma—2
- Texture—silt loam or silty clay loam
- Reaction—moderately acid to neutral

BCg or Cg horizon:
- Hue—10YR, 2.5Y, or 5Y

Value—4 to 6
Chroma—1 to 4
Texture—silt loam or loam
Reaction—moderately acid to neutral

Armstrong Series

Typical Pedon

Armstrong silty clay loam, 9 to 14 percent slopes, moderately eroded, in a cultivated field; in Iowa County, Iowa; 1,120 feet north and 1,470 feet east of the southwest corner of sec. 18, T. 78 N., R. 11 W.; USGS Millersburg topographic quadrangle; lat. 41 degrees 33 minutes 24.1 seconds N. and long. 91 degrees 10 minutes 40.1 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; many fine roots throughout; few fine tubular pores; few distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; abrupt smooth boundary.

BE—8 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; many fine roots throughout; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 23 inches; brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure; firm; many fine roots throughout; few fine tubular pores; common distinct brown (7.5YR 4/3) clay films on faces of peds; about 2 percent rounded gravel; slightly acid; clear smooth boundary.

2Bt2—23 to 37 inches; brown (7.5YR 4/4) clay; moderate medium subangular blocky structure; firm; many very fine roots throughout; few fine tubular pores; common distinct brown (7.5YR 4/3) clay films on faces of peds; many fine distinct yellowish red (5YR 4/6) redoximorphic concentrations; about 10 percent angular gravel; strongly acid; clear smooth boundary.

2Bt3—37 to 51 inches; brown (7.5YR 5/4) and strong brown (7.5YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots throughout; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; about 12 percent angular gravel; strongly acid; gradual smooth boundary.

2Bt4—51 to 63 inches; strong brown (7.5YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots throughout; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many black (10YR 2/1) iron and manganese oxides; common fine distinct yellowish brown (10YR 5/8) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; about 8 percent angular and rounded gravel; strongly acid; gradual smooth boundary.

2BC—63 to 72 inches; yellowish brown (10YR 5/6 and 5/4) clay loam; weak medium prismatic structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; many black (10YR 2/1) iron and manganese oxides; common fine distinct yellowish brown (10YR 5/8) redoximorphic concentrations; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; about 5 percent angular gravel; moderately acid; gradual smooth boundary.

2C—72 to 80 inches; yellowish brown (10YR 5/4) and pale brown (10YR 6/3) clay loam; massive; firm; many black (10YR 2/1) iron and manganese oxides; common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; about 5 percent angular gravel; moderately acid.

Range in Characteristics

Depth to carbonates: More than 40 inches
Other features: Some pedons have an EB horizon.

Ap or A horizon:
- Hue—10YR
- Value—3
- Chroma—1 or 2
- Texture—loam, clay loam, silty clay loam, or silt loam
- Reaction—moderately acid to neutral

E horizon (if it occurs):
- Hue—10YR
- Value—4 or 5
- Chroma—2 or 3
- Texture—loam or silt loam
- Reaction—moderately acid to neutral

BE horizon (if it occurs):
- Hue—10YR
- Value—4 or 5
- Chroma—2 to 4
- Texture—loam or clay loam
- Reaction—moderately acid to neutral

Bt horizon (if it occurs):
- Hue—7.5YR or 10YR
- Value—4 or 5
- Chroma—2 to 6
- Texture—loam or clay loam
- Content of rock fragments—1 to 10 percent; a stone line commonly occurs at the lower boundary of this horizon
- Reaction—moderately acid to neutral

2Bt horizon:
- Hue—5YR or 7.5YR
- Value—4 or 5
- Chroma—2 to 6
- Texture—clay loam or clay
- Content of rock fragments—2 to 15 percent
- Reaction—very strongly acid to slightly acid

2BC or 2C horizon:
- Hue—10YR or 2.5Y
- Value—4 to 6
- Chroma—3 to 6
- Texture—clay loam
- Content of rock fragments—2 to 15 percent
- Reaction—moderately acid to slightly alkaline

Atterberry Series

Typical Pedon

Atterberry silt loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 530 feet east and 80 feet north of the southwest corner of sec. 5, T. 80 N., R. 12 W.; USGS Hartwick topographic quadrangle; lat. 41 degrees 22 minutes 39 seconds N. and long. 92 degrees 16 minutes 36 seconds W., NAD 83:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

E—9 to 14 inches; dark gray (10YR 4/1) silt loam, light gray (10YR 6/1) dry; weak thin platy structure parting to weak fine granular; friable; few fine roots; few fine tubular pores; few fine faint grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; clear smooth boundary.

BE—14 to 17 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; few fine faint brown (10YR 5/3) redoximorphic concentrations; moderately acid; clear smooth boundary.

Btg1—17 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; few fine faint yellowish brown (10YR 5/4) redoximorphic concentrations; moderately acid; clear smooth boundary.

Btg2—22 to 34 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg3—34 to 48 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine tubular pores; common faint grayish brown (10YR 5/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BCg—48 to 54 inches; olive gray (5Y 5/2) silty clay loam; weak medium and coarse prismatic structure; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg1—54 to 64 inches; light olive gray (5Y 6/2) silt loam; massive; friable; few fine roots; few fine tubular pores; few fine irregular masses of iron-manganese; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg2—64 to 80 inches; olive gray (5Y 5/2) silt loam; massive; friable; few fine irregular masses of iron-manganese; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 45 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid to neutral

E horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

BE horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or silty clay loam
Reaction—strongly acid to neutral

Btg horizon:
Hue—10YR to 5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam
Reaction—strongly acid to neutral

BCg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2
Texture—silt loam or silty clay loam
Reaction—moderately acid to slightly alkaline

Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2
Texture—silt loam
Reaction—slightly acid to slightly alkaline

Bassett Series

Typical Pedon

Bassett loam, 5 to 9 percent slopes, moderately eroded, in a cultivated field; in Iowa County, Iowa; 370 feet east and 695 feet south of the northwest corner of sec. 11, T. 81 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 50 minutes 48.2 seconds N. and long. 91 degrees 52 minutes 12.4 seconds W., NAD 83:

Ap—0 to 9 inches; very dark brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; common fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

BE—9 to 12 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; common fine roots; common fine tubular pores; slightly acid; clear smooth boundary.
2Bt1—12 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine subangular blocky structure; firm; few fine roots; few fine tubular pores; few fine distinct brown (10YR 4/3) clay films on faces of peds; few fine irregular masses of iron-manganese; about 2 percent gravel; slightly acid; clear smooth boundary.
2Bt2—16 to 29 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct light brownish gray (10YR 6/2) silt coats on faces of peds; few fine irregular masses of iron-manganese; about 2 percent gravel; moderately acid; gradual smooth boundary.
2Bt3—29 to 40 inches; mottled dark yellowish brown (10YR 4/4) and grayish brown (10YR 5/2) clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; many medium distinct light brownish gray (10YR 6/2) silt coats on faces of peds; few fine irregular masses of iron-manganese; about 2 percent gravel; slightly acid; clear smooth boundary.
2Bt4—40 to 54 inches; yellowish brown (10YR 5/4) clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; few fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; about 2 percent gravel; slightly acid; clear smooth boundary.
2BC—54 to 80 inches; yellowish brown (10YR 5/6) loam; weak fine prismatic structure parting to weak medium subangular blocky; firm; few fine irregular masses of iron-manganese; common fine and medium faint strong brown (7.5YR 5/6) and common fine and medium distinct strong brown (7.5YR 5/8) redoximorphic concentrations; common fine and medium prominent grayish brown (2.5Y 5/2) redoximorphic depletions; about 2 percent gravel; moderately alkaline.

Range in Characteristics

Depth to carbonates: 48 to 80 inches
Depth to glacial till: 12 to 24 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—loam or silt loam
Reaction—strongly acid to neutral

BE horizon:
Hue—10YR or 7.5YR
Value—4 to 8
Chroma—3 to 8
Texture—loam or silt loam
Reaction—strongly acid to slightly acid

2Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 8
Chroma—1 to 8

Texture—loam, clay loam, or sandy clay loam
Reaction—strongly acid to slightly acid

2BC horizon (if it occurs):
Hue—2.5Y, 10YR, or 7.5YR
Value—4 to 8
Chroma—1 to 8
Texture—clay loam, loam, or sandy clay loam
Reaction—strongly acid to moderately alkaline

Taxadjunct features: The representative pedons for the severely eroded Bassett soils in map units 171D3, 171E2, and 171E3 are taxadjuncts because the surface layer does not meet the color requirements for Mollic subgroups. These pedons are classified as fine-loamy, mixed, superactive, mesic Typic Hapludalfs.

Bremer Series

Typical Pedon

Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 1,600 feet south and 700 feet east of the northwest corner of sec. 22, T. 81 N., R. 11 W.; USGS Marengo topographic quadrangle; lat. 41 degrees 49 minutes 07.2 seconds N. and long. 92 degrees 07 minutes 20.9 seconds W., NAD 83:

Ap—0 to 7 inches; black (N 2.5/) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; common fine roots throughout; common very fine tubular pores; slightly acid; abrupt smooth boundary.

A1—7 to 15 inches; black (N 2.5/) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; friable; common very fine roots throughout; many very fine tubular pores; slightly acid; clear smooth boundary.

A2—15 to 21 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few very fine roots throughout; many very fine tubular pores; slightly acid; clear smooth boundary.

Btg1—21 to 28 inches; very dark gray (5Y 3/1) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots throughout; many very fine tubular pores; common distinct dark gray (2.5Y 4/1) clay films on faces of peds; common fine black (10YR 2/1) iron and manganese oxides; common fine and medium prominent dark yellowish brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg2—28 to 35 inches; dark gray (5Y 4/1) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots throughout; many very fine tubular pores; common distinct dark gray (2.5Y 4/1) clay films on faces of peds; few fine and medium black (10YR 2/1) iron and manganese oxides; common fine and medium prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg3—35 to 56 inches; gray (5Y 5/1) silty clay loam; moderate medium subangular blocky structure; friable; many very fine tubular pores; common distinct gray (2.5Y 5/1) clay films on faces of peds; common fine and medium black (10YR 2/1) iron and manganese oxides; many medium prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; slightly acid; gradual smooth boundary.

BCg—56 to 64 inches; gray (5Y 5/1) silty clay loam; weak medium subangular blocky structure; friable; many very fine tubular pores; few distinct gray (2.5Y 5/1) clay films on faces of peds; many fine and medium black (10YR 2/1) iron and manganese oxides; many medium prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; slightly acid; clear wavy boundary.

Cg—64 to 80 inches; gray (5Y 5/1) silt loam; massive; friable; many very fine tubular pores; many fine and medium black (10YR 2/1) iron and manganese oxides; many coarse prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 24 to 36 inches

A and Ap horizons:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam
Reaction—moderately acid to neutral

Bt or Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam or silty clay
Reaction—moderately acid to neutral

BCg or Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam, silt loam, or silty clay
Reaction—slightly acid

Chelsea Series

Typical Pedon

Chelsea loamy fine sand, 2 to 9 percent slopes, in a pasture; in Iowa County, Iowa; 1,600 feet north and 240 feet east of the southwest corner of sec. 11, T. 80 N., R. 9 W.; USGS Oxford topographic quadrangle; lat. 41 degrees 44 minutes 57.8 seconds N. and long. 91 degrees 52 minutes 10.8 seconds W., NAD 83:

Ap—0 to 6 inches; brown (10YR 4/3) loamy fine sand, brown (10YR 5/3) dry; weak fine granular structure; very friable; many very fine and fine roots; moderately acid; abrupt smooth boundary.
E1—6 to 11 inches; dark yellowish brown (10YR 4/4) loamy fine sand, yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; very friable; common very fine roots; moderately acid; clear smooth boundary.
E2—11 to 20 inches; yellowish brown (10YR 5/4) fine sand, light yellowish brown (10YR 6/4) dry; single grain; loose; few very fine roots; strongly acid; clear smooth boundary.
E3—20 to 36 inches; light yellowish brown (10YR 6/4) fine sand, very pale brown (10YR 7/4) dry; single grain; loose; few very fine roots; strongly acid; clear smooth boundary.
E and Bt—36 to 80 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; yellowish brown (10YR 5/4) loamy fine sand and fine sandy loam bands 1/2 inch to 2 inches thick at depths of 36, 47, 54, 63, and 74 inches; strongly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
- Hue—10YR
- Value—3 or 4
- Chroma—1 to 4
- Texture—loamy fine sand or fine sand
- Reaction—strongly acid or moderately acid

E horizon:
- Hue—10YR or 7.5YR
- Value—4 to 6
- Chroma—2 to 6
- Texture—fine sand or loamy fine sand
- Reaction—strongly acid or moderately acid

E and Bt horizon:
- Hue—7.5YR or 10YR
- Value—3 to 5
- Chroma—3 to 6
- Texture—sandy loam, loamy sand, fine sandy loam, loamy fine sand, or fine sand in the Bt part; fine sand or loamy fine sand in the E part
- Reaction—strongly acid or moderately acid

Chequest Series

Typical Pedon

Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 1,890 feet west and 1,110 feet south of the northeast corner of sec. 32, T. 79 N., R. 12 W.; USGS Deep River topographic quadrangle; lat. 41 degrees 36 minutes 46.8 seconds N. and long. 92 degrees 16 minutes 01 second W., NAD 83:

Ap—0 to 8 inches; black (N 2.5/) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; many fine roots throughout; common very fine tubular pores; slightly acid; abrupt smooth boundary.

A1—8 to 17 inches; black (N 2.5/) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; firm; common very fine roots throughout; common very fine tubular pores; slightly acid; clear smooth boundary.

A2—17 to 23 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; firm; common very fine roots throughout; common very fine tubular pores; slightly acid; clear smooth boundary.

Btg1—23 to 28 inches; dark gray (10YR 4/1) silty clay; strong fine and medium subangular blocky structure; firm; common very fine roots throughout; few very fine tubular pores; few distinct dark gray (2.5Y 4/1) clay films on faces of peds; common pressure faces on faces of peds; slightly acid; clear smooth boundary.

Btg2—28 to 42 inches; gray (2.5Y 5/1) silty clay; strong medium subangular blocky structure; firm; few very fine roots throughout; few very fine tubular pores; common distinct dark gray (2.5Y 4/1) clay films on faces of peds; common pressure faces on faces of peds; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg3—42 to 54 inches; gray (2.5Y 6/1) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine tubular pores; few distinct gray (2.5Y 5/1) clay films on faces of peds; common fine and medium black (10YR 2/1) iron and manganese oxides; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.
Cg1—54 to 66 inches; gray (2.5Y 6/1) silt loam; massive; friable; few fine black (10YR 2/1) iron and manganese oxides; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear wavy boundary.
Cg2—66 to 80 inches; light brownish gray (2.5Y 6/2) loam; massive; friable; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 10 to 24 inches

Ap and A horizons:
Hue—10YR or N
Value—2 or 3
Chroma—0 to 2
Texture—silty clay loam or silt loam
Reaction—slightly acid or neutral

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1
Texture—silty clay loam or silty clay
Reaction—moderately acid or slightly acid

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam, silt loam, loam, or clay loam
Reaction—moderately acid to neutral

Clinton Series

Typical Pedon

Clinton silt loam, 5 to 9 percent slopes, in a cultivated field; in Iowa County, Iowa; 470 feet north and 2,040 feet west of the southeast corner of sec. 23, T. 79 N., R. 12 W.; USGS Williamsburg NW topographic quadrangle; lat. 41 degrees 37 minutes 53.1 seconds N. and long. 92 degrees 12 minutes 30.1 seconds W., NAD 83:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; few fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.
E—5 to 12 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to weak thin platy; friable; few fine roots; common very fine tubular pores; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.
Bt1—12 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common very

fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; few clay coatings on surfaces along pores; common distinct brown (10YR 4/3) clay films on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt3—27 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; common distinct brown (10YR 5/3) clay films on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt4—39 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine and medium prismatic structure parting to weak coarse subangular blocky; firm; few very fine roots; common very fine tubular pores; few distinct brown (10YR 5/3) clay films on faces of peds; few fine irregular masses of iron-manganese; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BC—50 to 66 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure; friable; common very fine tubular pores; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common fine faint grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.

C—66 to 80 inches; brown (10YR 5/3) silty clay loam; massive; friable; few very fine tubular pores; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common fine faint grayish brown (10YR 5/2) redoximorphic depletions; moderately acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
- Hue—10YR
- Value—3 or 4
- Chroma—1 to 3
- Texture—silt loam or silty clay loam
- Reaction—strongly acid to slightly acid

E horizon (if it occurs):
- Hue—10YR
- Value—4 or 5
- Chroma—2 to 4
- Texture—silt loam
- Reaction—strongly acid or moderately acid

Bt horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 or 4
- Texture—silty clay loam or silty clay
- Reaction—strongly acid or moderately acid

BC and C horizons:
- Hue—10YR
- Value—5
- Chroma—3 or 4

Texture—silty clay loam or silt loam
Reaction—strongly acid to slightly acid

Colo Series

Typical Pedon

Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 800 feet south and 100 feet west of the northeast corner of sec. 18, T. 79 N., R. 10 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 39 minutes 25 seconds N. and long. 92 degrees 02 minutes 48 seconds W., NAD 83:

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; friable; common fine roots; few very fine tubular pores; neutral; abrupt smooth boundary.

A1—9 to 16 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak and moderate fine granular structure; friable; common fine roots; few very fine tubular pores; neutral; clear smooth boundary.

A2—16 to 30 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; friable; common very fine roots; common very fine tubular pores; common medium rounded dark concretions; neutral; gradual smooth boundary.

A3—30 to 36 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium subangular blocky structure; friable; few very fine roots; common very fine tubular pores; neutral; gradual smooth boundary.

Bg1—36 to 43 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; common very fine tubular pores; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Bg2—43 to 50 inches; very dark gray (2.5Y 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine tubular pores; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Bg3—50 to 59 inches; gray (2.5Y 4/1) silty clay loam; weak medium prismatic structure; friable; common very fine tubular pores; few fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; neutral; gradual smooth boundary.

BCg—59 to 67 inches; gray (5Y 5/1) silty clay loam; weak coarse prismatic structure; friable; few very fine tubular pores; common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; neutral; gradual smooth boundary.

Cg—67 to 80 inches; light olive gray (5Y 6/2) silty clay loam; massive; friable; few very fine tubular pores; common fine and medium prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 4/6) redoximorphic concentrations; neutral.

Range in Characteristics

Thickness of the mollic epipedon: More than 36 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
Hue—10YR, 2.5Y, 5Y, or N; 10YR in overwash phase
Value—2 or 3; 3 to 5 in overwash phase
Chroma—0 to 2; 1 or 2 in overwash phase
Texture—silty clay loam or silt loam

Reaction—moderately acid to neutral; slightly acid to moderately alkaline in overwash phase

Bg horizon:
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—1
Texture—silty clay loam
Reaction—moderately acid to neutral

BCg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam
Reaction—moderately acid to neutral

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam, silt loam, or clay loam
Reaction—moderately acid to neutral

Dickinson Series

Typical Pedon

Dickinson fine sandy loam, 5 to 9 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,840 feet east and 810 feet south of the northwest corner of sec. 5, T. 80 N., R. 9 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 45 minutes 57.5 seconds N. and long. 91 degrees 56 minutes 33.1 seconds W., NAD 83:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; friable; many fine roots; few fine tubular pores; many distinct very dark brown (10YR 2/2) organic coats on faces of peds; neutral; clear smooth boundary.

A—9 to 19 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine roots; few fine tubular pores; common distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

Bw1—19 to 25 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots; few fine tubular pores; common distinct dark brown (10YR 3/3) organic coats on faces of peds; moderately acid; clear smooth boundary.

Bw2—25 to 30 inches; brown (10YR 4/3) fine sandy loam; weak medium prismatic structure parting to weak medium subangular blocky; very friable; common fine roots; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; moderately acid; clear smooth boundary.

BC—30 to 33 inches; yellowish brown (10YR 5/4) loamy sand; weak medium prismatic structure parting to single grain; very friable; few fine roots throughout; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; moderately acid; abrupt smooth boundary.

C1—33 to 48 inches; yellowish brown (10YR 5/4 and 5/6) fine sand; single grain; loose; moderately acid; gradual smooth boundary.

C2—48 to 80 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 12 to 24 inches
Depth to loamy sand or sand: 20 to 42 inches
Depth to carbonates: More than 60 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—fine sandy loam, sandy loam, or loam
Reaction—moderately acid to neutral

Bw horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—2 to 4
Texture—sandy loam or fine sandy loam
Reaction—strongly acid to slightly acid

BC and C horizons:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—loamy fine sand, loamy sand, fine sand, or sand
Reaction—moderately acid to neutral

Dinsdale Series

Typical Pedon

Dinsdale silty clay loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 515 feet east and 45 feet south of the northwest corner of sec. 2, T. 81 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 51 minutes 41.3 seconds N. and long. 92 degrees 52 minutes 05.7 seconds W., NAD 83:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; few fine tubular pores; common distinct very dark brown (10YR 2/2) organic coats on faces of peds; moderately acid; clear smooth boundary.

AB—10 to 14 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 4/3) dry; moderate fine and very fine subangular blocky structure; friable; common fine roots; few fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; moderately acid; clear smooth boundary.

Bt1—14 to 24 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—24 to 33 inches; yellowish brown (10YR 5/4) clay loam; moderate fine subangular blocky structure; firm; few very fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on vertical faces of peds; about 2 percent subrounded gravel; common fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; moderately acid; gradual smooth boundary.

2Bt3—33 to 45 inches; about 60 percent yellowish brown (10YR 5/4) and 40 percent strong brown (7.5YR 5/8) clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on vertical faces of peds; about 3 percent subrounded gravel; common fine distinct gray (10YR 6/1) redoximorphic depletions; moderately acid; gradual smooth boundary.

2BC1—45 to 58 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure; firm; very few distinct brown (10YR 5/3) clay films on vertical faces of peds; about 3 percent subrounded gravel; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common fine distinct gray (10YR 6/1) redoximorphic depletions; slightly effervescent; slightly alkaline; gradual smooth boundary.

2BC2—58 to 80 inches; about 65 percent yellowish brown (10YR 5/4) and 35 percent strong brown (7.5YR 5/8) clay loam; extremely coarse prismatic structure; firm; about 5 percent subrounded gravel; common fine prominent yellowish red (5YR 4/6) redoximorphic concentrations; common fine distinct gray (10YR 6/1) redoximorphic depletions; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to till: 20 to 40 inches
Depth to carbonates: 45 to 65 inches

Ap, A, or AB horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—1 to 3
- Texture—silt loam or silty clay loam
- Reaction—strongly acid to neutral

Bt horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—3 to 6
- Texture—silty clay loam; a stone line is commonly at the lower boundary
- Reaction—strongly acid to neutral

2Bt horizon (if it occurs):
- Hue—10YR or 7.5YR
- Value—4 or 5
- Chroma—3 to 8
- Texture—loam, sandy clay loam, or clay loam; vertical seams or wedges of sand or loamy sand 2 to 6 inches wide extend downward from the stone line to a depth of 3 to 4 feet in most pedons
- Reaction—moderately acid to neutral

2BC horizon:
- Hue—10YR or 7.5YR
- Value—4 or 5
- Chroma—4 to 8
- Texture—loam, sandy clay loam, or clay loam; vertical seams or wedges of sand or loamy sand 2 to 6 inches wide extend downward from the stone line to a depth of 3 to 4 feet in most pedons
- Reaction—neutral to moderately alkaline

Taxadjunct features: The representative pedon for the moderately eroded Dinsdale soil in map unit 83C2 is a taxadjunct because the surface layer does not meet the

thickness requirements for Mollisols. This pedon is classified as a fine-silty, mixed, superactive, mesic Mollic Hapludalf.

Downs Series

Typical Pedon

Downs silt loam, 5 to 9 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,160 feet north and 2,530 feet west of the southeast corner of sec. 4, T. 80 N., R. 12 W.; USGS Ladora topographic quadrangle; lat. 41 degrees 45 minutes 50.4 seconds N. and long. 92 degrees 14 minutes 58 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

BE—8 to 12 inches; brown (10YR 4/3) silt loam; weak fine and very fine subangular blocky structure; friable; many fine roots; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; strongly acid; clear smooth boundary.

Bt1—12 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—20 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; very few distinct light gray (10YR 7/1) silt coats on faces of peds; strongly acid; gradual smooth boundary.

Bt3—26 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine prismatic structure parting to moderate medium and fine subangular blocky; friable; common very fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; strongly acid; gradual smooth boundary.

Bt4—33 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on vertical faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; few fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; few fine distinct strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BC—48 to 62 inches; pale brown (10YR 6/3) silt loam; weak medium prismatic structure; friable; few very fine roots; few fine tubular pores; common medium faint light brownish gray (10YR 6/2) redoximorphic depletions; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

C—62 to 80 inches; pale brown (10YR 6/3) silt loam; massive; friable; few fine tubular pores; common medium faint light brownish gray (10YR 6/2) redoximorphic depletions; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
Hue—10YR

Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid to neutral

E horizon (if it occurs):
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam
Reaction—strongly acid to neutral

BE horizon:
Hue—10YR
Value—4
Chroma—3 or 4
Texture—silt loam
Reaction—strongly acid to slightly acid

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam
Reaction—strongly acid to slightly acid

BC and C horizons:
Hue—10YR
Value—5 or 6
Chroma—3 to 6
Texture—silt loam
Reaction—strongly acid to slightly acid

Taxadjunct features: The representative pedons for the severely eroded Downs soils in map units 162D3, 162E2, and 162E3 are taxadjuncts because the surface layer does not meet the color requirements for Mollic subgroups. These pedons are classified as fine-silty, mixed, superactive, mesic Typic Hapludalfs.

Ella Series

Typical Pedon

Ella silt loam, 2 to 5 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 1,740 feet south and 400 feet west of the northeast corner of sec. 4, T. 79 N., R. 10 W.; USGS Holbrook topographic quadrangle; lat. 41 degrees 36 minutes 38.4 seconds N. and long. 91 degrees 58 minutes 11 seconds W., NAD 83:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common fine roots throughout; common very fine tubular pores; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak thin platy structure; friable; common fine roots throughout; common very fine tubular pores; slightly acid; clear smooth boundary.

Bt1—15 to 22 inches; brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable; common very fine roots throughout; common very fine

tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—22 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; strongly acid; gradual smooth boundary.

Bt3—36 to 47 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; common fine distinct yellowish brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; clear smooth boundary.

Bt4—47 to 62 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; fine irregular masses of iron-manganese; common fine distinct yellowish brown (7.5YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; clear smooth boundary.

2C—62 to 80 inches; dark yellowish brown (10YR 4/4) silt loam with thin strata of silt and fine sandy loam; massive; friable; few very fine tubular pores; common fine irregular masses of iron-manganese; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—1 to 3
- Texture—silt loam
- Reaction—strongly acid to neutral

E horizon:
- Hue—10YR or 2.5Y
- Value—4 to 6
- Chroma—2 or 3
- Texture—silt loam
- Reaction—strongly acid to slightly acid

Bt horizon:
- Hue—7.5YR or 10YR
- Value—4 or 5
- Chroma—3 or 4
- Texture—silty clay loam or silt loam
- Reaction—strongly acid to slightly acid

2C horizon:
- Hue—7.5YR or 10YR
- Value—4 to 7
- Chroma—3 to 8
- Texture—stratified silt loam, silty clay loam, loam, or fine sandy loam
- Reaction—strongly acid to moderately alkaline

Ely Series

Typical Pedon

Ely silty clay loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 2,590 feet north and 370 feet east of the southwest corner of sec. 36, T. 80 N., R. 11 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 41 minutes 41.5 seconds N. and long. 92 degrees 05 minutes 02.4 seconds W., NAD 83:

Ap—0 to 9 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; common fine roots throughout; common very fine tubular pores; neutral; abrupt smooth boundary.

A1—9 to 20 inches; black (10YR 2/1) silty clay loam, very dark yellowish brown (10YR 4/1) dry; moderate fine granular structure; friable; common very fine roots throughout; common very fine tubular pores; neutral; clear smooth boundary.

A2—20 to 29 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; common very fine roots throughout; common very fine tubular pores; neutral; clear smooth boundary.

AB—29 to 35 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; neutral; few fine distinct dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral; clear smooth boundary.

Bg1—35 to 47 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; common fine distinct dark yellowish brown (10YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Bg2—47 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine tubular pores; many fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

BCg—61 to 68 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium subangular blocky structure; friable; common very fine tubular pores; common fine black (10YR 2/1) masses of iron-manganese accumulation; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—68 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; common very fine tubular pores; common fine black (10YR 2/1) masses of iron-manganese accumulation; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches
Depth to carbonates: More than 48 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silty clay loam or silt loam
- Reaction—moderately acid to neutral

AB or BA horizon:
- Hue—10YR
- Value—3

Chroma—1 or 2
Texture—silty clay loam
Reaction—moderately acid to neutral

Bg and BCg horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 in the upper part; 2 to 4 in the lower part
Texture—silty clay loam
Reaction—moderately acid to neutral

Cg horizon:
Hue—10YR
Value—5
Chroma—1 to 3
Texture—silty clay loam, silt loam, loam, or clay loam
Reaction—moderately acid to neutral

Fayette Series

Typical Pedon

Fayette silt loam, 5 to 9 percent slopes, moderately eroded, in a cultivated field; in Iowa County, Iowa; 585 feet west and 1,720 feet south of the northeast corner of sec. 22, T. 81 N., R. 10 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 48 minutes 46.2 seconds N. and long. 91 degrees 59 minutes 20.2 seconds W., NAD 83:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; many fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

BE—9 to 14 inches; brown (10YR 4/3) silt loam; weak medium platy structure parting to moderate fine subangular blocky; friable; many fine roots; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; strongly acid; clear smooth boundary.

Bt1—14 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; very few distinct light gray (10YR 7/1) silt coats on faces of peds; strongly acid; clear smooth boundary.

Bt2—21 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; strongly acid; clear smooth boundary.

Bt3—31 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; few fine tubular pores; common distinct brown (10YR 4/4) clay films on all faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; few fine distinct light grayish brown (10YR 5/2) redoximorphic depletions; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Bt4—48 to 66 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; few fine tubular pores; common distinct brown (10YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; few

black (10YR 2/1) iron-manganese concretions; common fine distinct light grayish brown (10YR 5/2) redoximorphic depletions; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

BC—66 to 77 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure; friable; few distinct brown (10YR 4/4) clay films on faces of peds; few black (10YR 2/1) iron-manganese concretions; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

C—77 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; few black (10YR 2/1) iron-manganese concretions; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A horizon (in uncultivated areas):
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—strongly acid to neutral

Ap horizon:
- Hue—10YR
- Value—4
- Chroma—2 or 3
- Texture—silt loam
- Reaction—strongly acid to neutral

E horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—1 to 4
- Texture—silt loam or silty clay loam
- Reaction—strongly acid to slightly acid

BE horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 or 4
- Texture—silt loam or silty clay loam
- Reaction—strongly acid to slightly acid

Bt horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 to 6
- Texture—silty clay loam
- Reaction—very strongly acid to slightly acid

BC and C horizons:
- Hue—10YR
- Value—4 or 5
- Chroma—4 to 6

Texture—silt loam or silty clay loam
Reaction—strongly acid to moderately alkaline

Gara Series

Typical Pedon

Gara loam, 14 to 18 percent slopes, moderately eroded, in a pasture; in Iowa County, Iowa; 90 feet east and 1,220 feet north of the southwest corner of sec. 17, T. 78 N., R. 11 W.; USGS Millersburg topographic quadrangle; lat. 41 degrees 33 minutes 24.3 seconds N. and long. 92 degrees 09 minutes 41.1 seconds W., NAD 83:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots; few fine tubular pores; common distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

BE—7 to 12 inches; dark grayish brown (10YR 4/3) loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; many fine roots; few fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

Bt1—12 to 19 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; many fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; about 5 percent rounded gravel; strongly acid; clear smooth boundary.

Bt2—19 to 31 inches; yellowish brown (10YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; common very fine roots; few fine tubular pores; many distinct brown (10YR 4/3) clay films on faces of peds; very few distinct light gray (10YR 7/1) silt coats on faces of peds; about 5 percent rounded gravel; strongly acid; clear smooth boundary.

Bt3—31 to 43 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate medium subangular and angular blocky; firm; common very fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/1) silt coats on faces of peds; about 3 percent rounded gravel; few medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

BC—43 to 54 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure; firm; few very fine roots; few fine tubular pores; few distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; very few distinct light gray (10YR 7/1) silt coats on faces of peds; about 3 percent rounded gravel; common coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common medium distinct light brownish gray (10YR 6/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

C—54 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; few fine tubular pores; few black (10YR 2/1) iron-manganese concretions; about 2 percent rounded gravel; many coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; many medium distinct light brownish gray (10YR 6/2) redoximorphic depletions; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 to 70 inches

A or Ap horizon:
Hue—10YR

Value—3
Chroma—1 or 2
Texture—loam, silt loam, clay loam, or fine sandy loam
Reaction—moderately acid to neutral

E or BE horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—loam, silt loam, or clay loam
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam
Reaction—very strongly acid to slightly acid

BC and C horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—4 to 6
Texture—clay loam or loam
Reaction—slightly acid to moderately alkaline

Taxadjunct features: The representative pedons for the severely eroded Gara soils in map units 76D3, 76E3, 179D3, 179E2, 179E3, 179F2, 179F3, 993D2, 993E2, and 993F2 are taxadjuncts because the surface layer does not meet the color requirements for Mollic subgroups. These pedons are classified as fine-loamy, mixed, superactive, mesic Typic Hapludalfs.

Garwin Series

Typical Pedon

Garwin silty clay loam, 0 to 2 percent slopes, in a cultivated field; in Grundy County, Iowa; about 5 miles west and 3 miles south of Grundy Center; 1,440 feet east and 208 feet north of the southwest corner of sec. 29, T. 87 N., R. 17 W.; USGS Grundy Center topographic quadrangle; lat. 42 degrees 18 minutes 42 seconds N. and long. 92 degrees 51 minutes 38 seconds W., NAD 83:

Ap—0 to 7 inches; black (N 2/) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium granular structure; friable; moderately acid; clear smooth boundary.
A1—7 to 12 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium granular structure; friable; moderately acid; gradual smooth boundary.
A2—12 to 18 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; slightly acid; gradual smooth boundary.
Bg1—18 to 22 inches; dark gray (10YR 4/1) silty clay loam; very dark gray (10YR 3/1) coats on faces of peds; moderate fine subangular blocky structure parting to moderate medium granular; friable; few fine distinct yellowish brown (10YR 5/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Bg2—22 to 27 inches; dark gray (5Y 4/1) silty clay loam; very dark gray (10YR 3/1) coats on faces of peds; moderate very fine and fine subangular blocky structure; friable; few fine prominent yellowish brown (10YR 5/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.
Bg3—27 to 36 inches; dark gray (5Y 4/1) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few fine black concretions (manganese oxides); common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.
Bg4—36 to 42 inches; gray (5Y 5/1) silty clay loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; friable; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; neutral; gradual smooth boundary.
BCg—42 to 48 inches; olive gray (5Y 5/2) silt loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; few fine black concretions (manganese oxides); many fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; neutral; gradual smooth boundary.
Cg—48 to 60 inches; olive gray (5Y 5/2) silt loam; weak coarse prismatic structure; friable; few fine black concretions (manganese oxides); many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; darker coatings on edge of filled crayfish hole at a depth between 54 and 60 inches; neutral.

Range in Characteristics

Depth to carbonates: More than 48 inches
Thickness of the mollic epipedon: 18 to 24 inches

A or Ap horizon:
Hue—10YR, 5Y, or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam
Reaction—moderately acid to neutral

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam
Reaction—moderately acid to neutral

BCg horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid to slightly alkaline

Givin Series

Typical Pedon

Givin silt loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 480 feet east and 1,850 feet south of the northwest corner of sec. 33, T. 78 N., R. 10 W.; USGS North English topographic quadrangle; lat. 41 degrees 31 minutes 12 seconds N. and long. 92 degrees 01 minute 15 seconds W., NAD 83:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; common very dark gray (10YR 3/1) organic coats on faces of peds; slightly acid; abrupt smooth boundary.

E—7 to 12 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few fine roots; few fine tubular pores; common distinct very dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; clear smooth boundary.

BE—12 to 17 inches; grayish brown (10YR 5/2) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct light brownish gray (10YR 6/2) (dry) silt coats on faces of peds; common distinct very dark brown (10YR 3/3) organic coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Btg1—17 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg2—27 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine tubular pores; common distinct olive gray (5Y 5/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg3—42 to 50 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium and coarse prismatic structure; friable; few fine roots; few fine tubular pores; few distinct olive gray (5Y 5/2) clay films on faces of peds; few fine irregular masses of iron-manganese; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

BCg—50 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse prismatic structure; friable; few fine roots; few fine tubular pores; few fine irregular masses of iron-manganese; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—61 to 80 inches; light brownish gray (2.5Y 5/2) silty clay loam; massive; friable; few fine irregular masses of iron-manganese; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 80 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid or slightly acid

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam
Reaction—strongly acid to slightly acid

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam or silty clay
Reaction—strongly acid to slightly acid

BCg and Cg horizons:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam
Reaction—moderately acid or slightly acid

Greenbush Series

Typical Pedon

Greenbush silt loam, on a slope of 2 percent in a cultivated field; in Warren County, Illinois; about 0.5 mile west and 2.25 miles south of Greenbush; 1,500 feet west and 1,500 feet north of the southeast corner of sec. 18, T. 8 N., R. 1 W.; USGS Greenbush topographic quadrangle; lat. 40 degrees 32 minutes 45 seconds N. and long. 90 degrees 40 minutes 40 seconds W., NAD 27:

Ap—0 to 6 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.
E—6 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light grayish brown (10YR 6/2) dry; weak thin platy structure; friable; common faint very dark gray (10YR 3/1) organic coats on faces of peds; moderately acid; abrupt smooth boundary.
BE—10 to 17 inches; brown (10YR 4/3) silt loam; moderate medium platy structure parting to weak fine subangular blocky; friable; few distinct very dark gray (10YR 3/1) organic coats and common distinct gray (10YR 6/1) silt coats on faces of peds; moderately acid; clear smooth boundary.
Bt1—17 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium angular blocky; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds;

common distinct gray (10YR 6/1) silt coats on faces of peds; strongly acid; gradual smooth boundary.

Bt2—29 to 38 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to moderate fine angular blocky; friable; common faint brown (10YR 4/3) clay films on faces of peds; many faint light gray (10YR 7/2) silt coats on faces of peds; common prominent black (7.5YR 2/1) manganese stains; common medium distinct yellowish brown (10YR 5/6) iron accumulations; common medium prominent gray (5Y 6/1) iron depletions within peds; strongly acid; gradual wavy boundary.

Bt3—38 to 53 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to moderate fine angular blocky; friable; common faint brown (10YR 4/3) clay films on faces of peds; many distinct light gray (10YR 7/2) silt coats on faces of peds; common prominent black (7.5YR 2/1) manganese stains; common medium distinct yellowish brown (10YR 5/6) iron accumulations; common medium prominent gray (5Y 6/1) iron depletions within peds; strongly acid; gradual wavy boundary.

BCt—53 to 75 inches; about 60 percent brown (10YR 5/3) and 40 percent light olive gray (5Y 6/2) silt loam; weak medium and coarse prismatic structure parting to weak fine and medium angular blocky; friable; few faint brown (10YR 4/3) clay films on faces of peds; few faint light gray (10YR 7/2) silt coats on faces of peds; common prominent black (7.5YR 2/1) manganese stains; common medium distinct yellowish brown (10YR 5/6) iron accumulations within peds; moderately acid; gradual wavy boundary.

C—75 to 80 inches; about 55 percent yellowish brown (10YR 5/4) and 45 percent light olive gray (5Y 6/2) silt loam; massive; friable; many prominent black (7.5YR 2/1) manganese stains; many medium distinct light brownish gray (10YR 6/2) iron depletions within peds; moderately acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—2 or 3
- Texture—silt loam
- Reaction—strongly acid to slightly acid

B horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 to 6
- Texture—silty clay loam
- Reaction—very strongly acid to moderately acid

C horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—4 to 6
- Chroma—2 to 6

Texture—silt loam
Reaction—strongly acid to slightly acid

Taxadjunct features: The representative pedons for the severely eroded Greenbush soils in map units 162D3 and 162E3 are taxadjuncts because the surface layer does not meet the color requirements for Mollic subgroups. These pedons are classified as fine-silty, mixed, superactive, mesic Typic Hapludalfs.

Hayfield Series

Typical Pedon

Hayfield silt loam, 0 to 2 percent slopes, in a pasture; in Iowa County, Iowa; 1,920 feet south and 1,070 feet west of the northeast corner of sec. 11, T. 80 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 45 minutes 20.5 seconds N. and long. 91 degrees 51 minutes 19.9 seconds W., NAD 83:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many fine roots; common very fine tubular pores; few fine prominent dark brown (7.5YR 3/4) redoximorphic concentrations; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak thin platy structure; friable; common fine roots; common very fine tubular pores; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

BE—15 to 19 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure parting to weak thin platy; friable; common very fine roots; common very fine tubular pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

Bt—19 to 30 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; few very fine roots; few very fine tubular pores; common distinct gray (2.5Y 5/1) clay films on faces of peds; common fine faint grayish brown (10YR 5/2) redoximorphic depletions and common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

2BC—30 to 34 inches; light olive brown (2.5Y 5/3) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few very fine tubular pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

2C1—34 to 42 inches; light yellowish brown (2.5Y 6/3) sand; single grain; loose; few fine roots; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

2C2—42 to 57 inches; light olive brown (2.5Y 5/4) loamy sand; single grain; loose; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

2C3—57 to 80 inches; strong brown (7.5YR 5/6) loamy sand; single grain; loose; common fine distinct dark reddish brown (7.5YR 3/4) redoximorphic concentrations; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: More than 48 inches
Depth to sandy material: 20 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Texture—silt loam or loam
Reaction—moderately acid or slightly acid

E and BE horizons:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam or loam
Reaction—moderately acid or slightly acid

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or loam in the upper part; silty clay loam, silt loam, loam, or clay loam in the lower part
Reaction—strongly acid or moderately acid

2BC horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 to 6
Texture—loamy sand, coarse sandy loam, sandy loam, or loamy coarse sand
Reaction—moderately acid to neutral

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—loamy sand, sand, coarse sand, or loamy coarse sand
Reaction—moderately acid to slightly alkaline

Jackson Series

Typical Pedon

Jackson silt loam, 2 to 5 percent slopes, rarely flooded (mapped as a minor component in map unit 2219B), in a cultivated field; in Iowa County, Iowa; 1,250 feet south and 2,160 feet west of the northeast corner of sec. 30, T. 78 N., R. 10 W.; USGS North English topographic quadrangle; lat. 41 degrees 32 minutes 22.2 seconds N. and long. 92 degrees 02 minutes 32.6 seconds W., NAD 83:

Ap—0 to 7 inches; very dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; common fine roots throughout; common fine tubular pores; slightly acid; clear smooth boundary.
Bt1—7 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.
Bt2—16 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common very fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; clear smooth boundary.
Bt3—31 to 46 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common very fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct grayish brown (10YR 5/2) redoximorphic depletions; common fine distinct

strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.
2C—46 to 80 inches; strong brown (10YR 5/6), stratified loamy sand and sand; single grain; loose; slightly acid.

Range in Characteristics

Thickness of the silty alluvium: 40 to 60 inches
Depth to carbonates: More than 60 inches

Ap or A horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silt loam
Reaction—strongly acid to neutral

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam
Reaction—strongly acid to slightly acid

Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 or 4
Texture—silty clay loam or silt loam
Reaction—strongly acid to slightly acid

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 8
Chroma—2 to 6
Texture—stratified loamy sand or sand
Reaction—strongly acid to slightly acid

Judson Series

Typical Pedon

Judson silty clay loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,040 feet east and 805 feet south of the northwest corner of sec. 15, T. 79 N., R. 9 W.; USGS Conroy topographic quadrangle; lat. 41 degrees 39 minutes 23 seconds N. and long. 91 degrees 53 minutes 13 seconds W., NAD 83:

Ap—0 to 6 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; neutral; clear smooth boundary.
A—6 to 25 inches; very dark brown (10YR) 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; neutral; gradual smooth boundary.
AB—25 to 31 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few fine roots; few fine tubular pores; neutral; gradual smooth boundary.

Bw1—31 to 37 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; gradual smooth boundary.

Bw2—37 to 45 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; gradual smooth boundary.

BC—45 to 55 inches; brown (10YR 5/3) silty clay loam; moderate medium and coarse subangular blocky structure; friable; few fine roots; few fine tubular pores; few fine faint grayish brown (10YR 5/2) redoximorphic depletions; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; neutral; gradual smooth boundary.

C1—55 to 71 inches; yellowish brown (10YR 5/4) silty clay loam; massive; friable; few fine irregular masses of iron-manganese; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; neutral; gradual smooth boundary.

C2—71 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; few fine irregular masses of iron-manganese; few fine distinct grayish brown (10YR 5/2) redoximorphic depletions; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 32 to 52 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silty clay loam or silt loam
- Reaction—moderately acid to neutral

AB horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—2
- Texture—silty clay loam
- Reaction—moderately acid to neutral

Bw horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—3 to 5
- Texture—silty clay loam
- Reaction—moderately acid to neutral

BC and C horizons:
- Hue—10YR
- Value—3 to 5
- Chroma—3 or 4
- Texture—silty clay loam or silt loam
- Reaction—slightly acid to slightly alkaline

Kenyon Series

Typical Pedon

Kenyon loam, 5 to 9 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,050 feet west and 160 feet south of the northeast corner of sec. 3, T. 81 N., R. 9 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 51 minutes 40.1 seconds N. and long. 91 degrees 51 minutes 39.1 seconds W., NAD 83:

Ap—0 to 8 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many fine roots throughout; few fine tubular pores; common distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

A—8 to 15 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; many fine roots throughout; few fine tubular pores; few distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

BA—15 to 21 inches; brown (10YR 4/3) loam, brown (10YR 5/3) dry; moderate medium and fine subangular blocky structure; friable; many fine roots throughout; few fine tubular pores; common distinct dark brown (10YR 3/3) organic coats on faces of peds; slightly acid; clear smooth boundary.

2Bw1—21 to 33 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots throughout; few fine tubular pores; few distinct brown (10YR 4/3) organic coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; about 5 percent gravel; moderately acid; gradual smooth boundary.

2Bw2—33 to 47 inches; brown (10YR 5/3) loam; weak medium prismatic structure; firm; common fine roots throughout; few fine tubular pores; few distinct brown (10YR 4/3) organic coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; about 5 percent gravel; moderately acid; clear smooth boundary.

2BC—47 to 53 inches; grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) loam; weak medium prismatic structure; firm; few fine roots throughout; few fine tubular pores; few black (10YR 2/1) iron and manganese concretions; many coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; about 5 percent gravel; slightly acid; gradual smooth boundary.

2C1—53 to 63 inches; grayish brown (2.5Y 5/2) loam; massive; firm; about 5 percent gravel; many medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; slightly effervescent; slightly alkaline; gradual smooth boundary.

2C2—63 to 84 inches; pale brown (10YR 6/3) loam; massive; firm; about 5 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 45 to 66 inches

A or Ap horizon:
- Hue—10YR
- Value—2
- Chroma—1 or 2
- Texture—loam or silt loam
- Reaction—strongly acid to neutral

AB or BA horizon (if it occurs):
- Hue—10YR

Value—3 or 4
Chroma—2 or 3
Texture—loam, silt loam, or sandy clay loam
Reaction—strongly acid to slightly acid

2Bw horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—loam, clay loam, or sandy clay loam
Reaction—strongly acid or moderately acid

2BC or 2C horizon (if it occurs):
Hue—7.5YR to 5Y
Value—4 to 8
Chroma—1 to 8
Texture—loam
Reaction—slightly acid to moderately alkaline
Moist bulk density—1.75 to 1.9 gm/cc

Taxadjunct features: The representative pedons for the moderately eroded Kenyon soils in map units 83C, 83C2, and 83D2 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These pedons are classified as fine-loamy, mixed, superactive, mesic Dystric Eutrudepts.

Keomah Series

Typical Pedon

Keomah silt loam, 0 to 2 percent slopes, in a pasture; in Iowa County, Iowa; 1,360 feet south and 2,300 feet west of the northeast corner of sec. 3, T. 78 N., R. 9 W.; USGS Amish topographic quadrangle; lat. 41 degrees 36 minutes 02.6 seconds N. and long. 91 degrees 51 minutes 56.3 seconds W., NAD 83:

A—0 to 3 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; many fine roots throughout; few fine tubular pores; moderately acid; abrupt smooth boundary.

E1—3 to 8 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; moderate medium platy structure; friable; many fine roots throughout; few fine tubular pores; many distinct very dark gray (10YR 3/1) organic coats on faces of peds; moderately acid; abrupt smooth boundary.

E2—8 to 13 inches; dark grayish brown (10YR 4/2) silt loam, light grayish brown (10YR 6/2) dry; weak medium platy structure parting to moderate very fine subangular blocky; friable; many fine roots throughout; few fine tubular pores; few distinct light gray (10YR 7/2) silt coats on all faces of peds; moderately acid; clear smooth boundary.

BE—13 to 17 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure parting to weak fine subangular blocky; friable; many fine roots throughout; few fine tubular pores; many distinct light gray (10YR 7/2) silt coats on faces of peds; few fine irregular masses of iron-manganese; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; abrupt smooth boundary.

Bt1—17 to 29 inches; brown (10YR 5/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few black (10YR 2/1) iron and

manganese concretions; many medium faint strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; clear smooth boundary.

Bt2—29 to 41 inches; brown (10YR 5/3) and grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on all faces of peds; few black (10YR 2/1) iron and manganese concretions; many medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Btg1—41 to 51 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Btg2—51 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; few fine tubular pores; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

BCg—61 to 70 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure; friable; few distinct light gray (10YR 7/2) silt coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; many coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—70 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; few black (10YR 2/1) iron and manganese concretions; many coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A horizon:
- Hue—10YR
- Value—3
- Chroma—1
- Texture—silt loam
- Reaction—moderately acid to neutral

Ap horizon (if it occurs):
- Hue—10YR
- Value—4
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—1 to 3
- Texture—silt loam
- Reaction—strongly acid to slightly acid

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or silty clay loam
Reaction—strongly acid to neutral

Bt horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay or silty clay loam
Reaction—strongly acid to slightly acid

Bt horizon (lower part) or Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam or silty clay
Reaction—strongly acid to slightly acid

BCg and Cg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam
Reaction—strongly acid to neutral

Keswick Series

Typical Pedon

Keswick silty clay loam, 9 to 14 percent slopes, moderately eroded, in a pasture; in Iowa County, Iowa; 565 feet south and 2,240 feet west of the northeast corner of sec. 26, T. 79 N., R. 11 W.; USGS Williamsburg NW topographic quadrangle; lat. 41 degrees 37 minutes 43.1 seconds N. and long. 92 degrees 12 minutes 36.6 seconds W., NAD 83:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many fine roots; few fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

BE—7 to 13 inches; brown (10YR 4/3) silty clay loam; weak medium platy structure parting to moderate fine subangular blocky; friable; many fine roots; few fine tubular pores; common distinct dark brown (10YR 3/3) organic coats on faces of peds; strongly acid; abrupt smooth boundary.

2Bt1—13 to 24 inches; yellowish red (5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; few fine tubular pores; common distinct reddish brown (5YR 4/4) clay films on faces of peds; about 3 percent subrounded gravel; few fine prominent grayish brown (10YR 5/2) redoximorphic depletions; strongly acid; clear smooth boundary.

2Bt2—24 to 37 inches; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; firm; common fine roots; few fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; about 2 percent subrounded gravel; common fine faint yellowish red (5YR 4/6) redoximorphic concentrations; common

fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; strongly acid; clear smooth boundary.

2Bt3—37 to 52 inches; yellowish brown (10YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; about 2 percent subrounded gravel; common fine distinct yellowish red (5YR 4/6) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

2BC—52 to 70 inches; yellowish brown (10YR 5/6) clay loam; moderate medium prismatic structure; firm; few fine roots; few fine tubular pores; few distinct brown (7.5YR 4/4) clay films on faces of peds; very few distinct light gray (10YR 7/2) silt coats on faces of peds; few black (10YR 2/1) iron and manganese concretions; about 5 percent subrounded gravel; common fine distinct yellowish red (5YR 4/6) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

2C—70 to 80 inches; yellowish brown (10YR 5/6) clay loam; massive; firm; about 3 percent subrounded gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 42 to 75 inches

Ap or A horizon:
- Hue—10YR
- Value—2 to 4
- Chroma—1 or 2
- Texture—loam, silt loam, or clay loam
- Reaction—strongly acid to neutral

E horizon (if it occurs):
- Hue—10YR
- Value—4 or 5
- Chroma—2 or 3
- Texture—loam, silt loam, or clay loam
- Reaction—very strongly acid to slightly acid

BE horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 or 4
- Texture—loam, silt loam, or clay loam
- Reaction—very strongly acid to slightly acid

2Bt horizon (upper part):
- Hue—5YR or 7.5YR
- Value—4 or 5
- Chroma—3 to 6
- Texture—clay or clay loam
- Reaction—very strongly acid to moderately acid
- Other features—a pebble band typically occurs at the top of this horizon

2Bt horizon (lower part) and 2BC horizon:
- Hue—10YR, 7.5YR, or 5YR
- Value—4 or 5

Chroma—1 to 6
Texture—clay or clay loam
Reaction—very strongly acid to slightly alkaline

2C horizon:
Hue—10YR, 7.5YR, or 5YR
Value—4 or 5
Chroma—1 to 6
Texture—clay loam
Reaction—slightly acid to moderately alkaline

Klum Series

Typical Pedon

Klum fine sandy loam, 0 to 2 percent slopes, frequently flooded, on a flood plain; in Des Moines County, Iowa; about 7 miles north of Middletown; about 1,810 feet west and 250 feet south of the northeast corner of sec. 26, T. 71 N., R. 4 W.; USGS Pleasant Grove topographic quadrangle; lat. 40 degrees 55 minutes 43 seconds N. and long. 91 degrees 16 minutes 58 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; very friable; neutral; clear smooth boundary.
C1—8 to 12 inches; stratified dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) sandy loam, brown (10YR 5/3) dry; massive with weak thin alluvial stratification; friable; neutral; clear smooth boundary.
C2—12 to 25 inches; stratified dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and dark brown (10YR 3/3) loam and fine sandy loam; massive with weak thin alluvial stratification; very friable; neutral; gradual smooth boundary.
C3—25 to 60 inches; stratified dark brown (10YR 3/3), dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), brown (10YR 4/3), and grayish brown (10YR 5/2) fine sandy loam, silt loam, and loam; massive with weak thin alluvial stratification; very friable; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—fine sandy loam or sandy loam
Reaction—slightly acid or neutral

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—3 to 6
Chroma—2 to 4
Texture—stratified fine sandy loam, sandy loam, silt loam, loam, or loamy fine sand
Reaction—slightly acid or neutral

Koszta Series

Typical Pedon

Koszta silt loam, 0 to 2 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 780 feet south and 820 feet west of the northeast corner of sec. 12, T. 78 N., R. 11 W.; USGS North English topographic quadrangle; lat. 41 degrees 34 minutes 49 seconds N. and long. 92 degrees 04 minutes 07 seconds W., NAD 83:

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common fine and medium roots; common medium tubular pores; neutral; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to moderate fine subangular blocky; friable; common fine and medium roots; common medium tubular pores; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg1—14 to 21 inches; grayish brown (10YR 5/2) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; common fine tubular pores; few dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; gradual smooth boundary.

Btg2—21 to 29 inches; grayish brown (10YR 5/2) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; common fine tubular pores; common dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg3—29 to 41 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common fine tubular pores; common dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg4—41 to 51 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine tubular pores; few dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Cg—51 to 80 inches; stratified light brownish gray (2.5Y 6/2) and dark grayish brown (10YR 4/2) silt loam and sandy loam; massive; friable; few fine irregular masses of iron-manganese; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 70 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

E horizon:
Hue—10YR

Value—4 or 5
Chroma—2
Texture—silt loam
Reaction—strongly acid to neutral

Btg horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silty clay loam
Reaction—strongly acid to neutral

C horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam with thin strata of coarser material
Reaction—slightly acid to slightly alkaline

Ladoga Series

Typical Pedon

Ladoga silt loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 2,650 feet east and 1,750 feet north of the southwest corner of sec. 17, T. 78 N., R. 11 W.; USGS Millersburg topographic quadrangle; lat. 41 degrees 33 minutes 11.9 seconds N. and long. 92 degrees 09 minutes 41.8 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine and medium roots; few fine tubular pores; many distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; gradual smooth boundary.

BE—8 to 12 inches; brown (10YR 4/3) silt loam; weak medium platy structure parting to weak very fine and fine subangular blocky; friable; many fine roots; few fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on all faces of peds; slightly acid; gradual smooth boundary.

Bt1—12 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine and very fine subangular blocky structure; friable; many fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—22 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coats on vertical faces of peds; strongly acid; clear smooth boundary.

Bt3—32 to 40 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coats on vertical faces of peds; few black (10YR 2/1) iron and manganese oxides; common fine faint grayish brown (10YR 5/2) redoximorphic depletions; common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; strongly acid; clear smooth boundary.

Bt4—40 to 52 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few fine tubular pores; common distinct brown (10YR 5/3) clay films on faces of peds; few black (10YR 2/1) iron and manganese oxides; few

distinct light brownish gray (10YR 6/2) silt coats on vertical faces of peds; common fine and medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; strongly acid; gradual smooth boundary.

BC—52 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure; friable; few very fine roots; few fine tubular pores; few black (10YR 2/1) iron and manganese oxides; common fine and medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.

C—62 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; common fine and medium distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid to neutral

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam or silt loam
Reaction—strongly acid to slightly acid

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silty clay
Reaction—strongly acid or moderately acid

BC and C horizons:
Hue—10YR
Value—5
Chroma—2 to 4
Texture—silty clay loam or silt loam
Reaction—moderately acid or slightly acid

Taxadjunct features: The representative pedons for the severely eroded Ladoga soils in map units 76D3, 76E2, 76E3, 179D3, and 179E3 are taxadjuncts because the surface layer does not meet the color requirements for Mollic subgroups. These pedons are classified as fine, smectitic, mesic Typic Hapludalfs.

Lawson Series

Typical Pedon

Lawson silt loam, 0 to 2 percent slopes, occasionally flooded, on a flood plain, in a cultivated field; in Iowa County, Iowa; 500 feet north and 80 feet east of the southwest

corner of sec. 12, T. 80 N., R. 12 W.; USGS Williamsburg NW topographic quadrangle; lat. 41 degrees 44 minutes 47.6 seconds N. and long. 92 degrees 12 minutes 05.2 seconds W., NAD 83:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; common fine and medium roots throughout; common very fine tubular pores; neutral; abrupt smooth boundary.

A1—8 to 16 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; friable; common very fine roots throughout; common very fine tubular pores; slightly acid; clear smooth boundary.

A2—16 to 29 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; neutral; clear smooth boundary.

Cg1—29 to 42 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable; few very fine roots throughout; common very fine tubular pores; common faint very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg2—42 to 58 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable; common very fine tubular pores; common fine and medium distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg3—58 to 80 inches; dark grayish brown (10YR 4/2), stratified silt loam and loam; massive; friable; common very fine tubular pores; common fine and medium distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 40 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam or silty clay loam
- Reaction—slightly acid to slightly alkaline

C horizon:
- Hue—10YR or 2.5Y
- Value—3 to 6
- Chroma—1 to 3
- Texture—silt loam or loam
- Reaction—slightly acid to slightly alkaline

Lindley Series

Typical Pedon

Lindley loam, 9 to 14 percent slopes, moderately eroded, in a pasture; in Iowa County, Iowa; 600 feet east and 2,380 feet north of the southwest corner of sec. 32, T. 79 N., R. 10 W.; USGS North English topographic quadrangle; lat. 41 degrees 36 minutes 26.8 seconds N. and long. 92 degrees 02 minutes 37.4 seconds W., NAD 83:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable;

many fine roots throughout; few fine tubular pores; strongly acid; abrupt smooth boundary.

E—7 to 10 inches; brown (10YR 4/3) loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; friable; many fine roots throughout; few fine tubular pores; very strongly acid; clear smooth boundary.

Bt1—10 to 24 inches; yellowish brown (10YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; many fine roots throughout; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct very pale brown (10YR 7/3) sand skeletans on faces of peds; about 3 percent subrounded gravel; very strongly acid; gradual smooth boundary.

Bt2—24 to 36 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots throughout; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common distinct very pale brown (10YR 7/3) sand skeletans on faces of peds; common black (10YR 2/1) iron and manganese concretions; about 3 percent rounded gravel; many medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; many medium distinct grayish brown (10YR 5/2) redoximorphic depletions; very strongly acid; clear smooth boundary.

Bt3—36 to 48 inches; yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots throughout; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common black (10YR 2/1) iron and manganese concretions; about 2 percent subrounded gravel; many medium distinct grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.

Bt4—48 to 57 inches; yellowish brown (10YR 5/4 and 5/6) clay loam; weak medium prismatic structure; firm; few fine roots throughout; few fine tubular pores; few distinct brown (10YR 4/3) clay films on surfaces along root channels; common black (10YR 2/1) iron and manganese concretions; about 2 percent rounded gravel; many medium distinct grayish brown (10YR 5/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

C—57 to 80 inches; brownish yellow (10YR 6/6) clay loam; massive; firm; common black (10YR 2/1) iron and manganese concretions; about 2 percent rounded gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches

A or Ap horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—2 to 5
- Texture—silt loam, loam, or clay loam
- Reaction—very strongly acid to neutral

E horizon (if it occurs):
- Hue—10YR
- Value—4 to 6
- Chroma—2 to 4
- Texture—silt loam, loam, clay loam, or fine sandy loam
- Reaction—very strongly acid to slightly acid

Bt horizon:
- Hue—10YR or 7.5YR
- Value—4 or 5

Chroma—4 to 8
Texture—clay loam or loam
Reaction—very strongly acid to slightly acid

C horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—clay loam or loam
Reaction—slightly acid to moderately alkaline

Mahaska Series

Typical Pedon

Mahaska silty clay loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,980 feet west and 1,940 feet north of the southeast corner of sec. 21, T. 80 N., R. 10 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 43 minutes 20 seconds N. and long. 92 degrees 00 minutes 48 seconds W., NAD 83:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A—8 to 17 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

BA—17 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam, grayish brown (2.5Y 5/2) dry; moderate very fine subangular blocky structure; friable; few fine roots; few fine tubular pores; many distinct very dark gray (10YR 3/1) organic coats on faces of peds; moderately acid; clear smooth boundary.

Btg1—23 to 29 inches; dark grayish brown (2.5Y 4/2) silty clay; moderate fine subangular blocky structure; firm; few fine roots; few fine tubular pores; common dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; common fine faint grayish brown (2.5Y 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.

Btg2—29 to 36 inches; dark grayish brown (2.5Y 4/2) silty clay; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and brown (7.5YR 4/4) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg3—36 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; many distinct olive gray (5Y 5/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg4—46 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse prismatic structure; friable; few fine roots; few fine tubular pores; few distinct gray (2.5Y 5/1) clay films on surfaces along root channels and pores; very few distinct black (10YR 2/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Cg—61 to 80 inches; light olive gray (5Y 6/2) silty clay loam; massive; friable; few fine tubular pores; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 14 to 24 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam
Reaction—strongly acid to slightly acid

BA horizon:
Hue—2.5Y or 10YR
Value—3 or 4
Chroma—2 to 4
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Bt or Btg horizon (upper part):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam or silty clay
Reaction—strongly acid or moderately acid

Bt or Btg horizon (lower part):
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2 or 3
Texture—silty clay loam or silty clay
Reaction—strongly acid or moderately acid

Cg horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam
Reaction—moderately acid to neutral

Muscatine Series

Typical Pedon

Muscatine silty clay loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,340 feet south and 240 feet west of the northeast corner of sec. 11, T. 80 N., R. 10 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 45 minutes 22 seconds N. and long. 91 degrees 58 minutes 09 seconds W., NAD 83:

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A—10 to 17 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; gradual smooth boundary.
BA—17 to 23 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.
Bg1—23 to 33 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; very few distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; common fine faint grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.
Bg2—33 to 44 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common fine prominent yellowish brown (10YR 5/6) and common fine distinct brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.
BCg—44 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse subangular blocky structure; friable; few fine roots; few fine tubular pores; common fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.
Cg1—52 to 64 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; common fine prominent yellowish brown (10YR 5/6) and few coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.
Cg2—64 to 80 inches; grayish brown (2.5Y 5/2) silt loam; massive; friable; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 14 to 24 inches
Depth to carbonates: More than 48 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

BA horizon:
Hue—2.5Y or 10YR
Value—3
Chroma—2 to 4
Texture—silty clay loam
Reaction—moderately acid to neutral

Bg horizon:
Hue—2.5Y or 10YR
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam
Reaction—moderately acid to neutral

BCg and Cg horizons:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—2 to 4
Texture—silty clay loam or silt loam
Reaction—slightly acid to slightly alkaline

Nevin Series

Typical Pedon

Nevin silty clay loam, 0 to 2 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 1,550 feet east and 1,630 feet north of the southwest corner of sec. 17, T. 81 N., R. 11 W.; USGS Ladora topographic quadrangle; lat. 41 degrees 49 minutes 22.5 seconds N. and long. 92 degrees 05 minutes 51.9 seconds W., NAD 83:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many fine roots throughout; common fine tubular pores; slightly acid; abrupt smooth boundary.

A—8 to 19 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many fine roots throughout; common fine tubular pores; many distinct black (10YR 2/1) organic coats on faces of peds; slightly acid; clear smooth boundary.

BA—19 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure; friable; many fine roots throughout; common fine tubular pores; common distinct very dark gray (10YR 3/1) organic coats on all faces of peds; slightly acid; clear smooth boundary.

Btg1—25 to 34 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots throughout; common fine tubular pores; common very dark grayish brown (10YR 3/2) clay films on all faces of peds; few distinct very dark gray (10YR 3/1) organic coats on all faces of peds; few fine black (10YR 2/1) iron and manganese oxides; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg2—34 to 44 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common fine roots throughout; common fine tubular pores; common dark grayish brown (10YR 4/2) clay films on faces of peds; few fine black (10YR 2/1) iron and manganese oxides; common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; slightly acid; gradual smooth boundary.

BCg—44 to 52 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure; friable; few fine roots throughout; common fine tubular pores; few fine black (10YR 2/1) iron and manganese oxides; common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—52 to 71 inches; light brownish gray (2.5Y 5/2) silt loam; massive; friable; few fine black (10YR 2/1) iron and manganese oxides; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; neutral; clear wavy boundary.

2C—71 to 80 inches; light yellowish brown (2.5Y 6/3) sand; single grain; loose; few fine black (10YR 2/1) iron and manganese oxides; many coarse prominent strong brown (7.5YR 4/6) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

BA, Btg, and BC horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam
Reaction—moderately acid to neutral

C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 4
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

2C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—loamy sand, sand, gravelly loamy sand, or gravelly sand
Reaction—moderately acid to neutral

Nodaway Series

Typical Pedon

Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded, in a wooded pasture; in Iowa County, Iowa; 330 feet west and 2,500 feet north of the southeast corner of sec. 34, T. 79 N., R. 9 W.; USGS Amish topographic quadrangle; lat. 41 degrees 36 minutes 27.3 seconds N. and long. 91 degrees 52 minutes 22 seconds W., NAD 83:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine and medium roots throughout; common very fine tubular pores; neutral; abrupt smooth boundary.

C1—7 to 38 inches; stratified brown (10YR 4/3), dark grayish brown (10YR 4/2), and dark brown (10YR 3/3) silt loam; massive with weak thin alluvial stratification; friable; many very fine roots throughout; common very fine tubular pores; common faint very dark grayish brown (10YR 3/2) organic coats on faces of peds; neutral; gradual smooth boundary.

C2—38 to 54 inches; stratified brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam; massive with weak thin alluvial stratification; friable; common very fine roots throughout; common very fine tubular pores; few fine distinct dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral; clear smooth boundary.

Cg—54 to 80 inches; stratified grayish brown (10YR 5/2), dark grayish brown (10YR 4/2), and brown (10YR 4/3) silt loam; massive with weak thin alluvial stratification; friable; few very fine roots throughout; common very fine tubular pores; common

fine and medium prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Depth to buried soil: More than 40 inches

A or Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—slightly acid or neutral

C horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 4
Texture—silt loam or silty clay loam or stratified with these textures
Reaction—slightly acid or neutral

Osco Series

Typical Pedon

Osco silt loam, on a south-facing slope of 3 percent, in a cultivated field; in Carroll County, Illinois; about 3.5 miles east and 3.25 miles south of Lanark; 88 feet west and 316 feet north of the southeast corner of sec. 23, T. 24 N., R. 6 E.; USGS Lanark topographic quadrangle; lat. 42 degrees 03 minutes 13.4 seconds N. and long. 89 degrees 45 minutes 48.2 seconds W.; NAD 27:

Ap—0 to 10 inches; very dark brown (10YR 2/2) and black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.

A—10 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium to coarse granular structure; friable; strongly acid; clear smooth boundary.

BA—14 to 20 inches; dark yellowish brown (10YR 3/4) and dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; many roots; few distinct light brownish gray (10YR 6/2) (dry) silt coats (clay depletions) on faces of peds; common earthworm casts and holes; strongly acid; clear smooth boundary.

Bt1—20 to 26 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common faint dark brown (10YR 3/3) clay films; few distinct gray (10YR 6/1) (dry) silt coats (clay depletions) on faces of peds; strongly acid; clear smooth boundary.

Bt2—26 to 37 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; many faint dark yellowish brown (10YR 4/4) clay films; common distinct light brownish gray (10YR 6/2) (dry) silt coats (clay depletions) on faces of peds; many very dark gray (N 3/) and dark brown (7.5YR 3/2) redoximorphic concretions (iron and manganese oxides); common fine faint brown (10YR 5/3) and common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; strongly acid; clear smooth boundary.

Bt3—37 to 45 inches; light yellowish brown (10YR 6/4) silty clay loam; moderate coarse subangular blocky structure; friable; many faint dark yellowish brown (10YR

4/4) clay films on faces of peds; many prominent dark brown (7.5YR 3/2) redoximorphic concretions (iron and manganese oxides); common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; few medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; strongly acid; gradual smooth boundary.

BC—45 to 55 inches; yellowish brown (10YR 5/4) and brown (10YR 4/3) silty clay loam; weak coarse angular blocky structure; friable; few fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; strongly acid; gradual smooth boundary.

C—55 to 60 inches; yellowish brown (10YR 5/4 and 5/6) and brown (10YR 4/3) silt loam; massive with some vertical partings; friable; many fine distinct grayish brown (10YR 5/2) redoximorphic depletions; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches
Depth to carbonates: More than 48 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Reaction—strongly acid to slightly acid

Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—3 or 4
Texture—silty clay loam; subhorizons of silt loam in the upper or lower part in some pedons
Reaction—strongly acid or moderately acid

BC, C, or Cg horizon:
Hue—10YR; 2.5Y below a depth of 40 inches in some pedons
Value—4 or 5
Chroma—2 to 6
Texture—silt loam or silty clay loam
Reaction—strongly acid to neutral

Taxadjunct features: The representative pedon for the moderately eroded Osco soil (mapped as a minor component in map unit 120C2) is a taxadjunct because the surface layer does not meet the thickness requirements for Mollisols. This pedon is classified as a fine-silty, mixed, superactive, mesic Mollic Hapludalf.

Otley Series

Typical Pedon

Otley silty clay loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 295 feet east and 85 feet north of the southwest corner of sec. 1, T. 79 N., R. 11 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 40 minutes 22.9 seconds N. and long. 92 degrees 05 minutes 09.6 seconds W., NAD 83:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A1—7 to 13 inches; very dark brown (10YR 2/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; moderately acid; clear smooth boundary.
A2—13 to 18 inches; brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common very dark grayish brown (10YR 3/2) organic coats on faces of peds; moderately acid; gradual smooth boundary.
Bt1—18 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and on surfaces along pores; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.
Bt2—24 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; few fine tubular pores; common fine distinct brown (10YR 5/3) clay films on faces of peds; few fine irregular masses of iron-manganese; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.
Bt3—31 to 42 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct brown (10YR 5/3) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; moderately acid; gradual smooth boundary.
Btg—42 to 62 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse subangular blocky structure; friable; few fine irregular masses of iron-manganese; many fine prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; moderately acid; gradual smooth boundary.
Cg—62 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; few fine irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 5/6 and 5/8) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to carbonates: More than 72 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Bt horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silty clay
Reaction—strongly acid or moderately acid

Bt horizon (lower part):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam
Reaction—strongly acid to slightly acid

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—2 to 8
Texture—silty clay loam or silt loam
Reaction—moderately acid to neutral

Taxadjunct features: The representative pedons for the moderately eroded Otley soils in map units 24C2, 24E2, 24E3, 93D2, 192D2, 281C, 281C2, 281D2, 281D3, 281E2, and 876C2 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These pedons are classified as fine, smectitic, mesic Mollic Oxyaquic Hapludalfs. The representative pedons for the severely eroded Otley soils in map units 24D3, 93D3, 281C2, 281D2, 281D3, and 281E2 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These pedons are classified as fine, smectitic, mesic Oxyaquic Hapludalfs.

Pillot Series

Typical Pedon

Pillot silt loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 525 feet east and 690 feet north of the southwest corner of sec. 11, T. 80 N., R. 9 W.; USGS Oxford topographic quadrangle; lat. 41 degrees 44 minutes 47.7 seconds N. and long. 91 degrees 52 minutes 07.7 seconds W., NAD 83:

Ap—0 to 7 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; friable; many fine and medium roots throughout; common very fine tubular pores; neutral; abrupt smooth boundary.
A1—7 to 16 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; friable; many very fine roots throughout; many very fine tubular pores; slightly acid; clear smooth boundary.
A2—16 to 19 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; friable; common very fine roots throughout; many very fine tubular pores; moderately acid; clear smooth boundary.
Bt—19 to 31 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots throughout; many very fine tubular pores; few dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.
2BC—31 to 35 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; very friable; common very fine roots throughout; many very fine tubular pores; few brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.
2C1—35 to 49 inches; dark yellowish brown (10YR 4/4) loamy sand; single grain; loose; few very fine roots throughout; moderately acid; gradual smooth boundary.
2C2—49 to 80 inches; yellowish brown (10YR 5/4) sand; single grain; loose; moderately acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3

Texture—silt loam
Reaction—moderately acid to neutral

Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 or 4
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

2BC horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—sandy clay loam, loam, clay loam, or sandy loam
Reaction—moderately acid to neutral

2C horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—loamy sand, loamy fine sand, or sand
Reaction—moderately acid to neutral

Taxadjunct features: The representative pedons for the moderately eroded Pillot soils in map units 1442C2, 1442D2, and 1442E2 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These soils are classified as fine-silty over sandy or sandy-skeletal, mixed, superactive, mesic Mollic Hapludalfs.

Quiver Series

Typical Pedon

Quiver silt loam, in an area of Quiver-Zook-Klum complex, 0 to 2 percent slopes, frequently flooded, in a wooded pasture; in Iowa County, Iowa; 1,300 feet north and 1,880 feet east of the southwest corner of sec. 23, T. 81 N., R. 11 W.; USGS Marengo topographic quadrangle; lat. 41 degrees 48 minutes 28.1 seconds N. and long. 92 degrees 05 minutes 47.5 seconds W., NAD 83:

A—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many fine and medium roots; common very fine tubular pores; few fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; slightly acid; clear smooth boundary.

Cg1—9 to 16 inches; dark grayish brown (10YR 4/2) silt loam; massive with weak thin alluvial stratification; friable; common very fine roots; common very fine tubular pores; common distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; neutral; clear smooth boundary.

Cg2—16 to 29 inches; stratified dark gray (2.5Y 4/1), dark grayish brown (10YR 4/2), and brown (10YR 4/3) silt loam; massive with weak thin alluvial stratification; friable; common very fine roots; common very fine tubular pores; few distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; neutral; clear smooth boundary.

Cg3—29 to 63 inches; stratified dark grayish brown (2.5Y 4/2 and 10YR 4/2) and brown (10YR 4/3) silt loam; massive with weak thin alluvial stratification; friable; few very fine roots; few very fine tubular pores; few distinct very dark gray (10YR

3/1) organic coats on faces of peds; common fine distinct dark yellowish brown (10YR 4/6) redoximorphic concentrations; slightly alkaline; gradual smooth boundary.

Ab—63 to 80 inches; very dark gray (10YR 3/1) silt loam; weak medium subangular blocky structure; friable; common very fine tubular pores; common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; slightly alkaline.

Range in Characteristics

Depth to carbonates: More than 60 inches
Depth to buried soil: More than 60 inches

A horizon:
Hue—10YR, 2.5Y, or N
Value—2 or 3
Chroma—0 to 2
Texture—silt loam or silty clay loam
Reaction—slightly acid to moderately alkaline

Cg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—3 to 6
Chroma—0 to 2
Texture—silt loam or silty clay loam or stratified with these textures
Reaction—slightly acid to moderately alkaline

Ab horizon:
Hue—10YR, 2.5Y, or N
Value—2 or 3
Chroma—0 to 2
Texture—silt loam or silty clay loam
Reaction—slightly acid to moderately alkaline

Rozetta Series

Typical Pedon

Rozetta silt loam, on a northeast-facing slope of 1 percent, in an area of mixed hardwoods; in Stephenson County, Illinois; about 5 miles west of Eleroy; 150 feet south and 500 feet east of the center of sec. 18, T. 27 N., R. 6 E.; USGS Pearl City topographic quadrangle; elevation 890 feet; lat. 42 degrees 20 minutes 00 seconds N. and long. 89 degrees 51 minutes 19 seconds W., NAD 27:

A—0 to 4 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 6/1) dry; weak medium granular structure; friable; many roots; moderately acid; clear wavy boundary.

E—4 to 11 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure; friable; many roots; strongly acid; clear smooth boundary.

BE—11 to 14 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; firm; many roots; few faint brown (10YR 5/3) (dry) clay depletions on faces of peds; strongly acid; clear smooth boundary.

Bt1—14 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; many roots; many faint brown (10YR 5/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—21 to 39 inches; brown (10YR 5/3) silty clay loam; moderate medium and coarse subangular blocky structure; firm; common roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common faint pale brown (10YR 6/3) (dry) clay depletions on faces of peds; common medium faint light yellowish brown (10YR 6/4) and brown (10YR 4/3) masses of iron and manganese accumulation in

the matrix; few medium faint grayish brown (10YR 5/2) iron depletions in the matrix in the lower part of the horizon; strongly acid; clear smooth boundary.

Bt3—39 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse subangular blocky structure; firm; common roots; few faint brown (10YR 4/3) clay films on faces of peds; common medium faint pale brown (10YR 6/3) and common medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; moderately acid; clear smooth boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; common medium distinct dark grayish brown (10YR 4/2) iron depletions in the matrix; moderately acid in the upper part; neutral in the lower part.

Range in Characteristics

Depth to carbonates: More than 60 inches
Other features: Some pedons in eroded areas do not have an E horizon.

Ap or A horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 3
Texture—silt loam or silty clay loam
Reaction—very strongly acid to neutral

E horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam
Reaction—very strongly acid to moderately acid

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—silty clay loam
Reaction—very strongly acid to neutral

C horizon:
Hue—10YR
Value—4 to 6
Chroma—2 to 6
Texture—silt loam or silty clay loam
Reaction—moderately acid to moderately alkaline

Seaton Series

Typical Pedon

Seaton silt loam, 18 to 25 percent slopes, moderately eroded, in a CRP field; in Iowa County, Iowa; 100 feet south and 2,100 feet east of the northwest corner of sec. 11, T. 81 N., R. 10 W.; USGS Amana topographic quadrangle; lat. 41 degrees 50 minutes 47.2 seconds N. and long. 91 degrees 59 minutes 11.2 seconds W., NAD 83:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; very friable; many fine roots; common fine tubular pores; slightly acid; clear smooth boundary.

BE—5 to 8 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak medium platy structure parting to weak fine subangular

blocky; very friable; many fine roots; common fine tubular pores; slightly acid; clear smooth boundary.

Bt1—8 to 17 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine and fine subangular blocky structure; very friable; common fine roots; common fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—17 to 31 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; common fine roots; common fine tubular pores; common distinct brown (10YR 5/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—31 to 48 inches; yellowish brown (10YR 5/4) silt loam; weak medium and coarse subangular blocky structure; very friable; common fine roots; common fine tubular pores; few faint yellowish brown (10YR 5/4) clay films on faces of peds; moderately acid; clear smooth boundary.

BC—48 to 60 inches; yellowish brown (10YR 5/4) silt loam; weak medium and coarse prismatic structure; very friable; few fine roots; common fine tubular pores; slightly acid; clear smooth boundary.

C—60 to 80 inches; yellowish brown (10YR 5/6) silt loam; massive; very friable; common fine tubular pores; few fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap or A horizon:
- Hue—10YR
- Value—2 to 5
- Chroma—2 or 3
- Texture—silt loam or silt
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—4 to 6
- Chroma—2 to 4
- Texture—silt loam or silt
- Reaction—moderately acid to neutral

Bt horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—3 to 6
- Texture—silt loam
- Reaction—very strongly acid to neutral

BC horizon:
- Hue—10YR or 2.5Y
- Value—4 or 5
- Chroma—3 or 4
- Texture—silt loam
- Reaction—strongly acid to neutral

C horizon:
- Hue—10YR or 2.5Y
- Value—4 to 6
- Chroma—2 to 6

Texture—silt loam or silt
Reaction—moderately acid to moderately alkaline

Shelby Series

Typical Pedon

Shelby loam, 9 to 14 percent slopes, moderately eroded, in a cultivated field; in Iowa County, Iowa; 1,600 feet south and 50 feet west of the northeast corner of sec. 35, T. 80 N., R. 11 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 41 minutes 52.1 seconds N. and long. 92 degrees 05 minutes 07.7 seconds W., NAD 83:

Ap—0 to 8 inches; about 80 percent very dark grayish brown (10YR 3/2) and 20 percent brown (10YR 3/3) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common fine roots; common very fine tubular pores; neutral; abrupt smooth boundary.

BA—8 to 14 inches; dark brown (10YR 4/3) clay loam; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; common very fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

Bt1—14 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common distinct dark brown (10YR 3/3) organic coats on faces of peds; moderately acid; gradual smooth boundary.

Bt2—23 to 33 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt3—33 to 42 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; abrupt smooth boundary.

C1—42 to 48 inches; yellowish brown (10YR 5/6) clay loam; massive; firm; few very fine roots; few very fine tubular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—48 to 62 inches; about 80 percent yellowish brown (10YR 5/6) and 20 percent grayish brown (10YR 5/2) clay loam; massive; firm; few very fine tubular pores; strongly effervescent; moderately alkaline; gradual smooth boundary.

C3—62 to 80 inches; about 90 percent yellowish brown (10YR 5/6) and 10 percent grayish brown (10YR 5/2) clay loam; massive; firm; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to carbonates: More than 30 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam, clay loam, or silt loam
Reaction—strongly acid to neutral

AB horizon (if it occurs):
Hue—10YR

Value—2 or 3
Chroma—2 or 3
Texture—loam, clay loam, or silt loam
Reaction—strongly acid to neutral

Bt horizon or BA horizon (if it occurs):
Hue—10YR
Value—3 to 5
Chroma—3 to 6
Texture—clay loam
Reaction—strongly acid to neutral

BC horizon or C horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—clay loam, loam, or sandy clay loam
Reaction—neutral to moderately alkaline

Taxadjunct features: The representative pedons for the severely eroded Shelby soils in map units 24D3, 24E3, 93D3, 192D3, and 281D3 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These pedons are classified as fine-loamy, mixed, superactive, mesic Typic Hapludalfs.

Sparta Series

Typical Pedon

Sparta loamy fine sand, 2 to 5 percent slopes, in a wooded pasture; in Iowa County, Iowa; 1,320 feet east and 120 feet north of the southwest corner of sec. 1, T. 80 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 45 minutes 33.2 seconds N. and long. 91 degrees 51 minutes 05.7 seconds W., NAD 83:

A—0 to 14 inches; very dark grayish brown (10YR 3/2) loamy fine sand, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common fine roots; slightly acid; gradual smooth boundary.
Bw1—14 to 36 inches; brown (10YR 4/3) fine sand; single grain; loose; moderately acid; gradual smooth boundary.
Bw2—36 to 50 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; moderately acid; clear smooth boundary.
E and Bt—50 to 68 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; strong brown (7.5YR 5/6) bands of loamy fine sand 1/8 to 1/2 inch thick at depths of 50, 58, and 68 inches; moderately acid; clear smooth boundary.
C—68 to 80 inches; yellowish brown (10YR 5/6) fine sand; loose; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Depth to carbonates: More than 80 inches

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—1 or 2
Texture—loamy fine sand, loamy sand, or sand
Reaction—neutral to strongly acid

AB horizon (if it occurs):
Hue—7.5YR or 10YR
Value—2 or 3
Chroma—2 or 3
Texture—loamy fine sand, loamy sand, or sand
Reaction—slightly acid to strongly acid

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 6
Chroma—3 to 6
Texture—fine sand or loamy fine sand
Reaction—slightly acid to strongly acid

E part of the E and Bt horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 or 4
Texture—fine sand or sand
Reaction—slightly acid to strongly acid

Bt (lamellae) part of the E and Bt horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—loamy sand, loamy fine sand, or fine sand
Reaction—slightly acid to strongly acid

C horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—fine sand or sand
Reaction—strongly acid to slightly alkaline

Sperry Series

Typical Pedon

Sperry silt loam, 0 to 1 percent slopes, depressional, in a cultivated field; in Iowa County, Iowa; 1,290 feet north and 1,350 feet west of the southeast corner of sec. 21, T. 80 N., R. 10 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 43 minutes 13 seconds N. and long. 92 degrees 00 minutes 46 seconds W., NAD 83:

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

E1—10 to 13 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few fine roots; common fine tubular pores; few fine distinct brown (10YR 4/4) redoximorphic concentrations; slightly acid; clear smooth boundary.

E2—13 to 19 inches; gray (10YR 5/1) silt loam, light gray (10YR 7/1) dry; weak thick platy structure; friable; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg1—19 to 29 inches; dark gray (10YR 4/1) silty clay; moderate fine subangular blocky structure; firm; few fine roots; common fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine very dark brown (7.5YR

2.5/2) irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6 and 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg2—29 to 38 inches; dark gray (10YR 4/1) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few very fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine very dark brown (7.5YR 2.5/2) irregular masses of iron-manganese; common fine prominent dark yellowish brown (10YR 5/6 and 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Btg3—38 to 42 inches; gray (10YR 4/1) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few very fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine very dark brown (7.5YR 2.5/2) irregular masses of iron-manganese; common fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; slightly acid; clear smooth boundary.

BCg—42 to 50 inches; gray (5Y 5/1) silty clay loam; weak medium prismatic structure parting to weak coarse subangular blocky; firm; few fine roots; few fine vesicular pores; few fine very dark brown (7.5YR 2.5/2) irregular masses of iron-manganese; many medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; neutral; gradual smooth boundary.

Cg1—50 to 70 inches; gray (5Y 5/1) silty clay loam; massive; firm; few fine very dark brown (7.5YR 2.5/2) irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; neutral; gradual smooth boundary.

Cg2—70 to 80 inches; gray (5Y 5/1) silt loam; massive; firm; few fine very dark brown (7.5YR 2.5/2) irregular masses of iron-manganese; common fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 16 inches
Depth to carbonates: More than 60 inches

Ap or A horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—1
- Texture—silt loam or silty clay loam
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

Btg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—3 to 5
- Chroma—1
- Texture—silty clay or silty clay loam
- Reaction—moderately acid or slightly acid

BCg and Cg horizons:
- Hue—2.5Y or 5Y
- Value—5 or 6

Chroma—1 or 2
Texture—silty clay loam or silt loam (lower part)
Reaction—moderately acid to neutral

Stronghurst Series

Typical Pedon

Stronghurst silt loam, 0 to 2 percent slopes, in a CRP field; in Iowa County, Iowa; 1,470 feet west and 155 feet north of the southeast corner of sec. 6, T. 81 N., R. 10 W.; USGS Marengo topographic quadrangle; lat. 41 degrees 50 minutes 48.6 seconds N. and long. 92 degrees 02 minutes 40.9 seconds W., NAD 83:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, gray (10YR 6/2) dry; weak fine granular structure; friable; many fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

E—8 to 12 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thin platy structure parting to moderate fine subangular blocky; very friable; common fine roots; few fine tubular pores; many distinct pale brown (10YR 6/3) silt coats on faces of peds; moderately acid; abrupt smooth boundary.

BE—12 to 15 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; few fine tubular pores; many distinct pale brown (10YR 6/3) silt coats on faces of peds; moderately acid; clear smooth boundary.

Bt—15 to 23 inches; brown (10YR 5/3) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct pale brown (10YR 6/3) silt coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg1—23 to 34 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium and coarse subangular blocky structure; friable; common very fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg2—34 to 50 inches; light brownish gray (10YR 6/2) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few fine tubular pores; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine irregular masses of iron-manganese; many fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BCg—50 to 62 inches; light brownish gray (10YR 6/2) silty clay loam; weak coarse prismatic structure; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular masses of iron-manganese; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—62 to 80 inches; pale brown (10YR 6/3) silt loam; massive; friable; common fine irregular masses of iron-manganese; many fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap horizon:
Hue—10YR

Value—3 to 6
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

E horizon:
Hue—10YR
Value—4 to 6
Chroma—2 or 3
Texture—silt loam
Reaction—strongly acid to neutral

BE horizon:
Hue—10YR
Value—4 to 6
Chroma—2 or 3
Texture—silt loam or silty clay loam
Reaction—strongly acid to neutral

Bt and/or Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silt loam
Reaction—strongly acid to neutral

BC or C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam or silt loam
Reaction—strongly acid to neutral

Taintor Series

Typical Pedon

Taintor silty clay loam, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 1,490 feet west and 100 feet north of the southeast corner of sec. 21, T. 80 N., R. 10 W.; USGS Williamsburg topographic quadrangle; lat. 41 degrees 43 minutes 00 seconds N. and long. 92 degrees 00 minutes 44 seconds W., NAD 83:

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A1—9 to 16 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; common fine roots; few fine tubular pores; slightly acid; gradual smooth boundary.

A2—16 to 20 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

Btg1—20 to 25 inches; dark gray (10YR 4/1) silty clay loam; weak medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular masses of iron-manganese; many fine distinct gray (5Y 5/1) redoximorphic depletions; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg2—25 to 36 inches; dark gray (10YR 4/1) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark gray (5Y 4/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg3—36 to 47 inches; gray (10YR 5/1) silty clay loam; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; few fine tubular pores; common dark gray (5Y 4/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; slightly acid; gradual smooth boundary.

BCg—47 to 58 inches; gray (10YR 5/1) silty clay loam; weak coarse prismatic structure; few dark gray (5Y 4/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent yellowish brown (10YR 5/6) and common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

Cg1—58 to 67 inches; light brownish gray (2.5Y 6/2) silty clay loam; massive; friable; few fine irregular masses of iron-manganese; many fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; neutral; gradual wavy boundary.

Cg2—67 to 80 inches; light brownish gray (2.5Y 6/2) silt loam; massive; friable; few fine irregular masses of iron-manganese; many medium and coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 24 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
- Hue—10YR or N
- Value—2 or 3
- Chroma—0 or 1
- Texture—silty clay loam or silt loam
- Reaction—moderately acid or slightly acid

Btg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—4 or 5
- Chroma—1 or 2
- Texture—silty clay or silty clay loam
- Reaction—moderately acid or slightly acid

BCg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—4 or 5
- Chroma—1 or 2
- Texture—silty clay loam
- Reaction—moderately acid or slightly acid

Cg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—4 to 6
- Chroma—1 or 2

Texture—silty clay loam or silt loam
Reaction—slightly acid to slightly alkaline

Tama Series

Typical Pedon

Tama silty clay loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 700 feet west and 80 feet south of the northeast corner of sec. 1, T. 80 N., R. 12 W.; USGS Ladora topographic quadrangle; lat. 41 degrees 46 minutes 30.7 seconds N. and long. 92 degrees 11 minutes 04.9 seconds W., NAD 83:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; common distinct black (10YR 2/1) organic coats on faces of peds; slightly acid; abrupt smooth boundary.

A—8 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; common distinct very dark gray (10YR 3/1) organic coats on faces of peds; moderately acid; clear smooth boundary.

BA—17 to 23 inches; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; weak very fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct dark gray (10YR 4/1) organic coats on faces of peds; moderately acid; clear smooth boundary.

Bt1—23 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—32 to 41 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and coarse subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—41 to 47 inches; yellowish brown (10YR 5/4) silty clay loam; moderate coarse prismatic structure parting to weak coarse subangular blocky; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 5/3) clay films on faces of peds; very few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

BC—47 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse prismatic structure; friable; few distinct brown (10YR 5/3) clay films on faces of peds; very few fine irregular masses of iron-manganese; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

C—62 to 80 inches; yellowish brown (10YR 5/4) silty clay loam; massive; friable; few fine irregular masses of iron-manganese; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to carbonates: More than 48 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2

Texture—silty clay loam or silt loam
Reaction—strongly acid to slightly acid

BA horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Bt and BC horizons:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam
Reaction—strongly acid to moderately acid

C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Taxadjunct features: The representative pedons for the severely eroded Tama soils in map units 120D2, 120D3, and 120E2 are taxadjuncts because the surface layer does not meet the thickness requirements for Mollisols. These pedons are classified as fine-silty, mixed, superactive, mesic Mollic Hapludalfs.

Tell Series

Typical Pedon

Tell silt loam, 2 to 5 percent slopes, in an area of timber; in Iowa County, Iowa; 2,600 feet north and 440 feet west of the southeast corner of sec. 3, T. 80 N., R. 10 W.; USGS Amana topographic quadrangle; lat. 41 degrees 46 minutes 01.2 seconds N. and long. 91 degrees 52 minutes 20.7 seconds W., NAD 83:

A—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine roots; moderately acid; abrupt smooth boundary.
E—5 to 10 inches; brown (10YR 5/3) silt loam, pale brown (10YR 6/3) dry; weak thin and medium platy structure; friable; common very fine roots; moderately acid; clear smooth boundary.
BE—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; common very fine roots; strongly acid; clear smooth boundary.
Bt—14 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.
2BC—27 to 31 inches; yellowish brown (10YR 5/4) loam; weak fine and medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
2C1—31 to 58 inches; brown (7.5YR 5/4) sand; single grain; loose; strongly acid; clear smooth boundary.

2C2—58 to 80 inches; brown (7.5YR 4/4) loamy sand; single grain; loose; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—2 to 5
- Texture—silt loam
- Reaction—strongly acid to slightly acid

E horizon:
- Hue—10YR
- Value—4 or 5
- Chroma—2 to 4
- Texture—silt loam
- Reaction—strongly acid to slightly acid

BE horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—3 or 4
- Texture—silt loam
- Reaction—strongly acid to slightly acid

Bt horizon:
- Hue—10YR or 7.5YR
- Value—4 or 5
- Chroma—3 or 4
- Texture—silty clay loam or silt loam
- Reaction—strongly acid to slightly acid

2BC horizon:
- Hue—10YR or 7.5YR
- Value—3 to 5
- Chroma—3 to 6
- Texture—loam, sandy loam, or sandy clay loam
- Reaction—strongly acid to slightly acid

2C horizon:
- Hue—10YR or 7.5YR
- Value—4 or 5
- Chroma—4 to 8
- Texture—sand or loamy sand
- Reaction—strongly acid to slightly acid

Timula Series

Typical Pedon

Timula silt loam, in an area of Seaton-Timula silt loams, 35 to 60 percent slopes, in a pasture; in Henderson County, Illinois; about 1,056 feet east and 176 feet south of the center of sec. 10, T. 10 N., R. 5 W.; USGS Gladstone topographic quadrangle; lat. 40 degrees 52 minutes 17 seconds N. and long. 90 degrees 56 minutes 50 seconds W., NAD 83:

A—0 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many roots; slightly alkaline; clear smooth boundary.
E—6 to 12 inches; yellowish brown (10YR 5/4) silt loam, light yellowish brown (10YR 6/4) dry; weak coarse granular structure; friable; many roots; slightly alkaline; clear smooth boundary.
Bw1—12 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; many roots; slightly alkaline; gradual smooth boundary.
Bw2—18 to 24 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; few roots; slightly alkaline; clear smooth boundary.
C—24 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; very friable; few pale brown (10YR 6/3) deoxidized zones around root channels; few calcium carbonate concretions in the upper part; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 18 to 40 inches
Other features: In some pedons the E horizon has been incorporated into the Ap horizon.

Ap or A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—silt loam
Reaction—slightly acid to slightly alkaline

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam
Reaction—slightly acid to slightly alkaline

Bw horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—silt loam
Reaction—slightly acid to slightly alkaline

BC, Bk, or C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—2 to 4
Texture—silt loam
Reaction—slightly alkaline or moderately alkaline

Tuskeego Series

Typical Pedon

Tuskeego silt loam, 0 to 2 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 3,150 feet north and 700 feet east of the southwest corner of sec. 4, T.

78 N., R. 12 W.; USGS Deep River topographic quadrangle; lat. 41 degrees 35 minutes 27.3 seconds N. and long. 92 degrees 15 minutes 23.2 seconds W., NAD 83:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; common fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.

E1—9 to 16 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; common very fine roots; common very fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; common fine distinct dark yellowish brown (10YR 3/4) redoximorphic concentrations; slightly acid; clear smooth boundary.

E2—16 to 25 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure parting to weak thin platy; friable; few very fine roots; common very fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine distinct dark yellowish brown (10YR 3/4) redoximorphic concentrations; moderately acid; clear smooth boundary.

Btg1—25 to 35 inches; dark gray (10YR 4/1) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common very fine tubular pores; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Btg2—35 to 46 inches; gray (2.5Y 5/1) silty clay; moderate fine and medium subangular blocky structure; firm; few very fine roots; common very fine tubular pores; common distinct dark gray (2.5Y 4/1) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg3—46 to 58 inches; gray (2.5Y 5/1) silty clay; moderate medium subangular blocky structure; firm; common very fine tubular pores; common faint gray (2.5Y 5/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Btg4—58 to 66 inches; gray (2.5Y 5/1) silty clay loam; moderate medium subangular blocky structure; firm; common very fine tubular pores; few distinct gray (2.5Y 5/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

BCg—66 to 80 inches; gray (2.5Y 5/1) silty clay loam; weak medium subangular blocky structure; friable; common very fine tubular pores; common fine irregular masses of iron-manganese; many medium and coarse strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 72 inches

Ap or A horizon:
- Hue—10YR
- Value—3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—4 to 6
- Chroma—1 or 2

Texture—silt loam or silty clay loam
Reaction—moderately acid or slightly acid

Bg horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam
Reaction—strongly acid to slightly acid

Btg horizon and BC horizon (if it occurs):
Hue—10YR or 2.5Y in the upper part; 2.5Y or 5Y in the lower part
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam or silty clay
Reaction—strongly acid to slightly acid

Udolpho Series

Typical Pedon

Udolpho loam, mapped as a minor component in an area of Hayfield silt loam, 0 to 2 percent slopes, rarely flooded, in a pasture; in Iowa County, Iowa; 2,600 feet south and 540 feet west of the northeast corner of sec. 11, T. 80 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 45 minutes 07.5 seconds N. and long. 91 degrees 51 minutes 25 seconds W., NAD 83:

Ap—0 to 6 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many fine roots; common very fine tubular pores; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; abrupt smooth boundary.

E—6 to 10 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; common fine roots; common very fine tubular pores; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

BE—10 to 15 inches; grayish brown (10YR 5/2) loam; weak fine and medium subangular blocky structure; friable; common very fine roots; common very fine tubular pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

Btg—15 to 28 inches; gray (2.5Y 5/1) loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; common very fine tubular pores; common fine distinct dark gray (2.5Y 4/1) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

2C1—28 to 34 inches; gray (2.5Y 5/1) loamy sand; single grain; loose; few very fine roots; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

2C2—34 to 51 inches; dark grayish brown (2.5Y 4/2) sand; single grain; loose; common medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

2C3—51 to 80 inches; gray (5Y 5/1) loamy sand; single grain; loose; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; very slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 36 to 66 inches
Depth to sandy material: 20 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam, loam, or fine sandy loam
Reaction—moderately acid or slightly acid

E and BE horizons:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 or 2
Texture—silt loam, loam, or fine sandy loam
Reaction—moderately acid or slightly acid

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silt loam or loam in the upper part; loam, sandy clay loam, or clay loam in the lower part
Reaction—strongly acid to slightly acid

2C horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 to 6
Texture—loamy sand or sand
Reaction—moderately acid to slightly alkaline

Vesser Series

Typical Pedon

Vesser silt loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 2,460 feet west and 2,000 feet south of the northeast corner of sec. 32, T. 79 N., R. 12 W.; USGS Deep River topographic quadrangle; lat. 41 degrees 36 minutes 37.5 seconds N. and long. 92 degrees 16 minutes 08.4 seconds W., NAD 83:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.
A—7 to 14 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; common very fine tubular pores; slightly acid; clear smooth boundary.
E1—14 to 19 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure parting to weak thin platy; friable; common very fine roots; common very fine tubular pores; few fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.
E2—19 to 27 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; few very fine roots; common very

fine tubular pores; few fine prominent brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

Btg1—27 to 33 inches; dark gray (10YR 4/1) silty clay loam; weak fine subangular blocky structure; friable; few very fine roots; common very fine tubular pores; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Btg2—33 to 44 inches; dark gray (10YR 4/1) silty clay loam; moderate fine subangular blocky structure; firm; common very fine tubular pores; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine irregular masses of iron-manganese; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Btg3—44 to 50 inches; gray (10YR 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine irregular masses of iron-manganese; many medium prominent brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.

BCg—50 to 63 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure; firm; few very fine tubular pores; few distinct gray (10YR 5/1) clay films on faces of peds; common fine irregular masses of iron-manganese; many fine and medium distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—63 to 80 inches; grayish brown (10YR 5/2) silt loam; massive; friable; common fine irregular masses of iron-manganese; many fine and medium distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid.

Range in Characteristics

Depth to carbonates: More than 72 inches

Ap horizon:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid or slightly acid

E horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid or slightly acid

Btg horizon:
- Hue—10YR or 2.5Y
- Value—3 to 5
- Chroma—1 or 2
- Texture—silty clay loam
- Reaction—strongly acid to slightly acid

BCg and Cg horizons:
- Hue—10YR or 2.5Y
- Value—4 or 5
- Chroma—1 or 2
- Texture—silty clay loam or silt loam
- Reaction—strongly acid to slightly acid

Wabash Series

Typical Pedon

Wabash silty clay, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 2,440 feet east and 2,350 feet south of the northwest corner of sec. 31, T. 78 N., R. 9 W.; USGS Holbrook topographic quadrangle; lat. 41 degrees 31 minutes 08.6 seconds N. and long. 91 degrees 56 minutes 13.2 seconds W., NAD 83:

Ap—0 to 8 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; weak fine and medium granular structure; firm; common fine roots throughout; common very fine tubular pores; slightly acid; abrupt smooth boundary.

A—8 to 21 inches; black (N 2.5/) silty clay, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; firm; few very fine roots throughout; common very fine tubular pores; neutral; clear smooth boundary.

Bg1—21 to 40 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; strong fine and medium subangular blocky structure; firm; few very fine roots throughout; common very fine tubular pores; common pressure faces; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; neutral; clear smooth boundary.

Bg2—40 to 51 inches; dark gray (5Y 4/1) silty clay; moderate medium subangular blocky structure; very firm; few very fine tubular pores; common pressure faces; few fine black (10YR 2/1) iron and manganese oxides; many medium prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) redoximorphic concentrations; neutral; clear smooth boundary.

Bg3—51 to 71 inches; dark gray (5Y 4/1) silty clay; moderate coarse subangular blocky structure; very firm; few very fine tubular pores; common pressure faces; few fine (10YR 2/1) iron and manganese oxides; common medium prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) redoximorphic concentrations; neutral; mixed, 70 percent black (10YR 2/1) and very dark gray (2.5Y 3/1) band 3 inches thick occurring between the depths of 57 and 60 inches; gradual smooth boundary.

Cg—71 to 80 inches; gray (5Y 5/1) silty clay; massive; firm; few very fine tubular pores; few pressure faces; few fine (10YR 2/1) iron and manganese oxides; common medium prominent strong brown (7.5YR 4/4) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the mollic epipedon: More than 36 inches
Other features: Some pedons have overwash of silt loam or silty clay loam.

Ap and A horizons:
- Hue—10YR, 2.5Y, 5Y, or N
- Value—2 or 3
- Chroma—0 to 2
- Texture—silty clay or clay
- Reaction—strongly acid to neutral

Bg horizon:
- Hue—10YR, 2.5Y, 5Y, or N
- Value—2 to 5
- Chroma—0 to 2
- Texture—silty clay or clay
- Reaction—strongly acid to neutral

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay or clay
Reaction—strongly acid to slightly alkaline

Walford Series

Typical Pedon

Walford silt loam, terrace, 0 to 2 percent slopes, in a cultivated field; in Iowa County, Iowa; 520 feet west and 740 feet north of the southeast corner of sec. 21, T. 81 N., R. 9 W.; USGS Middle Amana topographic quadrangle; lat. 42 degrees 14 minutes 23 seconds N. and long. 91 degrees 38 minutes 41 seconds W., NAD 83:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots throughout; many fine tubular pores; few distinct very dark brown (10YR 2/2) organic coats on all faces of peds; neutral; abrupt smooth boundary.

E—8 to 12 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; friable; many fine roots throughout; many fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on all faces of peds; few distinct light gray (10YR 7/2) silt coats on all faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; abrupt smooth boundary.

Bg—12 to 19 inches; light grayish brown (10YR 6/2) silty clay loam; moderate fine subangular blocky structure; friable; many fine roots throughout; many fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few distinct light gray (10YR 7/2) silt coats on all faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine faint gray (10YR 6/1) redoximorphic depletions; strongly acid; clear smooth boundary.

Btg1—19 to 29 inches; light grayish brown (10YR 6/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; many fine roots throughout; many fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coats on all faces of peds; many fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine faint gray (10YR 6/1) redoximorphic depletions; strongly acid; clear smooth boundary.

Btg2—29 to 44 inches; light grayish brown (2.5Y 6/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots throughout; few fine tubular pores; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; very few distinct very dark gray (10YR 3/1) organic coats on faces of peds; few distinct light gray (10YR 7/2) silt coats on faces of peds; common black (10YR 2/1) iron and manganese concretions; many fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

BCg—44 to 55 inches; light grayish brown (2.5Y 6/2) silt loam; weak medium prismatic structure; friable; common black (10YR 2/1) iron and manganese concretions; many fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; strongly acid; gradual smooth boundary.

Cg—55 to 80 inches; light grayish brown (2.5Y 6/2) and strong brown (7.5YR 5/6) silt loam; massive; friable; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

E horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

Bg or Btg horizon:
Hue—10YR to 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam
Reaction—strongly acid to neutral

BCg horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam
Reaction—strongly acid to neutral

Cg horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silt loam
Reaction—strongly acid to neutral

Watkins Series

Typical Pedon

Watkins silt loam, 2 to 5 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 2,330 feet east and 200 feet south of the northwest corner of sec. 33, T. 81 N., R. 10 W.; USGS Marengo topographic quadrangle; lat. 41 degrees 47 minutes 17.6 seconds N. and long. 92 degrees 01 minute 02.9 seconds W., NAD 83:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; moderately acid; clear smooth boundary.

E—7 to 12 inches; about 90 percent very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam, gray (10YR 6/1) dry; weak thick platy structure parting to weak fine subangular blocky; friable; about 10 percent brown (10YR 4/3) peds from BE horizon; common distinct light gray (10YR 7/1) (dry) coats of silt and very fine sand on faces of peds; moderately acid; gradual smooth boundary.

BE—12 to 18 inches; about 85 percent brown (10YR 4/3) and 15 percent dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; few distinct light gray (10YR 7/1) (dry) coats of silt and very fine sand on

faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; moderately acid; clear smooth boundary.

Bt1—18 to 29 inches; brown (10YR 4/3) silty clay loam; weak fine prismatic structure parting to moderate medium subangular and angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/1) (dry) coats of silt and very fine sand on faces of peds; slightly acid; gradual smooth boundary.

Bt2—29 to 35 inches; brown (10YR 4/3) silty clay loam; weak coarse prismatic structure parting to moderate coarse subangular and angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/1) (dry) coats of silt and very fine sand on faces of peds; few fine very dark brown (10YR 2/2) concretions (oxides); few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Bt3—35 to 52 inches; brown (10YR 4/3) silty clay loam; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/1) (dry) coats of silt and very fine sand on faces of peds; few fine black (N 2/) concretions (oxides); moderately acid; gradual smooth boundary.

C—52 to 80 inches; brown (10YR 5/3) silty clay loam; massive; few fine black (N 2/) concretions (oxides); friable; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations and few fine prominent gray (5Y 6/1) redoximorphic depletions; moderately acid.

Range in Characteristics

Depth to carbonates: More than 60 inches

Ap or A horizon:
- Hue—10YR
- Value—3
- Chroma—1 or 2
- Texture—silt loam
- Reaction—moderately acid to neutral

E horizon:
- Hue—10YR
- Value—3 or 4
- Chroma—2
- Texture—silt loam
- Reaction—moderately acid to neutral

BE horizon (if it occurs):
- Hue—10YR
- Value—4
- Chroma—3 or 4
- Texture—silt loam or silty clay loam
- Reaction—strongly acid to slightly acid

Bt horizon (upper part):
- Hue—10YR
- Value—4
- Chroma—3 or 4
- Texture—silty clay loam
- Reaction—strongly acid to slightly acid

Bt horizon (lower part) and BC horizon (if it occurs):
- Hue—10YR or 2.5Y

Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam
Reaction—strongly acid to slightly acid

C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam; thin strata of loam, sandy loam, or loamy sand at a depth of more than 40 inches in some pedons
Reaction—moderately acid or slightly acid

2C horizon (if it occurs) (below a depth 60 inches):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—sand, loamy sand, or gravelly sand
Reaction—moderately acid or slightly acid

Waubeek Series

Typical Pedon

Waubeek silt loam, 2 to 5 percent slopes, in a cultivated field; in Iowa County, Iowa; 956 feet north and 1,404 feet west of the southeast corner of sec. 12, T. 81 N., R. 9 W.; USGS Amana topographic quadrangle; lat. 41 degrees 50 minutes 04.9 seconds N. and long. 91 degrees 50 minutes 10.4 seconds W., NAD 83:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

E—7 to 13 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy and weak fine subangular blocky structure; friable; many silt coats; few very dark grayish brown (10YR 3/2) wormcasts; slightly acid; gradual smooth boundary.

Bt1—13 to 19 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common distinct clay films; common light gray (10YR 7/1) silt coats; few very fine very dark brown (10YR 2/2) accumulations (oxides); moderately acid; clear smooth boundary.

Bt2—19 to 29 inches; brown (10YR 5/3) silty clay loam; moderate fine angular and subangular blocky structure; friable; common distinct clay films; common silt coats; few medium sand grains in the lower part; common fine very dark brown (10YR 2/2) accumulations (oxides); few fine prominent yellowish brown (10YR 5/8) and few fine faint brown (7.5YR 4/4) redoximorphic concentrations in the lower part; moderately acid; clear smooth boundary.

2Bt3—29 to 34 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular and angular blocky structure; friable; very few distinct clay films; distinct silt coats; common fine very dark brown (10YR 2/2) accumulations (oxides); few fine prominent grayish brown (10YR 5/2) redoximorphic depletions; about 5 percent pebbles; strongly acid; gradual smooth boundary.

2BC—34 to 45 inches; strong brown (7.5YR 5/6) loam; weak coarse prismatic structure parting to weak coarse subangular and angular blocky; firm; few distinct clay films on surfaces along root channels; common fine very dark brown (10YR 2/2) accumulations (oxides); few fine faint yellowish red (5YR 4/6) redoximorphic concentrations; many fine and medium prominent grayish brown (10YR 5/2)

redoximorphic depletions; about 5 percent pebbles; strongly acid; gradual smooth boundary.

2C1—45 to 57 inches; yellowish brown (10YR 5/4) loam; massive; firm; few very dark brown (10YR 2/2) accumulations (oxides); few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; many fine and medium distinct grayish brown (10YR 5/2) redoximorphic depletions; about 5 percent pebbles; moderately acid; gradual smooth boundary.

2C2—57 to 80 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; many fine and medium distinct grayish brown (10YR 5/2) redoximorphic depletions; about 5 percent pebbles; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches
Depth to till: 20 to 40 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Reaction—moderately acid to neutral

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam
Reaction—moderately acid to neutral

BE horizon (if it occurs):
Hue—10YR
Value—4
Chroma—3
Texture—silt loam or silty clay loam
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam
Reaction—strongly acid to slightly acid
Other features—a stone line or a thin lens of sandy material typically is at the lower boundary of this horizon at the contact with till

2Bt horizon:
Hue—7.5YR or 10YR
Value—5
Chroma—4 to 8
Texture—loam, clay loam, or sandy clay loam
Reaction—strongly acid to neutral

2BC and 2C horizons:
Hue—7.5YR or 10YR
Value—5
Chroma—4 to 8

Texture—loam, clay loam, or sandy clay loam
Reaction—strongly acid to neutral

Waukee Series

Typical Pedon

Waukee loam, 0 to 2 percent slopes, in a pasture; in Iowa County, Iowa; 2,000 feet south and 2,020 feet west of the northeast corner of sec. 5, T. 80 N., R. 9 W.; USGS Middle Amana topographic quadrangle; lat. 41 degrees 14 minutes 23.7 seconds N. and long. 91 degrees 38 minutes 41.1 seconds W., NAD 83:

A1—0 to 7 inches; very dark grayish brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots throughout; few fine tubular pores; neutral; clear smooth boundary.
A2—7 to 13 inches; very dark grayish brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many very fine roots throughout; few fine tubular pores; neutral; clear smooth boundary.
AB—13 to 17 inches; dark brown (10YR 3/3) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many very fine roots throughout; few fine tubular pores; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.
Bw1—17 to 23 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; common very fine roots throughout; few fine tubular pores; common distinct dark brown (10YR 3/3) organic coats on all faces of peds; moderately acid; clear smooth boundary.
Bw2—23 to 31 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; common very fine roots throughout; few fine tubular pores; common distinct dark brown (10YR 3/3) organic coats on all faces of peds; moderately acid; clear smooth boundary.
2BC—31 to 41 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure parting to single grain; very friable; few very fine roots throughout; moderately acid; gradual smooth boundary.
2C1—41 to 49 inches; dark yellowish brown (10YR 4/4) and light yellowish brown (10YR 6/4) loamy sand; single grain; loose; slightly acid; gradual smooth boundary.
2C2—49 to 80 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; about 5 percent subrounded gravel; slightly acid.

Range in Characteristics

Depth to sandy and gravelly material: 20 to 40 inches
Thickness of the mollic epipedon: 10 to 20 inches
Depth to carbonates: More than 72 inches

A or Ap horizon:
Hue—10YR
Value—2
Chroma—1 or 2
Texture—loam or silt loam that has a high content of sand
Reaction—strongly acid to neutral

Bw horizon:
Hue—7.5YR or 10YR
Value—3 to 5
Chroma—3 to 6

Texture—loam or sandy clay loam
Reaction—strongly acid or moderately acid

2BC and 2C horizons:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 8
Texture—loamy coarse sand, loamy sand, sand, or coarse sand or the gravelly analogs of these textures
Reaction—moderately acid or slightly acid

Wiota Series

Typical Pedon

Wiota silty clay loam, 0 to 2 percent slopes, rarely flooded, in a cultivated field; in Iowa County, Iowa; 960 feet west and 1,400 feet north of the southeast corner of sec. 21, T. 81 N., R. 11 W.; USGS Ladora topographic quadrangle; lat. 41 degrees 48 minutes 29.2 seconds N. and long. 92 degrees 07 minutes 34.7 seconds W., NAD 83:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; friable; common fine and medium roots throughout; common very fine tubular pores; moderately acid; abrupt smooth boundary.

A1—8 to 14 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; common very fine roots throughout; common very fine tubular pores; slightly acid; clear smooth boundary.

A2—14 to 19 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; moderately acid; clear smooth boundary.

Bt1—19 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—31 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine and medium subangular blocky structure; friable; few very fine roots throughout; common very fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; gradual smooth boundary.

BC—43 to 53 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse subangular blocky structure; friable; common very fine tubular pores; slightly acid; clear smooth boundary.

C1—53 to 65 inches; dark yellowish brown (10YR 4/4) silty clay loam; massive; friable; common very fine tubular pores; few fine distinct yellowish brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; clear smooth boundary.

C2—65 to 80 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; common very fine tubular pores; common fine and medium distinct yellowish brown (7.5YR 5/6) redoximorphic concentrations; common fine and medium distinct grayish brown (2.5Y 5/2) redoximorphic depletions; slightly acid.

Range in Characteristics

Depth to carbonates: More than 60 inches
Thickness of the mollic epipedon: 18 to 32 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam or silt loam
Reaction—strongly acid to neutral

Bt horizon:
Hue—10YR
Value—3 to 5
Chroma—3 or 4
Texture—silty clay loam
Reaction—strongly acid to slightly acid

BC or C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 6
Texture—silty clay loam or silt loam
Reaction—slightly acid

Zook Series

Typical Pedon

Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded, in a cultivated field; in Iowa County, Iowa; 1,800 feet south and 2,360 feet west of the northeast corner of sec. 31, T. 78 N., R. 9 W.; USGS Holbrook topographic quadrangle; lat. 41 degrees 31 minutes 14 seconds N. and long. 91 degrees 56 minutes 07 seconds W., NAD 83:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure parting to moderate fine granular; friable; common fine and medium roots; few very fine tubular pores; slightly acid; abrupt smooth boundary.

A1—7 to 20 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common fine roots; common very fine tubular pores; slightly acid; clear smooth boundary.

A2—20 to 37 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; strong fine subangular blocky structure; firm; few very fine roots; common very fine tubular pores; moderately acid; clear smooth boundary.

Bg1—37 to 48 inches; dark gray (2.5Y 4/1) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine tubular pores; slightly acid; gradual smooth boundary.

Bg2—48 to 67 inches; gray (5Y 5/1) silty clay loam; weak medium subangular blocky structure; friable; common very fine tubular pores; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid; gradual smooth boundary.

Cg—67 to 80 inches; gray (5Y 5/1) silt loam; massive; very friable; common very fine tubular pores; common medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: More than 36 inches
Depth to carbonates: More than 60 inches

Ap and A horizons:
- Hue—10YR or N; 10YR in overwash phase
- Value—2 or 3; 2 or 3 in overwash phase
- Chroma—0 or 1; 1 or 2 in overwash phase
- Texture—silty clay loam or silty clay; silt loam in overwash phase
- Reaction—moderately acid to slightly alkaline; moderately acid to slightly alkaline in overwash phase

Bg horizon:
- Hue—10YR to 5Y
- Value—2 to 5
- Chroma—1
- Texture—silty clay loam or silty clay
- Reaction—slightly acid or neutral

Cg horizon:
- Hue—10YR to 5Y
- Value—2 to 5
- Chroma—1
- Texture—silty clay loam, silt loam, or silty clay
- Reaction—slightly acid or neutral

Formation of the Soils

In this section, the major factors of soil formation are described as they relate to the soils of Iowa County. The processes of horizon differentiation also are described.

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 mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the living organisms on and in the soil; relief, topography, or lay of the land; and the length of time the forces of soil formation have acted on the soil material (Jenny, 1941).

Climate and plant and animal life are the active factors of soil formation. They act on the parent material and slowly change it into a natural body that has genetically related horizons, or layers. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of profile that forms and in extreme cases 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 development of soil horizons. A long period of time generally is needed for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the others.

Parent Material

In Iowa County, parent material has affected the general character of the soil profile. Most of the soils in the county formed in glacial till, or ice-laid material; in loess, or windblown material; in alluvium, or water-deposited material; or in eolian, or windblown, sands.

Glacial till.—In Iowa County the major Pleistocene depositions of pre-Wisconsin age are Nebraskan and Kansan (pre-Illinoian) drift (Scholtes and others, 1951). The Kansan drift is identifiable throughout the county. On upland side slopes, it forms an extensive part of the landscape. The Nebraskan drift, however, is not readily identifiable on the surface in Iowa County.

In some deep road cuts and along some of the major stream valleys, the Aftonian paleosol is present below the Kansan glacial till (Kay, 1916; Kay and Apfel, 1929). This paleosol consists mainly of glacial till made up of coarse fragments in a clay loam matrix. The upper part of the till consists of yellowish brown material that is oxidized and leached. Below this zone is dark gray material that is calcareous, contains limestone and dolomite particles, and is neither oxidized nor leached.

Soils formed on the Kansan till plain during the Yarmouth and Sangamon interglacial periods before the loess was deposited. On nearly level interstream divides, the soils were strongly weathered and had a gray, plastic subsoil (called gumbotil) consisting of paleosol. The gumbotil that remains is several feet thick and is very slowly permeable.

Geologic erosion has cut below the Yarmouth-Sangamon paleosol and into the Kansan till and older deposits. Generally, a stone line or subjacent till that is overlain by pedisediment is at the depth to which this erosion has cut (Ruhe, 1956; Ruhe and Daniels, 1958). A paleosol has formed in the pedisediment stone line and in the subjacent till. Armstrong and Keswick soils formed in this material.

Geologic erosion removed the loess from many slopes and exposed strongly weathered paleosols. In some places, the paleosols have been beveled or truncated and only the lower part of the strongly weathered materials remains. In other places, erosion has removed all of the paleosols and has exposed till that is only slightly weathered. Erosion cut through to below the Yarmouth-Sangamon paleosol during the Late Sangamon (Ruhe, 1956; Ruhe, 1959). The material below the paleosols consists of loamy sediments over a stone line that, in turn, is above a highly weathered, clayey, reddish brown, acid till. Material that formed in the late Sangamon period is exposed on the narrow, slightly lowered interstream divides on some side slopes.

Loess.—Loess of Wisconsin age covers much of the uplands of Iowa County. This type of parent material is extensive in the county (Ruhe and others, 1957; Ruhe and Scholtes, 1955). It consists of accumulated particles of silt and clay that have been deposited by the wind. Variations in soils are related to the distance of the soils from the source of the loess. The source of the loess in Iowa County is probably the bottom land along the Missouri River in the western part of Iowa (Hutton, 1947).

On the stable upland divides, the loess is about 10 to 12 feet thick (Schafer, 1955). Otley, Mahaska, and Taintor soils are the dominant loess soils in Iowa County. Clinton, Fayette, Givin, Keomah, Ladoga, Seaton, and Sperry soils also formed in loess. Many of the high stream terraces along the major streams are covered with loess. The loess on these high stream terraces contains less clay and slightly more sand than the loess that covers the adjacent uplands. The soil material underlying the loess in these areas is stratified alluvium or valley fill. The alluvium generally has a high content of sand and gravel.

Alluvium.—Alluvium consists of sediments that have been deposited by water. As these sediments move, they are sorted to some extent, but they are as well sorted as loess in only a few places. Also, alluvium does not have the wide range of particle sizes that occurs in glacial drift. The alluvium in Iowa County is derived from loess and glacial drift, so it is mainly a mixture of silt and clay, of silt and sand, or of sand and gravel. The coarse sand and gravel generally are only in the pre-Sangamon alluvial sediments on the stream benches. Sediments that accumulated at the foot of the slope on which they originated are called colluvium or local alluvium.

The soils on flood plains, on bottom land, and along drainageways formed in alluvium. As a river overflows its channel and the water spreads over the flood plain, coarse textured material, such as sand and coarse silt, is deposited first. As the floodwater spreads, it moves more slowly and finer textured sediments are deposited. As the floodwater recedes, the clay particles, which are the finest in texture, settle from the water that is left standing on the lowest part of the flood plain.

Quiver, Nodaway, and Klum soils commonly are closest to the stream channel and are coarser textured than the other soils on bottom land. Chequest, Tuskeego, and Zook soils are along the Iowa and English Rivers and their tributaries, commonly away from the meanders of the stream. Zook and Wabash soils typically are on the lower part of the bottom land and are the finest textured soils derived from alluvium in the county. Colo and Ackmore soils are along the smaller streams. These soils are widely distributed throughout the county. In places they formed in local alluvium at the base of upland slopes. Ely and Judson soils are the dominant soils that formed in local alluvium in the county. Typically, they are on footslopes or alluvial fans and are in lower positions on the landscape than those of the surrounding soils derived from loess and glacial materials.

Eolian material.—Eolian material consists of sediments that have been deposited by the wind. In some areas the wind has carried fine sand from the stream channels and the flood plains to higher elevations (Prior, 1976). This dune sand has been deposited on low stream terraces, high stream terraces, and uplands fringing the leeward side of valleys. Chelsea and Sparta soils formed in eolian sand that is more than 5 feet thick (fig. 16).

Climate

The soils in Iowa County have been forming under a midcontinental, subhumid climate for the past 5,000 years (Ruhe, 1956; Ruhe and others, 1957). The morphology and properties of the majority of the soils in Iowa County indicate that this climate was similar to the present climate. From 6,500 to 16,000 years ago, however, the climate probably was cool and moist. This type of climate was conducive primarily to a growth of forest vegetation (Ruhe, 1956; Ruhe and others, 1957). A study indicates that the climate during the Sangamon period of the Pleistocene Epoch was cool and moist and conducive mainly to the growth of conifers (Lane, 1941).

The influence of the general climate in a region is modified by local conditions in or near the developing soils. For example, soils on south-facing slopes formed under a micro-climate that was warmer and drier than the average climate of nearby areas. The low-lying, poorly drained soils on bottom land formed under a wetter and colder climate than that in most of the surrounding upland areas. These local differences influence the characteristics of the soils and account for some of the differences among soils in the same general climatic region.

Figure 16.—An area of Chelsea fine sand, 9 to 18 percent slopes, above an alluvial terrace of Nevin and Bremer soils. The Chelsea soils formed in eolian sand blown from nearby stream valleys.

Living Organisms

Many changes in climate and vegetation took place in Iowa during the post-glacial period (Lane, 1941; Ruhe, 1956). Spruce grew on the soils from 12,000 to 8,000 years ago. This type of vegetation was followed by a coniferous-deciduous forest, which lasted until about 6,500 years ago. At that time, grass became the dominant vegetation in the area.

For the past 5,000 years, the soils of the survey area have been influenced by prairie grasses and some trees. Big bluestem and little bluestem were the main prairie grasses. The dominant trees were deciduous—mainly oak, hickory, ash, elm, and maple.

The effects of vegetation on soils similar to those in Iowa County have been studied recently. Evidence shows that the vegetation changed while soils formed in areas bordering trees and grasses. The morphology of Armstrong, Atterberry, Bassett, Downs, Ella, Gara, Givin, Hayfield, Koszta, Ladoga, Tuskeego, Watkins, and Waubeek soils reflects the influence of both trees and grasses. Trees influenced the formation of Chelsea, Clinton, Fayette, Keomah, Keswick, Lindley, Seaton, Stronghurst, and Tell soils (Prill and Riecken, 1958). Grasses influenced the formation of Bremer, Chequest, Colo, Dickinson, Dinsdale, Ely, Judson, Kenyon, Mahaska, Nevin, Otley, Pillot, Shelby, Sparta, Sperry, Taintor, Tama, Vesser, Wiota, and Zook soils.

Important changes take place when the soil is cultivated. Some of these changes have little effect on productivity, while others have a drastic effect. The changes caused by water erosion generally are the most significant. On many of the cultivated soils in the county, particularly the gently rolling to hilly soils, part or all of the original surface layer has been lost through sheet erosion. In places, shallow to deep gullies have formed.

In many fields that are cultivated year after year, the granular structure that was apparent when the prairies were undisturbed has broken down. In these fields the soil surface tends to crust and harden when it dries. Fine textured soils that have been plowed when too wet are less permeable than similar soils in undisturbed areas.

Humans have increased the productivity of some soils. Large areas of bottom-land soils, such as Colo and Zook soils, have been made suitable for cultivation because drainage ditches have been dug and diversions have been constructed at the foot of upland slopes. The cropland in areas of Taintor and Mahaska soils on broad upland flats has been greatly improved because a drainage system, such as subsurface tile, has been installed.

Deficiencies in plant nutrients have been counteracted in some areas. Some soils are more productive than they were in their natural state because of applications of commercial fertilizer.

Relief

Relief is an important cause of differences among soils. It indirectly influences soil formation through its effect on drainage. In Iowa County, the soils range from level to very steep. In many areas on bottom land, the nearly level soils are occasionally flooded and have a permanently or periodically high water table. In depressions, water soaks into the nearly level soils that are subject to flooding. Conversely, much of the rainfall runs off the steep soils on uplands.

Level soils are on the broad upland flats and on the stream bottoms. The steepest soils in the county are generally on the southern and western sides of major streams and their tributaries. The intricate pattern of upland drainageways indicates that the landscape in nearly the entire county has been modified by geologic processes.

Bremer, Sperry, Taintor, Walford, and similar soils, which formed in areas where the water table is high, have a dominantly grayish subsoil. Ely, Givin, Ladoga, Mahaska,

Nevin, and similar soils formed in areas where the water table fluctuated and was periodically high. Gara, Lindley, Shelby, and other soils that formed in areas where the water table was deeper in the soil profile have a yellowish brown or strong brown subsoil. Bremer, Taintor, and other soils formed under prairie grasses and have a high water table. They contain more organic matter in the surface layer than well drained soils that also formed under prairie grasses. Clay accumulates in the subsoil of Sperry and other soils that are in slight depressions or in nearly level areas. A large amount of water carries the clay particles downward. Sperry soils are locally known as “claypan” soils because they have a slowly permeable subsoil, in which the greatest amount of downward-moving clay has accumulated.

Gara, Lindley, Shelby, and similar soils, which formed in glacial till, have a wide range in slope and are on many kinds of slopes. In these soils, the depth to carbonates is shallowest where the slopes are steepest, are convex, or are most unstable.

Time

The length of time required for a soil to form ultimately affects the kind of soil that is formed. An older or more strongly developed soil has well defined genetic horizons. A less well defined soil does not exhibit genetic horizons or has only weakly defined ones. Most soils on bottom land that are subject to frequent flooding are weakly developed because they have not been in place long enough for distinct horizons to develop.

On the steeper soils, material is generally removed before a thick profile with strongly developed horizons has had time to develop. Even though the material has been in place for a long time, the soil may be immature because much of the water runs off the slopes rather than through the soil profile. Shelby, Gara, and Lindley soils formed on recently dissected slopes of late Wisconsin age (Ruhe, 1956; Ruhe, 1959). These soils are no older than 11,000 to 14,000 years and are probably much younger.

Adair, Armstrong, and Keswick soils are among the oldest soils in the county (Ruhe, 1956; Ruhe and Scholtes, 1955). They formed in material that is much older than the loess-derived parent material of such soils as Clinton, Downs, Fayette, Ladoga, Mahaska, Otley, Seaton, Sperry, Tama, and Taintor soils. Soils derived from loess are no older than 14,000 to 16,000 years and may be considered younger.

Radiocarbon studies of wood fragments and organic matter in loess and glacial till have made it possible to determine the approximate ages of soils that formed in loess and glacial deposits in Iowa. In Iowa County, the loess is thickest in areas of the nearly level soils on stable upland divides. It is underlain by a Yarmouth-Sangamon paleosol that is on the pre-Illinoian (Kansan) till surface. In many places below the stable uplands, an organic layer is at the base of the loess. Organic matter below the solum of loess soils in Wayne County, Iowa, had radiocarbon ages of 19,000 to 20,000 years.

Processes of Horizon Differentiation

Horizons are differentiated from each other when four basic kinds of changes take place. These changes are additions, removals, transfers, and transformations (Simonson, 1959). Each of these kinds of change affects many substances in the soils, such as organic matter, soluble salts, carbonates, sesquioxides, and silicate clay materials. Most of these processes tend to promote horizon differentiation, but some tend to offset or retard it. The processes and the resulting changes occur simultaneously in soils. The ultimate nature of the profile is governed by the balance of these changes within the soil.

An accumulation of organic matter generally is an early phase of horizon differentiation. It has been an important process in the differentiation of horizons in the

soils of Iowa County. The amount of organic matter that has accumulated in the surface layer of the soils ranges from high to low. In some soils, as a result of erosion, the content of organic matter is now lower than it was in the past.

The removal of substances from parts of the soil profile is important in the differentiation of horizons. The downward movement of calcium carbonates and bases is an example. The upper part of the soils in Iowa County has been leached of calcium carbonate. Many soils have been leached to the extent that they are strongly acid or very strongly acid, even in the subsoil.

Phosphorus is removed from the subsoil by plant roots and transferred to the parts of the plant growing above ground. It is then returned to the surface layer in the plant residue. This process affects the form and distribution of phosphorus in the soil profile.

The translocation of silicate clay minerals is another important process. The clay minerals in the surface layer are carried downward in suspension by percolating water. They accumulate in the subsoil as fillings in pores and root channels and as clay films on the faces of the soil structure. This process has affected many of the soils in the county. In other soils, however, the clay content of the surface layer is not markedly different from that of the underlying layer and other evidence of clay movement is minimal.

Another kind of transfer occurs when cracks form as a result of shrinking and swelling. Because of the cracks, some of the material from the surface layer is transferred to the lower parts of the profile. This transfer is minimal in most soils. It is most common in very clayey soils. It can occur in such soils as Keswick and Zook soils.

Transformations are physical and chemical. The weathering of soil particles to smaller sizes is an example of a transformation. The reduction of iron is another example. This process is called gleying. It occurs when the soil is saturated for long periods. The soil contains enough organic matter for biological activity to take place during periods of saturation. Gleying is evidenced by ferrous iron and gray colors in the soil. It is characteristic of poorly drained soils, such as Taintor soils. The content of reductive extractable iron, or free iron, generally is lower in somewhat poorly drained soils, such as Mahaska soils. Another kind of transformation is the weathering of the primary apatite minerals in the parent material to secondary phosphorus compounds.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the "National Soil Survey Handbook" (available in local offices of the Natural Resources Conservation Service or on the Internet).

Ablation till. Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl. A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

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.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction toward which a slope faces. Also called slope aspect.

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 (fig. 17). In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact 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.

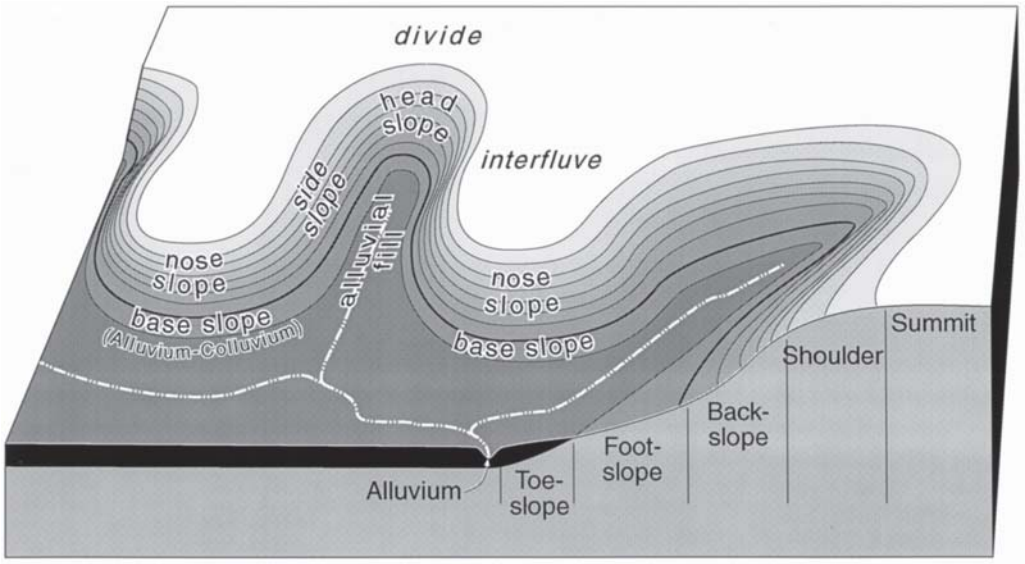

Figure 17.—Landscape relationship of geomorphic components and hillslope positions (modified after Ruhe and Walker, 1968).

Base slope (geomorphology). A geomorphic component of hills (fig. 17) 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).

Beach deposits. Material, such as sand and gravel, that is generally laid down parallel to an active or relict shoreline of a post-glacial or glacial lake.

Bedding plane. A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

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.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed; the adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Bottom land. An informal term loosely applied to various portions of a flood plain.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush

management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. See Terracettes.

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. See Redoximorphic features.

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 dense, compact, slowly permeable subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. A claypan is commonly hard when dry and plastic and sticky when wet.

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. Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. See Redoximorphic features.

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.

Coprogenous earth (sedimentary peat). A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology). A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations). 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.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

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.

Delta. A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divide. (a) The line of separation, or (b) the summit area, or narrow tract of higher ground that constitutes the watershed boundary between two adjacent drainage basins (fig. 17); it divides the surface waters that flow naturally in one direction from those that flow in the opposite direction.

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.

Drift. A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Earthy fill. See Mine spoil.

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 deposit. Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

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.

Erosion pavement. A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Esker. A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms. A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay. A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step. An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial. Of or pertaining to rivers or streams; produced by stream or river action.

Footslope. The concave surface at the base of a hillslope (fig. 17). 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.
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.
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.
Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.
Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.
Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.
Graded stripcropping. Growing crops in strips that grade toward a protected waterway.
Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
Ground water. Water filling all the unblocked pores of the material below the water table.
Gully. A small channel with steep sides caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. 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.
Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.
Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.
Head slope (geomorphology). A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway (fig. 17). 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.

Hill. A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope. A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill (fig. 17).

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.

L horizon.—A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

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.

Ice-walled lake plain. A relict surface marking the floor of an extinct lake basin that was formed on solid ground and surrounded by stagnant ice in a stable or unstable superglacial environment on stagnation moraines. As the ice melted, the lake plain became perched above the adjacent landscape. The lake plain is well sorted, generally fine textured, stratified deposits.

Igneous rock. Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., 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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology). A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill (fig. 17); shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream. A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. See Redoximorphic features.

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. A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Kame moraine. An end moraine that contains numerous kames. A group of kames along the front of a stagnant glacier, commonly comprising the slumped remnants of a formerly continuous outwash plain built up over the foot of rapidly wasting or stagnant ice.

Karst (topography). A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Ksat. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake bed. The bottom of a lake; a lake basin.

Lake plain. A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landslide. A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

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.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength. The soil is not strong enough to support loads.

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.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Masses. See Redoximorphic features.

Meander belt. The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar. A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll. One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

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 at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine spoil. An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

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. A kind of map unit that has little or no natural soil and supports little or no vegetation.

MLRA (major land resource area). A geographic area characterized by a particular pattern of land uses, elevation and topography, soils, climate, water resources, and potential natural vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

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.)

Mudstone. A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. See Redoximorphic features.

Nose slope (geomorphology). A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside (fig. 17). The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash. Stratified and sorted sediments (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain. An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Parts per million (ppm). The concentration of a substance in the soil, such as phosphorus or potassium, in one million parts of air-dried soil on a weight per weight basis.

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.

Pedisediment. A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

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:

Impermeable	less than 0.0015 inch
Very slow	0.0015 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

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Phosphorus. The amount of phosphorus available to plants at a depth of 30 to 42 inches is expressed in parts per million and based on the weighted average of air-dried soil samples. Terms describing the amount of available phosphorus are:

Very low	less than 7.5 ppm
Low	7.5 to 13.0 ppm
Medium	13.0 to 22.5 ppm
High	more than 22.5 ppm

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitted outwash plain. An outwash plain marked by many irregular depressions, such as kettles, shallow pits, and potholes, which formed by melting of incorporated ice masses.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology). A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings. See Redoximorphic features.

Potassium. The amount of potassium available to plants at a depth of 12 to 24 inches is expressed in parts per million and based on the weighted average of air-dried soil samples. Terms describing the amount of available potassium are:

Very low	less than 50 ppm
Low	50 to 79 ppm
Medium	79 to 125 ppm
High	more than 125 ppm

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.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

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 as 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. See Redoximorphic features.

Redoximorphic depletions. See Redoximorphic features.

Redoximorphic features. Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix. See Redoximorphic features.

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.

Relief. The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill. A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser. The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

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.

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.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat). See Permeability.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

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 that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The convex, erosional surface near the top of a hillslope (fig. 17). A shoulder is a transition from summit to backslope.

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 (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside (fig. 17). The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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. An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

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.

Sinkhole. A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Slickensides (pedogenic). Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

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.

Slope alluvium. Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

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 and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stagnation moraine. A body of drift released by the melting of a glacier that ceased flowing. Commonly but not always occurs near ice margins; composed of till, ice-contact stratified drift, and small areas of glacial lake sediment. Typical landforms are knob-and-kettle topography, locally including ice-walled lake plains.

Stone line. In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial.

Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

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; 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; represents the remnants of an abandoned flood plain, stream bed, 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.

Subglacial. Formed or accumulated in or by the bottom parts of a glacier or ice sheet.

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 (fig. 17). 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.

Swale. A slight depression in the midst of generally level land. A shallow depression in an undulating ground moraine caused by uneven glacial deposition.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation). 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, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes. Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

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."

Till. Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain. An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The gently inclined surface at the base of a hillslope (fig. 17). Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Upland. An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill. The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

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 disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by

atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered 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.

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