



United States
Department of
Agriculture

Soil
Conservation
Service

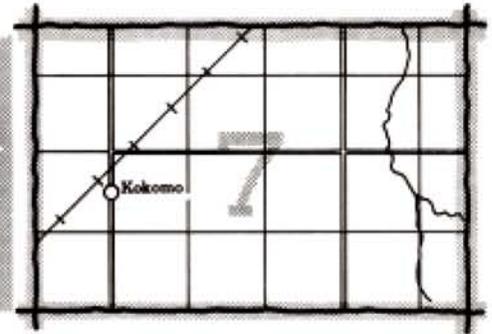
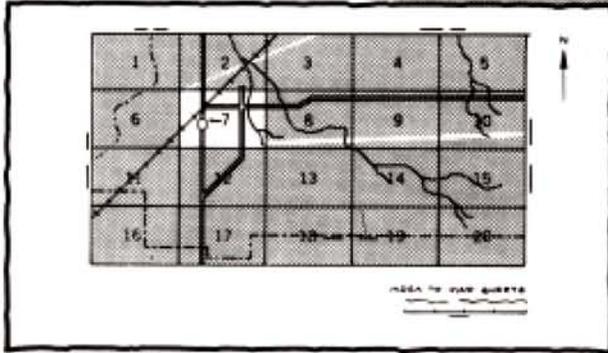
In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Henry County, Illinois



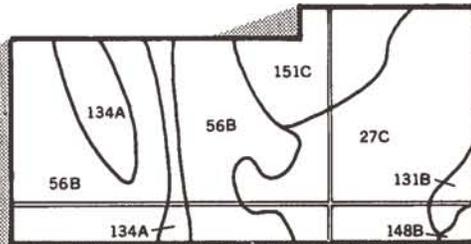
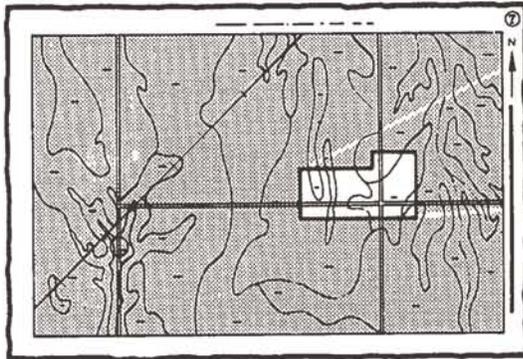
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

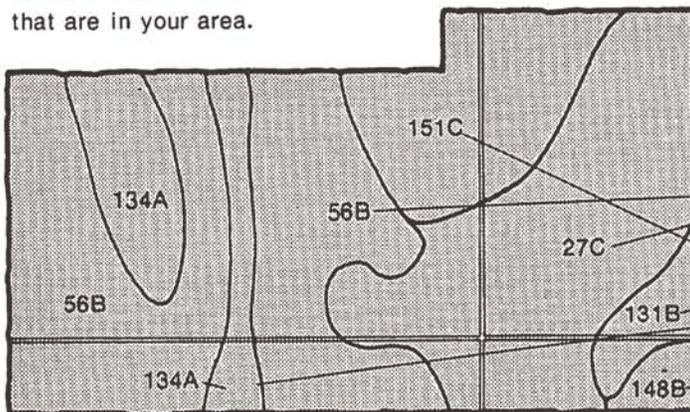


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



4. List the map unit symbols that are in your area.

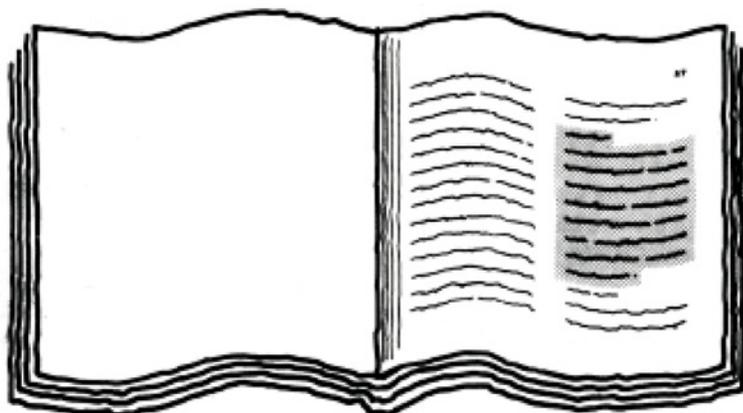


Symbols

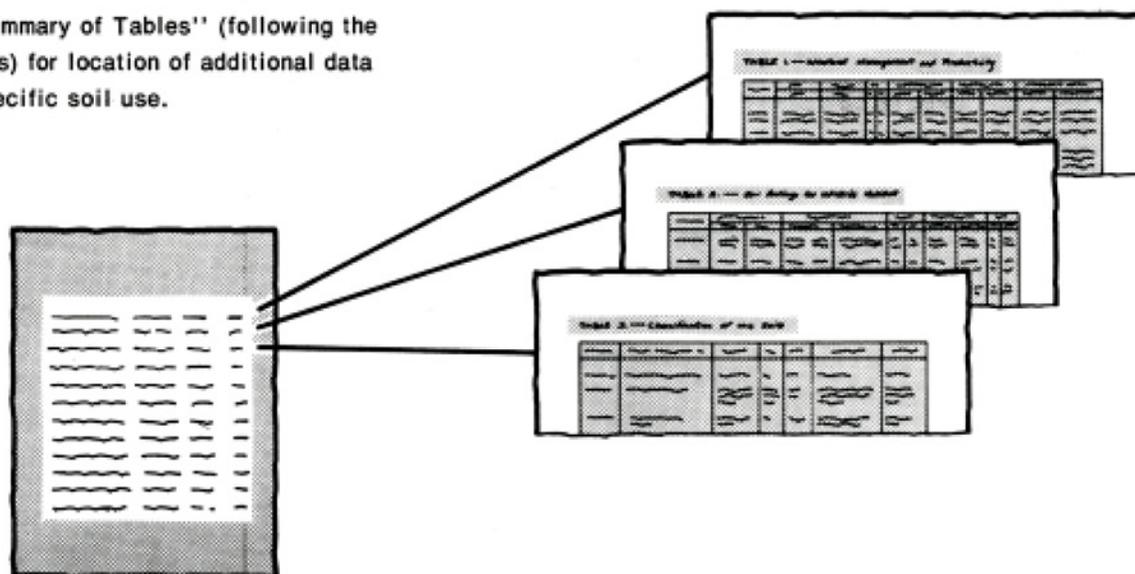
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.

A detailed illustration of a page from the 'Index to Soil Map Units'. It features multiple columns of text, likely listing map unit names and their corresponding page numbers.

6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



Consult "Contents" for parts of the publication that will meet your specific needs.

7. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

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 Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1975-80. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Henry County Soil and Water Conservation District. The cost was shared by the Henry County Board.

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

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 117.

Cover: Contour stripcropping and parallel tile outlet terraces in an area of Hickory soils.

Contents

Index to map units	v	Windbreaks and environmental plantings.....	82
Summary of tables	vii	Recreation.....	83
Foreword	ix	Wildlife habitat.....	83
General nature of the county.....	1	Engineering.....	85
How this survey was made.....	3	Soil properties	91
Map unit composition.....	4	Engineering index properties.....	91
General soil map units	5	Physical and chemical properties.....	92
Descriptions of associations.....	5	Soil and water features.....	93
Broad land use considerations.....	14	Engineering index test data.....	94
Detailed soil map units	17	Classification of the soils	95
Soil descriptions.....	17	Soil series and their morphology.....	95
Prime farmland.....	75	Formation of the soils	137
Use and management of the soils	77	Factors of soil formation.....	137
Crops and pasture.....	77	References	139
Woodland management and productivity.....	81	Glossary	141
		Tables	149

Soil Series

Adrian series.....	95	Keltner series.....	113
Aholt series.....	96	Keomah series.....	114
Assumption series.....	96	La Hogue series.....	114
Atlas series.....	97	Lenzburg series.....	115
Bold series.....	98	Loran series.....	116
Booker series.....	98	Marseilles series.....	116
Brenton series.....	99	Miami series.....	117
Calco series.....	100	Milford series.....	118
Canisteo series.....	100	Millbrook series.....	118
Catlin series.....	101	Montgomery series.....	119
Clarksdale series.....	101	Muscatine series.....	120
Coyne series.....	102	Niota series.....	120
Denny series.....	103	Oakville series.....	121
Denrock series.....	103	Orio series.....	122
Dickinson series.....	104	Orion series.....	122
Downs series.....	105	Palms series.....	123
Drummer series.....	105	Pella series.....	123
Elburn series.....	106	Plano series.....	124
Elco series.....	107	Port Byron series.....	125
Elkhart series.....	107	Proctor series.....	125
Fayette series.....	108	Radford series.....	126
Gilford series.....	108	Rozetta series.....	126
Harpster series.....	109	Sable series.....	127
Hickory series.....	110	Sawmill series.....	128
Hoopston series.....	110	Seaton series.....	128
Ipava series.....	111	Selma series.....	129
Jasper series.....	112	Sparta series.....	130
Joy series.....	112		

Sylvan series.....	130	Timula series	133
Tama series	131	Velma series	133
Tell series	132	Watseka series	134
Thorp series	132	Waukegan series.....	135
		Westville series.....	135

Issued October 1984

Index to Map Units

8D2—Hickory silt loam, 10 to 18 percent slopes, eroded.....	17	148C2—Proctor silt loam, 5 to 10 percent slopes, eroded.....	33
8D3—Hickory clay loam, 10 to 20 percent slopes, severely eroded.....	18	149A—Brenton silt loam, 0 to 3 percent slopes.....	34
8F2—Hickory loam, 18 to 35 percent slopes, eroded	18	152—Drummer silty clay loam.....	34
17A—Keomah silt loam, 0 to 3 percent slopes.....	19	153—Pella silty clay loam.....	35
19D2—Sylvan silt loam, 10 to 18 percent slopes, eroded.....	19	171A—Catlin silt loam, 0 to 2 percent slopes.....	35
19D3—Sylvan silty clay loam, 10 to 18 percent slopes, severely eroded.....	20	171B—Catlin silt loam, 2 to 5 percent slopes.....	35
19F—Sylvan silt loam, 18 to 30 percent slopes.....	20	172—Hoopeston sandy loam.....	36
22D2—Westville loam, 10 to 18 percent slopes, eroded.....	21	198A—Elburn silt loam, 0 to 3 percent slopes.....	36
22D3—Westville clay loam, 10 to 18 percent slopes, severely eroded.....	21	199A—Plano silt loam, 0 to 2 percent slopes.....	37
27C2—Miami loam, 5 to 10 percent slopes, eroded..	21	199B—Plano silt loam, 2 to 5 percent slopes.....	37
27D2—Miami loam, 10 to 18 percent slopes, eroded	22	199C2—Plano silt loam, 5 to 10 percent slopes, eroded.....	37
36A—Tama silt loam, 0 to 2 percent slopes.....	22	200—Orio loam.....	38
36B—Tama silt loam, 2 to 5 percent slopes.....	23	201—Gilford fine sandy loam.....	38
36C2—Tama silt loam, 5 to 10 percent slopes, eroded.....	23	206—Thorp silt loam.....	39
41A—Muscatine silt loam, 0 to 3 percent slopes.....	23	219A—Millbrook silt loam, 0 to 3 percent slopes.....	39
43A—Ipava silt loam, 0 to 3 percent slopes.....	25	250C2—Velma silt loam, 5 to 10 percent slopes, eroded.....	40
45—Denny silt loam.....	25	250D2—Velma silt loam, 10 to 15 percent slopes, eroded.....	40
49—Watsika loamy fine sand.....	25	250E2—Velma loam, 15 to 20 percent slopes, eroded.....	40
67—Harpster silty clay loam.....	26	257A—Clarksdale silt loam, 0 to 3 percent slopes.....	41
68—Sable silty clay loam.....	27	259B—Assumption silt loam, 2 to 5 percent slopes...	41
69—Milford silty clay loam.....	27	259C2—Assumption silt loam, 5 to 10 percent slopes, eroded.....	42
74—Radford silt loam.....	28	259D2—Assumption silt loam, 10 to 15 percent slopes, eroded.....	42
87A—Dickinson fine sandy loam, 0 to 2 percent slopes.....	28	261—Niota silt loam.....	42
87B—Dickinson fine sandy loam, 2 to 5 percent slopes.....	28	262—Denrock silt loam.....	43
87C2—Dickinson fine sandy loam, 5 to 10 percent slopes, eroded.....	29	274B—Seaton silt loam, 2 to 5 percent slopes.....	43
88B—Sparta loamy fine sand, 1 to 7 percent slopes.	29	274C2—Seaton silt loam, 5 to 10 percent slopes, eroded.....	44
88D—Sparta loamy fine sand, 7 to 15 percent slopes.....	30	274D2—Seaton silt loam, 10 to 18 percent slopes, eroded.....	44
100—Palms muck.....	30	275—Joy silt loam.....	45
102A—La Hogue loam, 0 to 3 percent slopes.....	31	277A—Port Byron silt loam, 0 to 2 percent slopes....	45
107—Sawmill silty clay loam.....	31	277B—Port Byron silt loam, 2 to 5 percent slopes....	45
107+—Sawmill silt loam, overwash.....	31	277C2—Port Byron silt loam, 5 to 10 percent slopes, eroded.....	45
119D2—Elco silt loam, 10 to 18 percent slopes, eroded.....	32	279A—Rozetta silt loam, 0 to 3 percent slopes.....	46
119D3—Elco silty clay loam, 10 to 18 percent slopes, severely eroded.....	32	280B—Fayette silt loam, 2 to 5 percent slopes.....	46
125—Selma clay loam.....	33	280C2—Fayette silt loam, 5 to 10 percent slopes, eroded.....	47
148B—Proctor silt loam, 2 to 5 percent slopes.....	33	280D2—Fayette silt loam, 10 to 15 percent slopes, eroded.....	47

280D3—Fayette silty clay loam, 10 to 18 percent slopes, severely eroded.....	48	575—Joy silt loam, sandy substratum.....	61
280E2—Fayette silt loam, 15 to 20 percent slopes, eroded.....	48	670—Aholt silty clay	61
386A—Downs silt loam, 0 to 2 percent slopes.....	49	741B—Oakville loamy fine sand, 1 to 7 percent slopes.....	61
386B—Downs silt loam, 2 to 5 percent slopes.....	49	741D—Oakville loamy fine sand, 7 to 15 percent slopes.....	62
386C2—Downs silt loam, 5 to 10 percent slopes, eroded.....	49	741E—Oakville loamy fine sand, 15 to 30 percent slopes.....	62
400—Calco silty clay loam.....	50	764A—Coyne fine sandy loam, 0 to 2 percent slopes.....	63
415—Orion silt loam	50	764B—Coyne loam, 2 to 5 percent slopes.....	63
439A—Jasper loam, sandy substratum, 0 to 2 percent slopes	51	777—Adrian muck.....	64
439B—Jasper loam, sandy substratum, 2 to 5 percent slopes	51	800C—Psammets, sloping.....	64
439D3—Jasper loam, sandy substratum, 10 to 15 percent slopes, severely eroded.....	52	802B—Orthents, loamy, gently sloping.....	64
447—Canisteo loam, sandy substratum.....	52	871B—Lenzburg silt loam, 1 to 7 percent slopes.....	65
457—Booker silty clay.....	53	871G—Lenzburg clay loam, 30 to 60 percent slopes.....	65
465—Montgomery silty clay.....	53	910G—Timula-Miami complex, 30 to 60 percent slopes.....	65
546B—Keltner silt loam, 2 to 5 percent slopes	54	913D—Marseilles-Hickory silt loams, 10 to 18 percent slopes	67
546C2—Keltner silt loam, 5 to 10 percent slopes, eroded.....	54	913D3—Marseilles-Hickory complex, 10 to 18 percent slopes, severely eroded.....	67
549D2—Marseilles silt loam, 12 to 18 percent slopes, eroded	55	913F2—Marseilles-Hickory complex, 18 to 35 percent slopes, eroded	68
549F2—Marseilles silt loam, 18 to 35 percent slopes, eroded	55	917B—Oakville-Tell complex, 1 to 7 percent slopes..	69
562A—Port Byron silt loam, sandy substratum, 0 to 2 percent slopes.....	56	917D—Oakville-Tell complex, 7 to 15 percent slopes.....	70
562B—Port Byron silt loam, sandy substratum, 2 to 5 percent slopes.....	56	918D3—Marseilles-Atlas silty clay loams, 12 to 18 percent slopes, severely eroded.....	70
564A—Waukegan silt loam, 0 to 2 percent slopes.....	57	943D3—Seaton-Timula silt loams, 10 to 20 percent slopes, severely eroded.....	71
564B—Waukegan silt loam, 2 to 5 percent slopes.....	57	943G—Seaton-Timula silt loams, 20 to 60 percent slopes.....	71
565A—Tell silt loam, 0 to 2 percent slopes.....	58	946D2—Hickory-Atlas silt loams, 12 to 20 percent slopes, eroded	72
565B—Tell silt loam, 2 to 5 percent slopes.....	58	946D3—Hickory-Atlas complex, 12 to 20 percent slopes, severely eroded.....	73
565C2—Tell silt loam, 5 to 10 percent slopes, eroded.....	58	957D3—Elco-Atlas silty clay loams, 10 to 18 percent slopes, severely eroded.....	74
567D2—Elkhart silt loam, 8 to 15 percent slopes, eroded.....	59	962D3—Sylvan-Bold complex, 10 to 18 percent slopes, severely eroded.....	74
572A—Loran silt loam, 0 to 2 percent slopes.....	59		
572B—Loran silt loam, 2 to 5 percent slopes.....	60		
572C2—Loran silt loam, 5 to 10 percent slopes, eroded.....	60		

Summary of Tables

Temperature and precipitation (table 1).....	150
Freeze dates in spring and fall (table 2).....	151
<i>Probability. Temperature.</i>	
Growing season (table 3).....	151
Acreage and proportionate extent of the soils (table 4).....	152
<i>Acres. Percent.</i>	
Prime farmland (table 5).....	154
Land capability and yields per acre of crops and pasture (table 6).....	155
<i>Land capability. Corn. Soybeans. Winter wheat. Oats.</i>	
<i>Grass-legume hay. Bromegrass-alfalfa.</i>	
Woodland management and productivity (table 7).....	161
<i>Ordination symbol. Management concerns. Potential</i>	
<i>productivity. Trees to plant.</i>	
Windbreaks and environmental plantings (table 8).....	165
Recreational development (table 9).....	175
<i>Camp areas. Picnic areas. Playgrounds. Paths and trails.</i>	
<i>Golf fairways.</i>	
Wildlife habitat potentials (table 10).....	182
<i>Potential for habitat elements. Potential as habitat for—</i>	
<i>Openland wildlife, Woodland wildlife, Wetland wildlife.</i>	
Building site development (table 11).....	188
<i>Shallow excavations. Dwellings without basements.</i>	
<i>Dwellings with basements. Small commercial buildings.</i>	
<i>Local roads and streets. Lawns and landscaping.</i>	
Sanitary facilities (table 12).....	195
<i>Septic tank absorption fields. Sewage lagoon areas.</i>	
<i>Trench sanitary landfill. Area sanitary landfill. Daily cover</i>	
<i>for landfill.</i>	
Construction materials (table 13).....	202
<i>Roadfill. Sand. Gravel. Topsoil.</i>	
Water management (table 14).....	208
<i>Limitations for—Pond reservoir areas; Embankments,</i>	
<i>dikes, and levees. Features affecting—Drainage, Irrigation,</i>	
<i>Terraces and diversions, Grassed waterways.</i>	
Engineering index properties (table 15).....	214
<i>Depth. USDA texture. Classification—Unified, AASHTO.</i>	
<i>Fragments greater than 3 inches. Percentage passing</i>	
<i>sieve number—4, 10, 40, 200. Liquid limit. Plasticity index.</i>	

Physical and chemical properties of the soils (table 16)	224
<i>Depth. Clay. Moist bulk density. Permeability. Available water capacity. Soil reaction. Shrink-swell potential. Erosion factors. Wind erodibility group. Organic matter.</i>	
Soil and water features (table 17).....	231
<i>Hydrologic group. Flooding. High water table. Bedrock. Potential frost action. Risk of corrosion.</i>	
Engineering index test data (table 18)	236
<i>Soil name and location. Parent material. Report number. Depth. Moisture density. Percentage passing sieve number—4, 10, 40, 200. Liquid limit. Plasticity index. Classification.</i>	
Classification of the soils (table 19).....	238
<i>Family or higher taxonomic class.</i>	

Foreword

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

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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

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



John J. Eckes
State Conservationist
Soil Conservation Service

Soil Survey of Henry County, Illinois

By S. L. Elmer, assisted by D. E. Calsyn and R. A. Tegeler, Soil Conservation Service, and S. J. Felt, Henry County soil scientist

Soils surveyed by D. E. Calsyn, S. L. Elmer, S. J. Felt, and R. A. Tegeler

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

HENRY COUNTY is in northwestern Illinois (fig. 1.) It has an area of 529,920 acres, or 828 square miles. It is bounded by Whiteside County on the north, Bureau and Stark Counties on the east, Mercer and Rock Island Counties on the west, Knox and Stark Counties on the south, and the Rock River in the northwest corner.

Henry County was established in 1837. In 1980, the population was 57,224. Cambridge, the county seat, has a population of 2,180. Kewanee, the largest town, has a population of 14,288.

This survey updates the soil survey of Henry County published by the University of Illinois in 1928 (6). It provides additional information and larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information concerning Henry County. It describes the transportation facilities and industry; farming; relief, physiography, and drainage; and climate.

Transportation Facilities and Industry

Henry County has a well developed system of transportation. Interstate Highway 74 and U.S. Highway 150 cross the county north and south. Interstate Highway 80 and U.S. Highways 6 and 34 cross the county east and west. Several state roads cross the county. The main secondary roads are blacktopped. Most rural areas are accessible by all-weather roads. Railroads furnish freight service to the county.

Several industries are established in the county. These include manufacturers of farm and other equipment and concrete and building material. The factories are at

Kewanee, Galva, and Geneseo. A large limestone quarry is at Cleveland. A number of pits provide crushed rock for roads and sand and gravel for building material. Hybrid seed corn is grown in the county. A commercial seed corn company is at Geneseo. Strip mining for coal in the past has significantly altered the use and productivity of about 3,000 acres in the east-central part of the county.

Farming

Farming has been a major enterprise in Henry County since its settlement. According to the 1978 Census of Agriculture, there are 1,910 operating farms in the county (10). The average farm size is about 260 acres. On about 80 percent of the farms, some livestock is raised. Much of the grain produced on the farms is fed to the livestock.

Corn, soybeans, and hay are the main crops. In 1979, the acreage in corn was 263,000; in soybeans, 94,000; and in hay, 25,600. Also, 18,500 was used for oats and 1,500 acres for wheat (4).

Hogs and cattle are the main livestock. In 1979, the total number of swine was 429,500, and the total number of cattle was 73,400. In 1980, there were 5,200 sheep and 31,200 laying hens.

Relief, Physiography, and Drainage

Dr. Richard Anderson, Department of Geology, Augustana College, Rock Island, Illinois, helped prepared this section.

The topography of Henry County consists of upland plains, dissected valley sides, a broad, sandy plain that has dunes, and flood plains. This landscape is the result of the action of continental glaciers in the recent

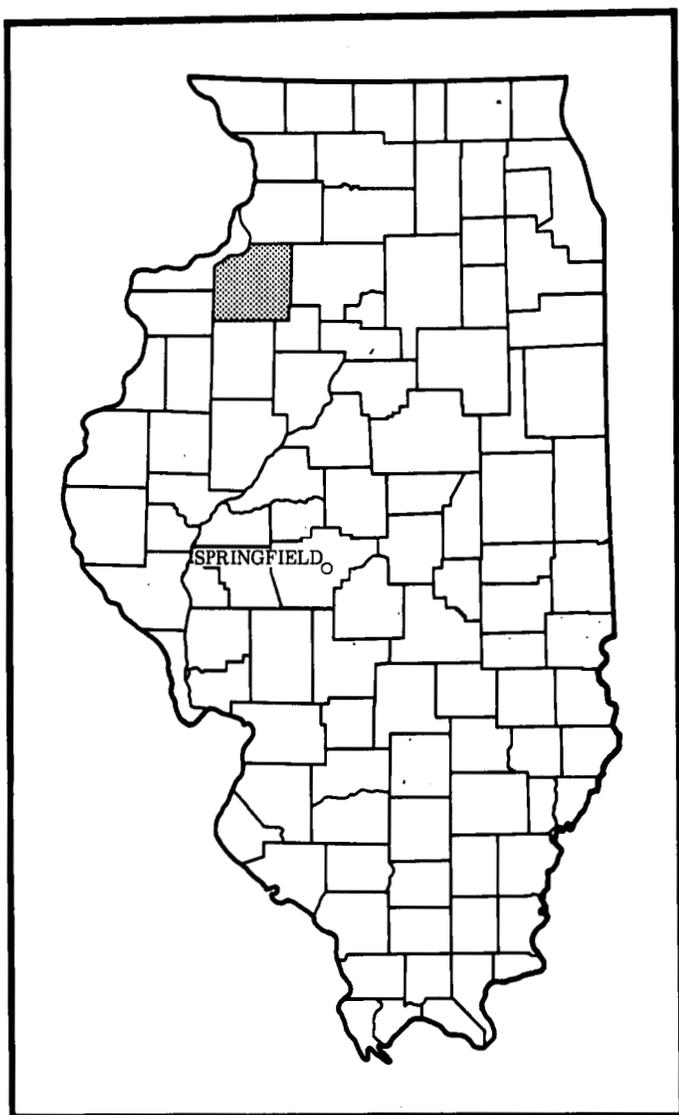


Figure 1.—Location of Henry County in Illinois.

geologic past and of postglacial stream erosion. The gently rolling uplands are the result of glacial deposition, and the dissected valley sides and flood plains are the result of postglacial stream erosion. The broad, sandy plain that has dunes is a glacial outwash plain deposited by melt water.

The upland plains are remnants of a once continuous surface of glacial deposits (5). In Henry County they are at elevations ranging from less than 650 feet above sea level in the northwest to 850 feet in the southeast. Although largely of glacial origin, they are covered by 10 feet or more of wind-deposited loess, which reaches a maximum thickness, in excess of 50 feet, in the bluffs

south and east of Geneseo. The upland plains function as stream divides separating adjacent stream drainage basins. They are surrounded by innumerable tributary valleys which drain into the larger streams in the county. The dissected valley sides are in the steepest and most rugged parts of the county. The relief along the dissected valley sides is as much as 150 feet along the bluffs of the Rock River downstream from Green Rock. Elsewhere, the relief, from the uplands to the adjacent valley floor, rarely exceeds 100 feet.

The northeastern part of the county is a broad, sandy plain where stabilized sand dunes are very common. The sand was deposited by glacial melt water when the front of the glacier was east of Henry County in a position now marked by the Bloomington Moraine in Bureau County. In Henry County the elevation of the plain ranges from 625 feet above sea level in the east to 600 feet in the west. The sand dunes are most prominent in northeast- to southwest-trending zones lying north of the Green River. In these zones, the dunes lie directly southeast of the broad, shallow valleys that cross the area from northeast to southwest and drain toward the Green River. Aside from the dunes, many of which rise 50 to 100 feet above the level of the plain, the relief of the plain is very low, generally less than 25 feet.

Flood plains occur along most of the streams of the county. The broadest are those along the largest streams—Rock River, Green River, and Edwards River. Flood plains are the floors of the valleys, which have been cut by the streams. They are subject to periodic flooding. They are underlain by river-deposited silt, clay, and sand which, in turn, overlie consolidated limestone or shale bedrock. Along the Rock River, bedrock is at a depth of less than 10 feet in many places. In some areas along the other streams in the county, the bedrock is at a depth of as much as 100 feet or more. Terraces underlain by fine sand or small amounts of gravel are common on the flood plains.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Henry County is cold in winter. In summer it generally is hot but has occasional cool spells. Precipitation falls as snow during frequent snowstorms in winter and chiefly as rain showers, which often are heavy, during the warmer periods, when warm moist air moves in from the south. The amount of annual rainfall usually is adequate for corn, soybeans, and small grain.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Geneseo, Illinois, in the period 1957 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 24 degrees F, and the average daily minimum temperature is 15

degrees. The lowest temperature on record, which occurred at Geneseo on January 16, 1977, is minus 22 degrees. In summer the average temperature is 73 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on June 19, 1971, is 101 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 36 inches. Of this; 24 inches, or 65 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 20 inches. The heaviest 1-day rainfall during the period of record was 4.88 inches at Geneseo on July 17, 1969. Thunderstorms occur on about 50 days each year, and most occur in summer.

The average seasonal snowfall is about 30 inches. The greatest snow depth at any one time during the period of record was 16 inches. On an average of 21 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12 miles per hour, in spring.

Tornadoes and severe thunderstorms strike occasionally. They are of local extent and of short duration and cause only sparse damage in narrow belts. Hailstorms sometimes occur during the warmer periods. The hail falls in scattered small areas.

How This Survey Was Made

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

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

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

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

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were 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 were 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 state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

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

Map Unit Composition

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

other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

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

General Soil Map Units

Stephen J. Felt, Henry County soil scientist, helped prepare this section.

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

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

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

The general soil map of Henry County joins with the general soil map of Rock Island County. One association that was mapped in Rock Island County was not mapped in Henry County because its extent was insignificant. This association joins with a similar association in Henry County. It has one major soil in common with the Henry County association. Some of the names of associations in Henry County do not agree with those in Rock Island County because the extent of the major soils is different. The soils in these associations have similar potentials for land uses. The differences in the association names do not significantly affect the use of these maps for general planning.

Descriptions of Associations

Nearly Level to Sloping Soils on Uplands

These soils formed in deep loess on uplands characterized by broad flats, undulating and gently rolling knolls, and ridges. They make up about 29 percent of the county. Most areas are used for cultivated crops and hay. Seasonal wetness and water erosion are the main concerns of management.

1. Tama-Muscatine association

Nearly level to sloping, well drained to somewhat poorly

drained, silty soils that formed in loess

This association consists of soils on broad flats, ridgetops, and side slopes on loess-covered uplands. Shallow depressions and narrow drainageways are common. Slopes range from 0 to 10 percent.

This association makes up about 13 percent of the county. It is about 50 percent Tama soils, 25 percent Muscatine soils, and 25 percent minor soils (fig. 2).

Tama soils are nearly level to sloping, are moderately permeable, and are moderately well drained and well drained. Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is silty clay loam about 35 inches thick. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray silt loam.

Muscatine soils are nearly level, are moderately permeable, and are somewhat poorly drained. Typically, the surface layer is black silt loam about 10 inches thick. The subsurface layer is very dark grayish brown silty clay loam about 4 inches thick. The subsoil is silty clay loam about 30 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown and mottled. The underlying material to a depth of 60 inches is grayish brown and mottled. The upper part is silty clay loam, and the lower part is silt loam.

Minor in this association are the Assumption, Denny, Elkhart, Radford, Sable, Sylvan, and Velma soils. Assumption soils formed in loess and glacial till. The poorly drained Denny soils are in shallow depressions. The strongly sloping Elkhart, Sylvan, and Velma soils are on side slopes. Radford soils are subject to rare flooding and are on the bottom of drainageways. The nearly level, poorly drained Sable soils are in drainageways and on broad upland flats.

Most areas of this association are used for cultivated crops and hay. The major soils are well suited to corn, soybeans, small grain, legumes, and grasses. In the nearly level areas used for cultivated crops, a seasonal high water table is a limitation. An artificial drainage system may be needed. In the gently sloping and sloping areas, measures that help to control erosion and maintain fertility, organic matter content, and tilth are needed.

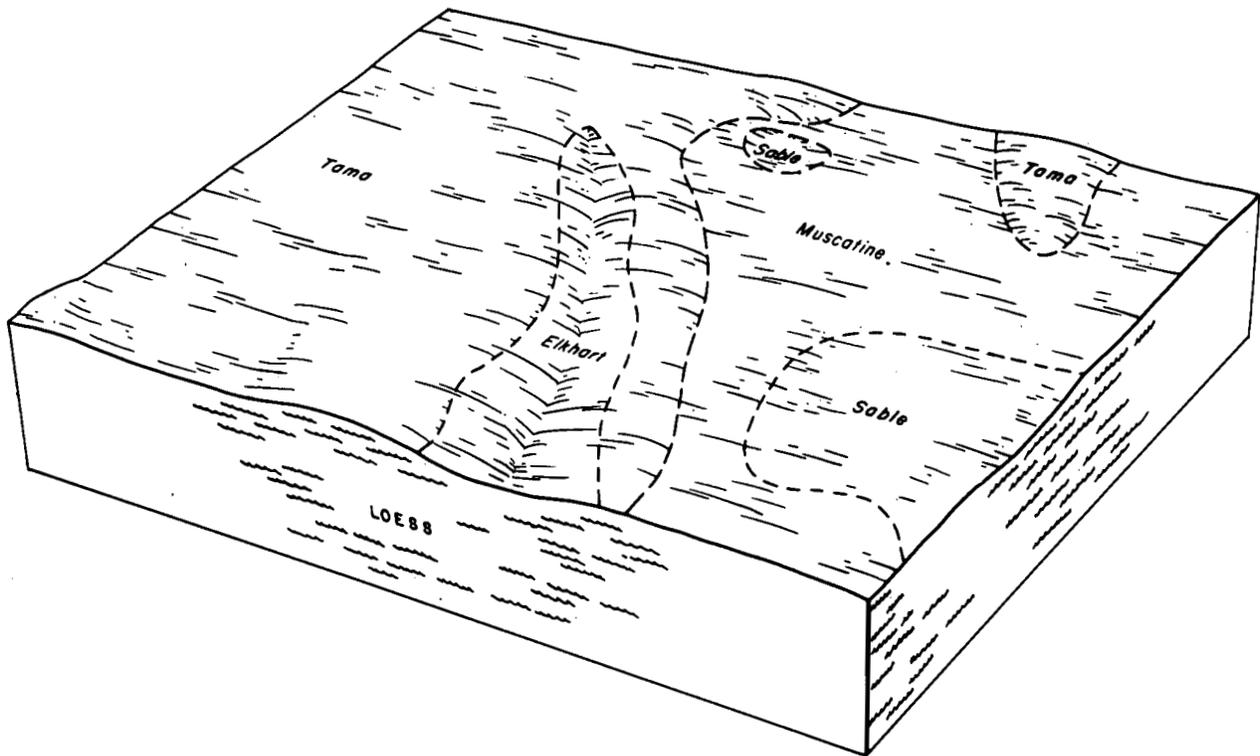


Figure 2.—Pattern of soils in the Tama-Muscatine association.

2. Tama-Ipava association

Nearly level to sloping, well drained to somewhat poorly drained, silty soils that formed in loess

This association consists of soils on broad flats, ridgetops, and side slopes on loess-covered uplands. Shallow depressions and narrow drainageways are common. Slopes range from 0 to 10 percent.

This association makes up about 16 percent of the county. It is about 45 percent Tama soils, 30 percent Ipava soils, and 25 percent minor soils.

Tama soils are nearly level to sloping, are moderately permeable, and are moderately well drained and well drained. Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is silty clay loam about 35 inches thick. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray silt loam.

Ipava soils are nearly level, are moderately slowly permeable, and are somewhat poorly drained. Typically, the surface layer is black silt loam about 7 inches thick.

The subsurface layer is black and dark grayish brown silty clay loam about 7 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is dark grayish brown and brown silty clay loam, the next part is grayish brown and light brownish gray silty clay loam, and the lower part is light brownish gray silt loam. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown silt loam.

Minor in this association are the Assumption, Denny, Elkhart, Radford, Sable, Sylvan, and Velma soils. Assumption soils formed in loess and glacial till. The poorly drained Denny soils are in shallow depressions. Elkhart, Sylvan, and Velma soils are strongly sloping and are on side slopes. Radford soils are subject to rare flooding. They are on the bottom of drainageways. The poorly drained Sable soils are in drainageways and on broad upland flats.

The major soils in this association are used for cultivated crops and hay. They are well suited to corn, soybeans, small grain, legumes, and grasses. In the nearly level areas used for cultivated crops, a seasonal high water table is a limitation. An artificial drainage system may be needed. In the gently sloping and sloping areas, measures that help to control erosion and

maintain fertility, organic matter content, and tilth are needed.

Nearly Level to Very Steep Soils on Uplands

These nearly level to very steep soils formed in deep loess. They make up about 31 percent of the county. Most areas are used for cultivated crops. The steeper areas remain in native timber. Water erosion is the main concern of management.

3. Downs-Sylvan-Fayette association

Nearly level to steep, well drained and moderately well drained, silty soils that formed in loess

This association consists of soils on ridgetops and side slopes on loess-covered uplands. Narrow drainageways are common. Slopes range from 0 to 30 percent.

This association makes up about 25 percent of the county. It is about 30 percent Downs soils, 20 percent Sylvan soils, 10 percent Fayette soils, and 40 percent minor soils (fig. 3).

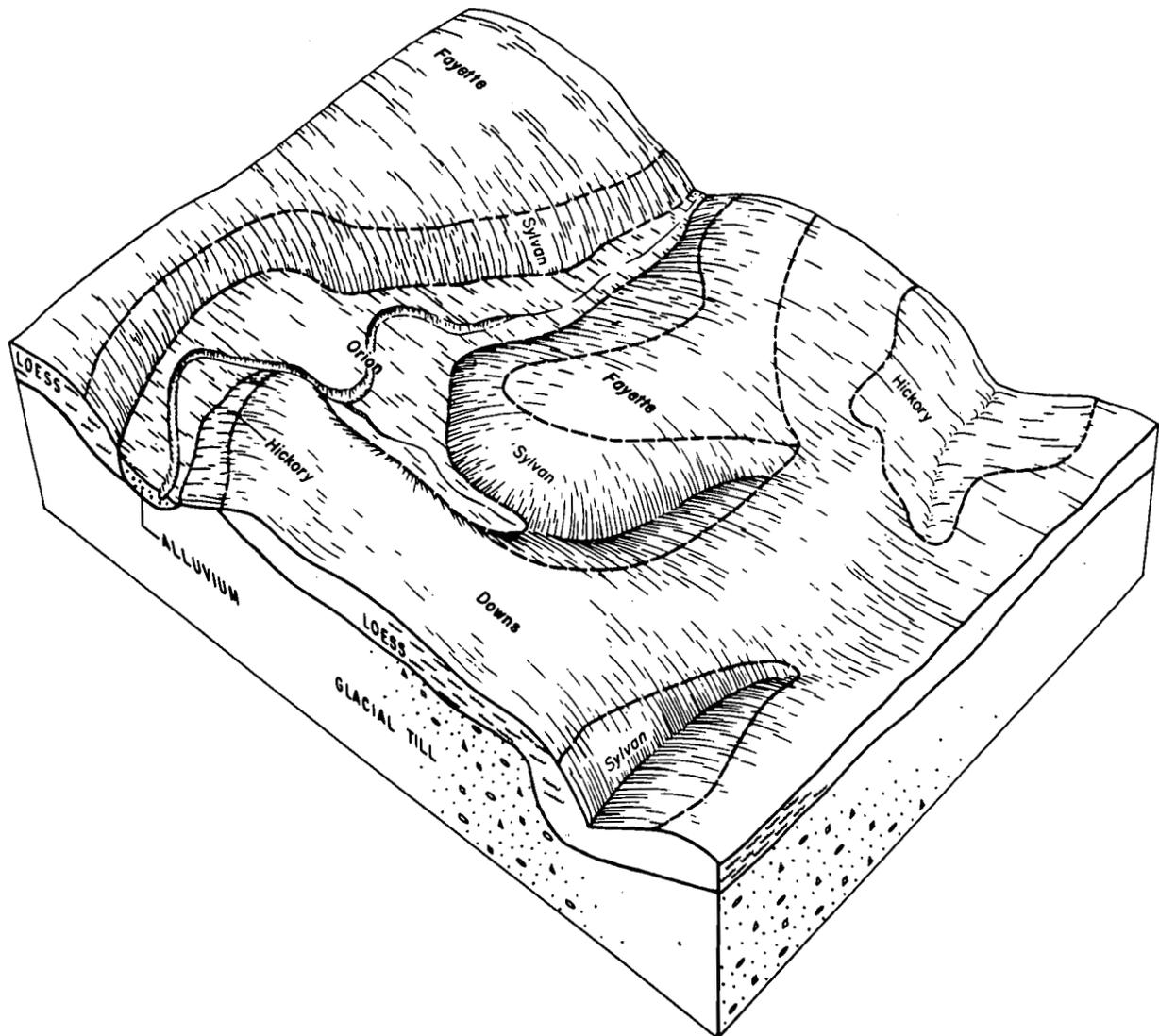


Figure 3.—Pattern of soils in the Downs-Sylvan-Fayette association.

Downs soils are nearly level to sloping and are well drained and moderately well drained. Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 45 inches thick. The upper part is dark yellowish brown silt loam; the next part is yellowish brown silty clay loam; and the lower part is yellowish brown, mottled silty clay loam and silt loam. The underlying material to a depth of 60 inches is light yellowish brown, mottled silt loam.

Sylvan soils are strongly sloping to steep and are well drained. Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is about 28 inches thick. It is brown silty clay loam in the upper part, dark yellowish brown silty clay loam in the next part, and yellowish brown silt loam in the lower part. The underlying material to a depth of 60 inches is light olive brown, calcareous silt loam.

Fayette soils are gently sloping to moderately steep and are well drained. Typically, the surface layer is mixed dark grayish brown and dark brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown. The upper part is silty clay loam, and the lower part is silt loam.

Minor in this association are the Atlas, Clarksdale, Elco, Hickory, Keomah, Marseilles, Orion, and Rozetta

soils. The somewhat poorly drained Atlas, Clarksdale, and Keomah soils contain more clay in the subsoil than the major soils. Elco and Hickory soils formed in loess and glacial till. Marseilles soils formed in material weathered from shale. The somewhat poorly drained Orion soils are on the bottom of drainageways. Rozetta soils are moderately well drained. Their surface layer is lighter colored than that of the Downs soils.

The major soils in this association are used for cultivated crops, hay, and pasture. Some areas remain in native timber. The less sloping areas are suited to corn, soybeans, small grain, and legumes. The more sloping areas are better suited to legumes, grasses, and trees. Measures that help to control erosion and maintain fertility, organic matter content, and tilth are needed.

4. Seaton-Port Byron association

Nearly level to very steep, well drained and moderately well drained, silty soils that formed in loess

This association consists of soils on ridgetops and side slopes on loess-covered uplands. Narrow drainageways are common. Slopes range from 0 to 60 percent.

This association makes up about 6 percent of the county. It is about 40 percent Seaton soils, 25 percent Port Byron soils, and 35 percent minor soils (fig. 4).

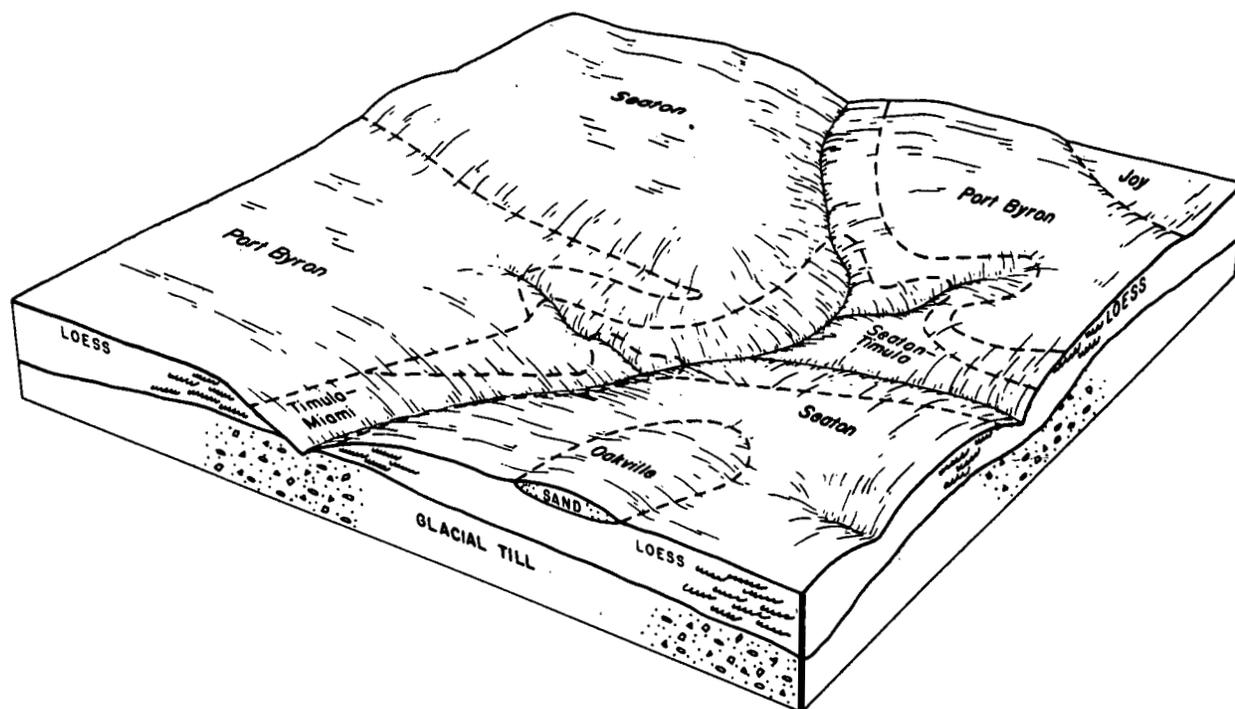


Figure 4.—Pattern of soils in the Seaton-Port Byron association.

Seaton soils are gently sloping to very steep and are well drained. Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsurface layer is dark brown, dark yellowish brown, and yellowish brown silt loam about 42 inches thick. The underlying material to a depth of 60 inches is dark yellowish brown silt loam.

Port Byron soils are nearly level to sloping and are well drained and moderately well drained. Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsurface layer is very dark grayish brown and dark brown silt loam about 12 inches thick. The subsoil is silt loam about 35 inches thick. The upper part is dark yellowish brown, the next part is yellowish brown, and the lower part is brown and mottled. The underlying material to a depth of 60 inches is brown, mottled silt loam.

Minor in this association are the Joy, Miami, Oakville, and Timula soils. The nearly level, somewhat poorly drained Joy soils are on broad interstream divides. The very steep, well drained Miami soils, which formed in glacial till, are on side slopes. The strongly sloping to steep, well drained Oakville soils, which formed in sandy material, are on side slopes. The strongly sloping to very steep, well drained Timula soils are on side slopes. Their subsoil contains less clay than that of the major soils.

Most areas of this association are used for cultivated crops, hay, and pasture. The very steep areas remain in native timber. Some areas are being developed for residential uses.

The less sloping areas are suited to corn, soybeans, small grain, and legumes. The more sloping areas are better suited to legumes and grasses. The very steep areas on side slopes are best suited to trees. Measures that help to control erosion and maintain fertility, organic matter content, and tilth are needed.

Nearly Level to Sloping Soils on Outwash Plains and Terraces

These soils are on loess-covered outwash plains characterized by broad flats, nearly level to gently rolling knolls, and ridges. They make up about 15 percent of the county. Most areas are used for cultivated crops and hay. Water erosion and seasonal wetness are the main concerns of management.

5. Plano-Elburn association

Nearly level to sloping, well drained and somewhat poorly drained, silty soils that formed in loess and the underlying glacial outwash

This association consists of soils on loess-covered outwash plains and terraces. Shallow depressions are common. Slopes range from 0 to 10 percent.

This association makes up about 12 percent of the county. It is about 35 percent Plano and similar soils, 25 percent Elburn soils, and 40 percent minor soils (fig. 5).

Plano soils are nearly level to sloping and are well drained. Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown silty clay loam; the next part is dark yellowish brown silt loam; and the lower part is dark yellowish brown and yellowish brown, mottled sandy loam and loam.

Elburn soils are nearly level and are somewhat poorly drained. Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark brown and dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown, mottled silty clay loam; the next part is grayish brown, mottled silty clay loam; and the lower part is mottled grayish brown, yellowish brown, and dark yellowish brown, stratified loam and sandy loam.

Minor in this association are the Brenton, Catlin, Drummer, Jasper, Keltner, Lenzburg, Loran, Millbrook, Proctor, and Thorp soils. Catlin and Proctor soils are similar to the Plano soils. Brenton, Millbrook, and Proctor soils have glacial outwash within 40 inches of the surface. The moderately well drained and well drained Catlin soils have glacial till within 60 inches of the surface. The nearly level, poorly drained Drummer soils are on outwash plains. Jasper soils, which have a sandy substratum, formed in loamy outwash material. Keltner and Loran soils formed in loess and in clayey material weathered from shale. Lenzberg soils formed in loamy material derived from surface mining activities. The poorly drained Thorp soils are in shallow depressions.

Most areas of this association are used for cultivated crops or hay. The major soils are well suited to corn, soybeans, small grain, legumes, and grasses. In the nearly level areas used for cultivated crops, a seasonal high water table is a limitation. An artificial drainage system may be needed. In the gently sloping and sloping areas, erosion is the main management concern.

6. Drummer-Harpster association

Nearly level, poorly drained, silty soils that formed in loess and loamy outwash material

This association consists of soils on outwash plains. Some areas are ponded for brief periods. Slopes range from 0 to 2 percent.

This association makes up about 3 percent of the county. It is about 35 percent Drummer and similar soils, 25 percent Harpster soils, and 40 percent minor soils.

Typically, the surface layer of the Drummer soils is black silty clay loam about 8 inches thick. The subsurface layer is black and very dark gray silty clay loam about 14 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is grayish brown and light brownish gray silty clay loam; the next part is light olive gray and brownish yellow silty clay

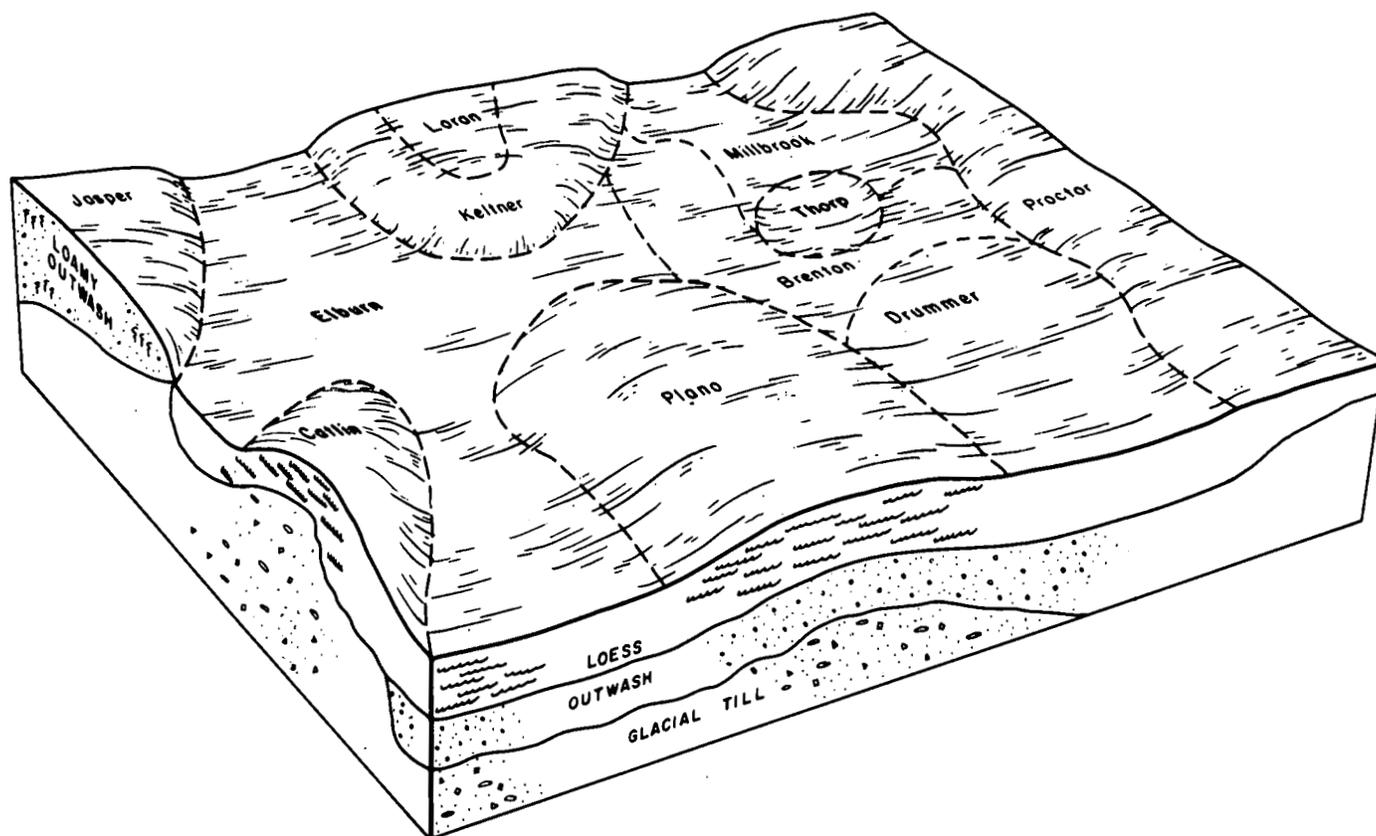


Figure 5.—Pattern of soils in the Plano-Elburn association.

loam; and the lower part is olive gray, light brownish gray, and yellowish brown, stratified loam and sandy loam.

Typically, the surface layer of the Harpster soils is black silty clay loam about 7 inches thick. The subsurface layer is black and very dark grayish brown silty clay loam about 9 inches thick. It is mottled in the lower part. The subsoil is silty clay about 25 inches thick. It is mottled. The upper part is grayish brown and olive brown, the next part is gray and dark gray, and the lower part is gray and olive brown. The underlying material to a depth of 60 inches is mottled olive brown and grayish brown silt loam.

Minor in this association are the Canisteo, Gilford, Pella, Sawmill, and Selma soils. The poorly drained Canisteo and Selma soils contain more sand in the upper part than the major soils. The very poorly drained Gilford soils contain more sand and less clay than the major soils. The poorly drained Pella soils are on flats. They are similar to the Drummer soils but have carbonates at a depth of 23 to 40 inches. The poorly drained Sawmill soils are commonly in old meander

channels. Their dark surface soil is thicker than that of the major soils.

The major soils in this association are used for cultivated crops and hay. They are well suited to corn, soybeans, small grain, and legumes. In areas used for cultivated crops, a seasonal high water table is a major limitation. An artificial drainage system, particularly a tile drainage system, is needed. Crop residue management improves tilth.

Nearly Level to Steep Soils on Outwash Plains, Dunes, and Terraces

These soils are on outwash plains and terraces characterized by flats, knolls, dunes, and ridges. They make up about 9 percent of the county. Most areas are used for cultivated crops, pasture, or hay. Drought and soil blowing are the main concerns of management.

7. Oakville-Tell-Waukegan association

Nearly level to steep, well drained, sandy and silty soils

that formed in sandy material or in loess and the underlying sandy material

This association consists of soils on ridgetops and side slopes on outwash plains. Shallow depressions are common. Slopes range from 0 to 30 percent.

This association makes up about 6 percent of the county. It is about 35 percent Oakville soils, 15 percent Tell soils, 14 percent Waukegan soils, and 36 percent minor soils.

Oakville soils are gently sloping to steep. Typically, the surface layer is very dark brown loamy fine sand about 3 inches thick. The subsoil is fine sand about 20 inches thick. The upper part is brown and dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is light yellowish brown fine sand.

Tell soils are nearly level to strongly sloping. Typically, the surface layer is mixed dark brown and dark grayish brown silt loam about 7 inches thick. The subsoil is about 24 inches thick. The upper part is brown silt loam, the next part is yellowish brown silt loam, and the lower part is strong brown sandy loam. The underlying material to a depth of 60 inches is yellowish brown sand.

Waukegan soils are nearly level and gently sloping. Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is very dark gray and very dark brown silt loam about 12 inches thick. The subsoil is about 22 inches thick. The upper part is brown silt loam, and the lower part is dark yellowish brown sandy loam and sand. The underlying material to a depth of 60 inches is dark yellowish brown sand.

Minor in this association are the Dickinson, Gilford, Hoopeston, Joy, Orio, Port Byron, Selma, Sparta, and Thorp soils. Dickinson soils contain more clay in the upper part than the Oakville soils and less clay than the Tell and Waukegan soils. The very poorly drained Gilford and poorly drained Selma soils are nearly level. The nearly level, somewhat poorly drained Hoopeston and Joy soils are on flats. The Joy soils are those that have a sandy substratum. The poorly drained Orio and Thorp soils are in shallow depressions. The Port Byron soils are those that have a sandy substratum. They are more than 40 inches deep to sand. The excessively drained, sandy Sparta soils are on flats and ridges.

The nearly level to sloping soils in this association are used for cultivated crops. The moderately sloping to steep soils either are used for pasture or hay or remain in native timber. The less sloping areas, except for the sandy areas, are suited to corn, soybeans, small grain, legumes, and grasses. The more sloping areas are better suited to legumes, grasses, and trees. In areas used for cultivated crops, droughtiness is a major limitation. Measures that help to control soil blowing and erosion, conserve moisture, and maintain fertility, organic matter content, and tillage are needed.

8. Dickinson-Sparta association

Nearly level to strongly sloping, well drained and excessively drained, loamy and sandy soils that formed in loamy or sandy sediments

This association consists of soils on terraces and ridges on outwash plains. Shallow depressions are common. Slopes range from 0 to 15 percent.

This association makes up about 3 percent of the county. It is about 25 percent Dickinson soils, 20 percent Sparta soils, and 55 percent minor soils (fig. 6).

Dickinson soils are nearly level to sloping and are well drained. Typically, the surface layer is very dark brown fine sandy loam about 6 inches thick. The subsurface layer is very dark grayish brown and dark brown fine sandy loam about 13 inches thick. The subsoil is about 25 inches thick. The upper part is brown fine sandy loam, the next part is dark yellowish brown sandy loam, and the lower part is dark yellowish brown and yellowish brown loamy sand and fine sand. The underlying material to a depth of 60 inches is yellowish brown sand.

Sparta soils are gently sloping to strongly sloping and are excessively drained. Typically, the surface layer is very dark grayish brown loamy fine sand about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown loamy fine sand about 6 inches thick. The subsoil is dark yellowish brown loamy fine sand about 14 inches thick. The underlying material to a depth of 60 inches is brown and strong brown sand and fine sand. It is mottled in the lower part.

Minor in this association are the Gilford, Hoopeston, Oakville, Orio, Port Byron, Tell, Watseka, and Waukegan soils. The very poorly drained Gilford and poorly drained Orio soils are in nearly level or depressional areas. The somewhat poorly drained Hoopeston and Watseka soils are nearly level. Oakville soils are well drained. Their surface soil is lighter colored than that of the major soils. Port Byron, Tell, and Waukegan soils contain less sand in the upper part than the major soils. The Port Byron soils are those that have a sandy substratum.

Most areas of this association are used for cultivated crops and hay. The major soils are suited to legumes and grasses. Except for the most sandy soils, they also are suited to corn, soybeans, and small grain. In areas used for cultivated crops, droughtiness is a major limitation. Measures that help to control soil blowing and erosion, conserve moisture, and maintain fertility, organic matter content, and tillage are needed.

Nearly Level and Gently Sloping Soils on Terraces and Lake Plains

These soils are on clayey terraces covered by loess or loamy sediments and on lake plains characterized by broad flats and undulating ridges. They make up about 5 percent of the county. Most areas are used for cultivated

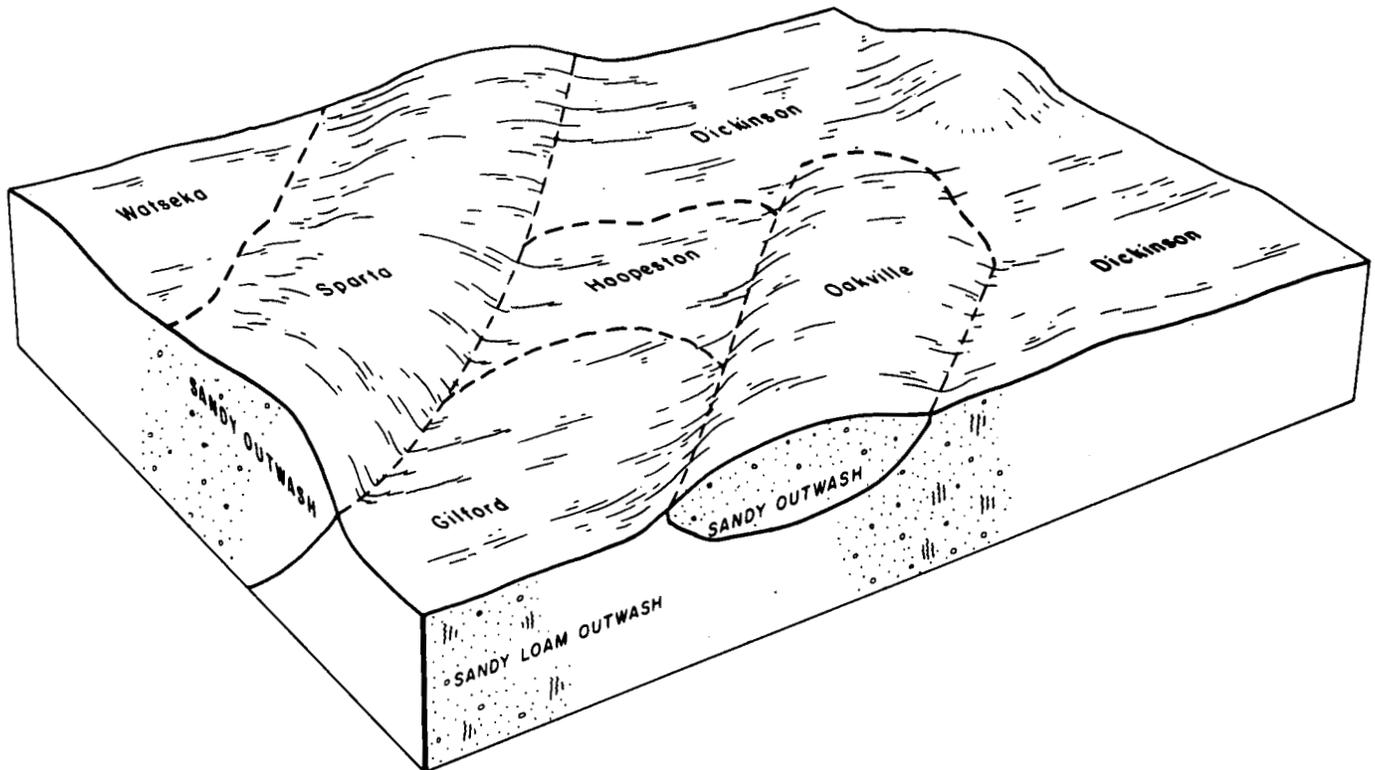


Figure 6.—Pattern of soils in the Dickinson-Sparta association.

crops. Seasonal wetness, ponding, and water erosion are the main concerns of management.

9. Niota-Coyne-Denrock association

Nearly level and gently sloping, poorly drained, well drained, and somewhat poorly drained, silty and loamy soils that formed in loess, clayey lacustrine sediments, and loamy outwash material

This association consists of soils on alluvial terraces. Narrow, sandy ridges are common. Slopes range from 0 to 5 percent.

This association makes up about 2 percent of the county. It is about 25 percent Niota soils, 20 percent Coyne soils, 13 percent Denrock soils, and 42 percent minor soils (fig. 7).

Niota soils are nearly level and are poorly drained. Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsurface layer is dark grayish brown, mottled silt loam about 4 inches thick. The subsoil is mottled, firm silty clay about 40 inches thick. The upper part is dark grayish brown and grayish brown; the next part is light brownish gray, grayish brown, and light olive gray; and the lower part is reddish

brown. The underlying material to a depth of 60 inches is light olive gray, mottled silt loam.

Coyne soils are nearly level and gently sloping and are well drained. Typically, the surface layer is very dark brown loam about 7 inches thick. The subsurface layer is very dark brown, dark brown, very dark grayish brown, and brown very fine sandy loam about 19 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown very fine sandy loam and loam; the next part is yellowish brown and strong brown silt loam; and the lower part is reddish brown, mottled silty clay.

Denrock soils are nearly level and are somewhat poorly drained. Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark brown silty clay loam about 5 inches thick. The subsoil is about 41 inches thick. The upper part is reddish brown, firm clay, and the lower part is mottled reddish brown, dark grayish brown, strong brown, and light brownish gray, friable, stratified clay loam and sandy loam. The underlying material to a depth of 60 inches is reddish brown, mottled loamy sand.

Minor in this association are the Booker, Dickinson, Millbrook, Oakville, Port Byron, Sawmill, Tell, and

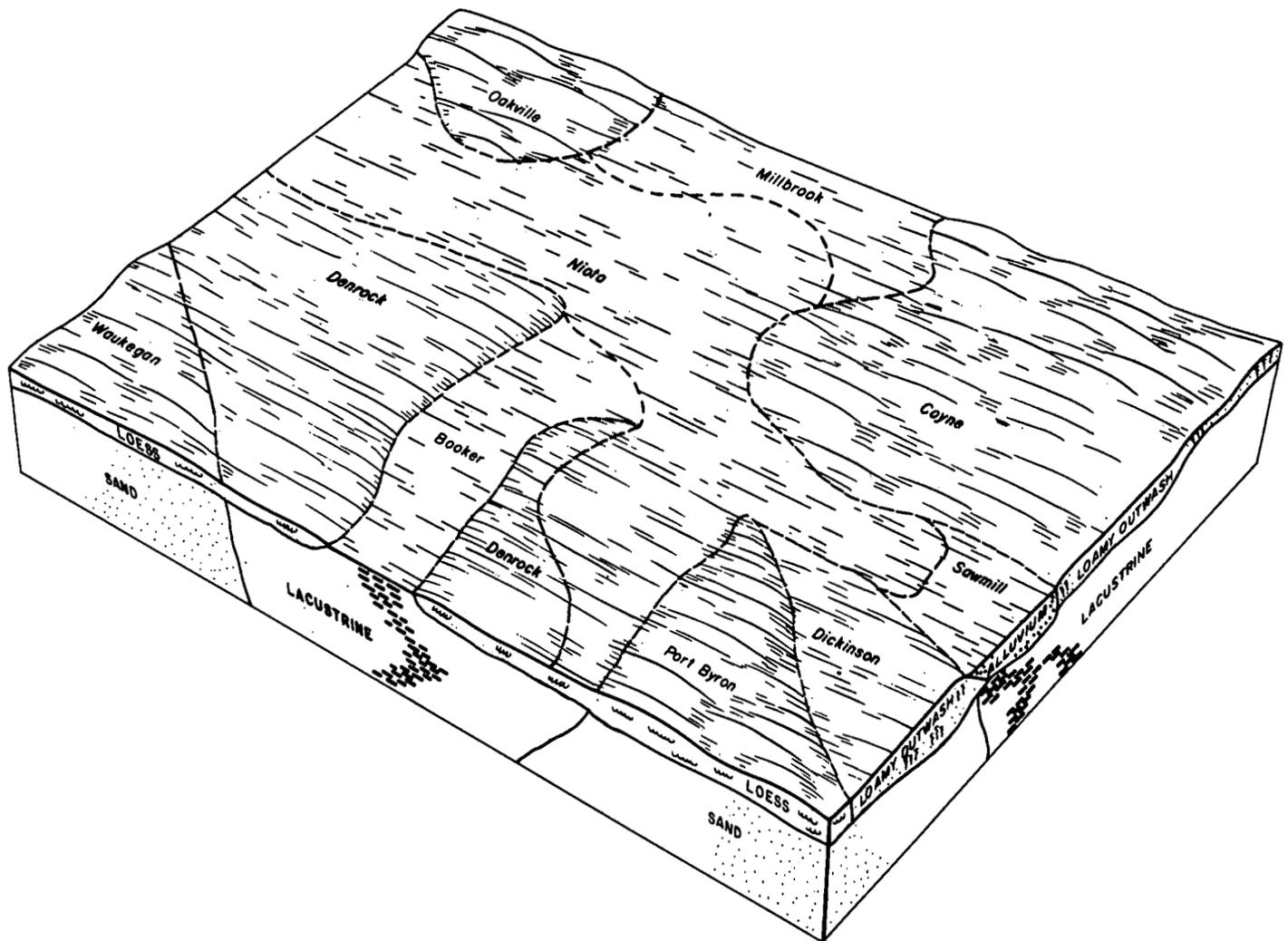


Figure 7.—Pattern of soils in the Niota-Coyne-Denrock association.

Waukegan soils. The very poorly drained Booker soils typically have a silty clay surface layer. They are in nearly level or depressional areas. The well drained Dickinson, Oakville, Tell, Port Byron, and Waukegan soils and the somewhat poorly drained Millbrook soils contain less clay in the lower part than the major soils. Millbrook soils are in the slightly depressional areas. The Port Byron soils are those that have a sandy substratum. The Sawmill soils are poorly drained. Their surface layer and subsurface layer are thicker and darker than those of the major soils.

Most areas of this association are used for cultivated crops and hay. Some are being developed for residential uses. The major soils are suited to corn, soybeans, small grain, legumes, and grasses. In most of the nearly level

areas used for cultivated crops, a seasonal high water table is a major limitation. An artificial drainage system, particularly a system of open drainage ditches, is needed. In sloping areas, measures that help to control soil blowing and erosion, conserve moisture, and maintain fertility and organic matter content are needed.

10. Booker-Aholt-Montgomery association

Nearly level, very poorly drained, clayey soils that formed in lacustrine material

This association consists of soils on old glacial lake plains. These soils are frequently ponded for brief periods. Sandy ridges are common. Slopes range from 0 to 2 percent.

This association makes up about 3 percent of the county. It is about 30 percent Booker soils, 15 percent Aholt soils, 15 percent Montgomery soils, and 40 percent minor soils.

Booker soils are nearly level or depressional. Typically, the surface layer is very dark gray, very firm silty clay about 8 inches thick. The subsurface layer is about 10 inches of very dark gray, very firm silty clay and clay. The subsoil is olive gray, mottled, very firm clay about 26 inches thick. The underlying material to a depth of 60 inches is mottled olive gray, reddish brown, and yellowish brown, firm silty clay.

Aholt soils are nearly level or depressional and are calcareous. Typically, the surface layer is black, very firm silty clay about 8 inches thick. The subsurface layer is black and very dark gray, mottled, very firm clay about 15 inches thick. The subsoil is mottled, very firm clay about 28 inches thick. The upper part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is olive gray, mottled, very firm, calcareous silty clay.

Montgomery soils are nearly level. Typically, the surface layer is black, firm silty clay about 8 inches thick. The subsurface layer is black and very dark gray, firm silty clay about 9 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is dark gray and grayish brown silty clay loam; the next part is light olive gray, calcareous silty clay loam; and the lower part is olive gray and light olive gray, calcareous clay and silty clay. The underlying material to a depth of 60 inches is light olive gray, mottled, calcareous silty clay.

Minor in this association are the Milford, Niota, and Oakville soils. The poorly drained Milford soils contain less clay than the major soils. The nearly level, poorly drained Niota soils are slightly higher on the landscape than the major soils. Also, their surface soil contains less clay. The well drained, sandy Oakville soils are on hills.

Most areas of this association are used for cultivated crops. If adequately drained, the major soils are moderately suited to corn, soybeans, small grain, grasses, and legumes. In the areas used for cultivated crops, a seasonal high water table is a major limitation. Ponding frequently delays planting or damages crops. An artificial drainage system, particularly a system of open drainage ditches, is needed. Crop residue management improves tilth.

Nearly Level Soils on Flood Plains

These soils are on bottom land adjacent to the major streams. The landscape is characterized by broad flats and old channels. The soils make up about 11 percent of the county. Most areas are used for cultivated crops. Seasonal wetness and flooding are the main concerns of management.

11. Sawmill-Radford association

Nearly level, poorly drained and somewhat poorly drained, silty soils that formed in alluvial deposits

This association consists of soils on bottom land along drainageways and on flood plains along streams and rivers. Many areas are frequently flooded for brief periods. Slopes range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 50 percent Sawmill soils, 30 percent Radford soils, and 20 percent minor soils (fig. 8).

Sawmill soils are poorly drained. Typically, the surface layer is very dark gray silty clay loam about 7 inches thick. The subsurface layer is black silty clay loam about 25 inches thick. The subsoil to a depth of 60 inches is silty clay loam. The upper part is dark gray, and the lower part is olive gray and mottled.

Radford soils are somewhat poorly drained. Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled silt loam about 8 inches thick. The underlying material to a depth of about 28 inches is very dark grayish brown and very dark gray silt loam. Below this to a depth of 60 inches is a buried silty clay loam surface layer. The upper part is black, and the lower part is black and mottled.

Minor in this association are the Assumption, Calco, Elburn, Jasper, Orion, and Selma soils. The moderately well drained Assumption soils are on glacial till plains. The poorly drained Calco soils have carbonates throughout. The somewhat poorly drained Elburn soils are on loess-covered stream terraces. The well drained Jasper soils are on stream terraces. The somewhat poorly drained Orion soils are along drainageways and streams. Their surface soil is lighter colored than that of the major soils. The poorly drained Selma soils contain more sand than the major soils. They are on low terraces.

Most areas of this association are used for cultivated crops. The major soils are moderately suited to corn, soybeans; small grain, legumes, and grasses. In areas used for cultivated crops, a seasonal high water table is a major limitation. Also, the flooding commonly delays planting or damages crops. An artificial drainage system is needed.

Broad Land Use Considerations

Most of the soils in Henry County are used for cultivated crops, dominantly corn and soybeans. Other uses include pasture, woodland, urban development, recreational development, and wildlife habitat. The suitability of the soils for these uses varies significantly.

Erosion is the main hazard on the cropland in associations 1, 2, 3, and 4. Droughtiness is the main limitation in associations 7 and 8. Wetness is the main limitation in associations 5, 6, 9, 10, and 11. Associations

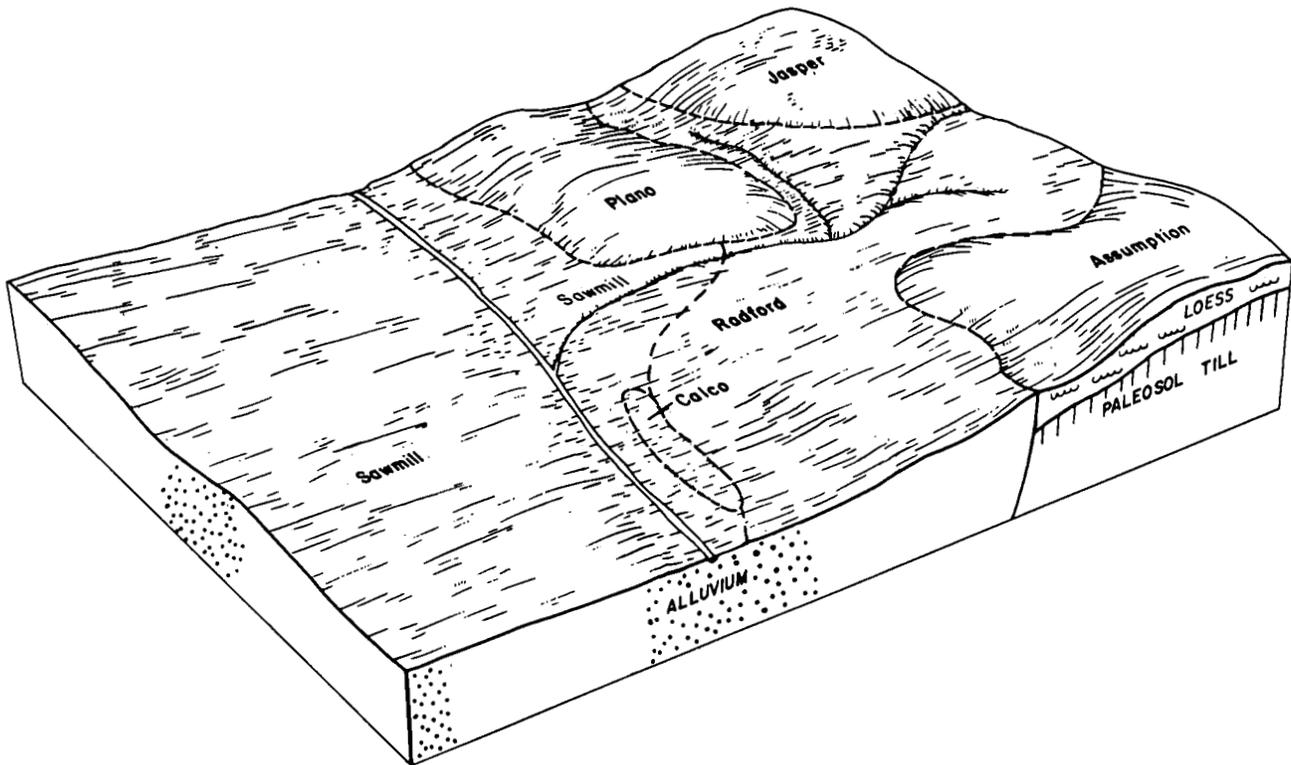


Figure 8.—Pattern of soils in the Sawmill-Radford association.

6, 10, and 11 also are subject to ponding or flooding, which causes slight or moderate crop damage.

A small acreage is pastured or wooded, mainly in associations 3, 4, 7, and 11. All of the associations are suitable for grasses and legumes. In all of the associations, the suitability for trees is good or excellent, but some of the soils, such as Sylvan, Fayette, Seaton, and Oakville, have a moderate or severe equipment limitation because of the slope. Using special equipment, however, helps to overcome this limitation.

A few areas in the county are used for urban development. Generally, the less sloping areas of association 4 have the best suitability for urban uses in the county. In other associations, low strength, frost action, wetness, and steep slopes are the major limitations. The soils in associations 6, 10, and 11 are poorly suited to urban development because of ponding or flooding. The soils in the hilly areas in associations 3 and 4 are poorly suited because of steep slopes and the shrink-swell potential. Sites that are suitable for houses

or small commercial buildings generally are available, however, in these areas.

The potential for recreational development ranges from poor to good, depending on the intensity of the expected use. Associations 3, 4, 7, and 8 have good potential for intensive recreational uses. Associations 6, 10, and 11 have poor potential because of ponding or flooding. The steeper slopes in associations 3, 4, 7, and 8 limit the potential of the soils for intensive recreational development. All of these associations are suited to paths and trails for hiking or horseback riding. Small areas suitable for intensive uses, such as playgrounds and campsites, generally are available in the associations that have poor potential.

The potential for wildlife habitat is good throughout the county. At least some of the soils in all the associations have good potential for openland wildlife habitat. The potential for woodland wildlife habitat is good in associations 3 and 4. The nearly level, poorly drained and very poorly drained soils in associations 6, 10, and 11 have good potential for wetland wildlife habitat.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Tama silt loam, 2 to 5 percent slopes, is one of several phases in the Tama series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Seaton-Timula silt loams, 20 to 60 percent slopes, is an example.

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

small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Three soils that were mapped in Rock Island County join with similar soils that have different names in Henry County. These soils were not included in the soil survey of Henry County because their extent was insignificant. Seven soil complexes that were mapped in Rock Island County were not mapped in Henry County because their extent was insignificant or the soil patterns were different. These complexes join with a similar soil or complex in Henry County that has at least one soil name in common.

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

Soil Descriptions

8D2—Hickory silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are long and irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil to a depth of 60 inches is firm clay loam. The upper part is brown, and the lower part is yellowish brown and mottled. In some areas the soil contains less sand. In other areas the subsoil is thinner. In some places a seasonal high water table is at a depth of 4 to 6 feet during the spring. In other places the subsoil is redder.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and moderately well drained Elco soils on the upper side slopes. Elco soils have a perched seasonal high water table 1.5 to 3.5 feet below the surface. Also included are Marseilles and Radford soils. Marseilles soils have bedrock within a depth of 40 inches. They are on the lower side slopes. The somewhat poorly drained Radford soils are on flood plains along narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for hay or pasture. Some are wooded. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

8D3—Hickory clay loam, 10 to 20 percent slopes, severely eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are long or irregular in shape and range from 10 to 150 acres in size.

Typically, the surface layer is dark brown clay loam about 5 inches thick. The subsoil is firm clay loam about 35 inches thick. The upper part is dark brown and yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm clay loam. In some areas the soil contains less sand. In other areas it has a thinner subsoil and is shallower to carbonates. In places the subsoil is redder.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and moderately well drained Elco soils on the upper side slopes. Elco soils have a perched seasonal high water table 1.5 to 3.5 feet below the surface. Also included are Marseilles, Orion, and Radford soils. Marseilles soils are along the lower drainageways. They have bedrock within a depth of 40 inches. The somewhat poorly drained Orion and Radford soils are on the bottom of drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is low. The subsoil is medium acid to neutral. The surface layer tends to crust after rains and forms clods if tilled when wet.

Most areas are used for cultivated crops. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

8F2—Hickory loam, 18 to 35 percent slopes, eroded. This steep, well drained soil is along drainageways on dissected uplands. Individual areas are long or irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsurface layer is brown loam about 10 inches thick. The subsoil to a depth of 60 inches is yellowish brown, firm clay loam. It is mottled in the lower part. In some areas the soil contains less sand. In some places the subsoil is thinner. In other places it is redder.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Also included are Atlas, Elco, and Marseilles soils. The somewhat poorly drained Atlas and moderately well drained Elco soils contain more clay in the lower part of the subsoil than the Hickory soil. They are on the upper side slopes. Elco soils have a perched seasonal high water table 1.5 to 3.5 feet below the surface. Marseilles soils have bedrock within a depth of 40 inches. They are on the lower side slopes. Included soils make up less than 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for pasture or remain in the native timber. This soil is unsuited to cultivated crops and poorly suited to hay because of the erosion hazard and the steep slopes. It is moderately suited to pasture and woodland. It is poorly suited to dwellings and septic tank absorption fields because of the steep slopes.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the

main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

17A—Keomah silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on broad upland ridgetops. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsurface layer is mixed dark grayish brown and brown silt loam about 4 inches thick. The subsoil is about 39 inches thick. It is mottled. The upper part is brown silty clay loam; the next part is brown, firm silty clay; and the lower part is light brownish gray and yellowish brown silty clay loam. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown silt loam. In some places the surface layer is darker. In other places the subsoil contains less clay.

Included with this soil in mapping are small areas of the moderately well drained Downs and Rozetta and well drained Fayette soils. The included soils contain less clay in the subsoil than the Keomah soil. Also, they are on the slightly higher ridgetops. They make up less than 10 percent of the unit.

Water and air move through the Keomah soil at a moderately slow rate. Surface runoff is slow. The depth to a seasonal high water table is 2 to 4 feet. Available water capacity is high. Organic matter content is moderately low. The subsoil is very strongly acid. The surface layer tends to puddle and crust after rains. The shrink-swell potential is high.

Most areas are used for cultivated crops or hay. Some remain in native timber. This soil is well suited to cultivated crops, hay, and pasture and moderately suited to woodland. It is poorly suited to dwellings because of the perched seasonal high water table and the high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the perched seasonal high water table and the moderately slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

In the areas used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIw.

19D2—Sylvan silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is about 28 inches thick. The upper part is brown silty clay loam, the next part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is light olive brown, calcareous silt loam. In some areas the subsoil is thicker. In some places the soil contains more sand. In other places it is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Radford soils, the moderately well drained Elco soils, and the Bold soils. Atlas and Elco soils are on the lower side slopes. They contain more clay in the subsoil than the Sylvan soil. They have a perched seasonal high water table, which in the Atlas soil is within a depth of 2.0 feet and in the Elco soil is at a depth of 1.5 to 3.5 feet. Bold soils are calcareous throughout. They contain less clay than the Sylvan soil. They are in positions on the landscape similar to those of the Sylvan soil. Radford soils are on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil is medium acid to neutral.

Most areas are used for hay and pasture. Some remain in native timber. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help

to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Applying chemicals, plowing contoured furrows, which removes the competing vegetation before the trees are planted, or clearing the area by other mechanical means helps to control the initial plant competition. Cutting helps to control the subsequent competition. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

19D3—Sylvan silty clay loam, 10 to 18 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes and at the head of drainageways on dissected uplands. Individual areas are irregular in shape and range from 10 to 120 acres in size.

Typically, the surface layer is mixed yellowish brown and very dark grayish brown silty clay loam about 8 inches thick. The subsoil is about 23 inches thick. The upper part is yellowish brown silty clay loam, the next part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is mottled, calcareous silt loam. The upper part is yellowish brown, and the lower part is light brownish gray. In some areas the subsoil is thicker. In other areas the soil contains more sand. In places it is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Radford soils, the moderately well drained Elco soils, and the Bold soils. Atlas and Elco soils are on the lower side slopes. They contain more clay in the subsoil than the Sylvan soil. They have a perched seasonal high water table, which in the Atlas soil is within a depth of 2.0 feet and in the Elco soil is at a depth of 1.5 to 3.5 feet. Bold soils contain less clay than the Sylvan soil. They are calcareous throughout. They are in positions on the landscape similar to those of the Sylvan soil. Radford soils are on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is very low. The subsoil is neutral. The surface layer tends to crust after rains and forms clods if tilled when wet.

Most areas are used for cultivated crops. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help

to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent growth competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

19F—Sylvan silt loam, 18 to 30 percent slopes. This steep, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 10 to 80 acres in size.

Typically, the surface layer is mixed very dark grayish brown and brown silt loam about 5 inches thick. The subsurface layer is dark brown silt loam about 5 inches thick. The subsoil is about 20 inches thick. The upper part is strong brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is yellowish brown, calcareous silt loam. In some areas the soil contains more sand. In other areas the subsoil is thicker.

Included with this soil in mapping are small areas of the Marseilles soils and the somewhat poorly drained Orion and Radford soils. Marseilles soils have bedrock within a depth of 40 inches. They are along the lower drainageways. Orion and Radford soils are on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil is medium acid to neutral.

Most areas are used for either pasture or native timber. This soil is unsuited to cultivated crops and poorly suited to hay because of the erosion hazard and the steep slopes. It is well suited to pasture and woodland. It is poorly suited to dwellings and septic tank absorption fields because of the steep slopes.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a

grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

22D2—Westville loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is mixed dark brown and dark grayish brown loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown and dark brown clay loam; the next part is reddish brown and yellowish red, firm clay loam and sandy clay loam; and the lower part is strong brown, firm sandy clay loam. In some places the soil does not have the red colors and contains less sand. In other places it does not have the red colors and contains less sand and more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of drainageways. These soils make up less than 10 percent of the unit.

Water and air move through the Westville soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for hay or pasture. Some remain in native timber. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Applying chemicals, plowing contoured furrows, which removes the competing vegetation before the trees are planted, or clearing by other mechanical means helps to control the initial plant competition. Cutting helps to control the subsequent competition. Planting the trees on the

contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

22D3—Westville clay loam, 10 to 18 percent slopes, severely eroded. This strongly sloping, well drained soil is along drainageways on uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is brown clay loam about 5 inches thick. The subsoil to a depth of 60 inches is firm clay loam. The upper part is reddish brown, the next part is yellowish red, and the lower part is strong brown. In some places the soil does not have the red colors and contains less sand. In other places it does not have the red colors and contains less sand and more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of drainageways. Included soils make up less than 10 percent of the unit.

Water and air move through the Westville soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is low. The subsoil is strongly acid or medium acid. The surface layer tends to crust after rains and forms clods if tilled when wet.

Most areas are used for cultivated crops. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

27C2—Miami loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on dissected uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown loam about 5 inches thick. The subsoil is about 26 inches thick. The upper part is dark brown, friable loam; the next part is dark brown and dark yellowish brown, firm clay loam; and the lower part is yellowish brown, firm clay loam. The underlying material to a depth of 60

inches is yellowish brown, firm, calcareous loam. In some places the subsoil is thinner. In other places the surface layer is darker.

Included with this soil in mapping are some areas of Jasper, Millbrook, and Proctor soils. The rapidly permeable Jasper soils have a sandy substratum. They are on the upper side slopes. Millbrook soils are nearly level and somewhat poorly drained. The moderately rapidly permeable Proctor soils have a thick, dark surface layer. They are in positions on the landscape similar to those of the Miami soil. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Miami soil at a moderate rate and through the underlying material at a moderately slow rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the moderately slow permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming and a system of conservation tillage that leaves crop residue on the surface after planting.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

27D2—Miami loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on dissected uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown, firm loam about 8 inches thick. The subsoil is firm clay loam about 17 inches thick. The upper part is dark yellowish brown and mottled, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is yellowish brown, firm, calcareous sandy loam. In some areas the subsoil is thicker. In other areas it is thinner. In places the soil contains less sand.

Included with this soil in mapping are small areas of Timula soils. These soils contain less sand and clay than the Miami soil. They are on the upper parts of some slopes. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Miami soil at a moderate rate and through the underlying material at a moderately slow rate. Surface runoff is rapid. Available water capacity is high. Organic matter

content is moderately low. The subsoil is medium acid or slightly acid.

Most areas are used for hay and pasture. Some remain in native timber. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the moderately slow permeability in the underlying material.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

36A—Tama silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on broad upland ridgetops. Individual areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark brown silt loam about 10 inches thick. The subsurface layer is very dark brown and very dark grayish brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is yellowish brown, mottled silt loam. In places the surface soil is less than 10 inches thick.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils and the somewhat poorly drained Ipava soils. These included soils are slightly lower on the landscape than the Tama soil. They make up less than 15 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is strongly acid or medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to

prevent surface crusting and maintains tilth. If this soil is used for hay and pasture, timely deferment of grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

36B—Tama silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on upland ridgetops and at the head of drainageways. Individual areas are irregular in shape or long and range from 5 to 300 acres in size.

Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is silty clay loam about 35 inches thick. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray silt loam. In some places the surface soil is less than 10 inches thick. In other places the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils and the somewhat poorly drained Ipava soils. The included soils are nearly level. They make up less than 15 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

36C2—Tama silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridgetops, on side slopes, and at the head of drainageways on uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsurface layer is

dark brown silt loam about 4 inches thick. The subsoil is about 39 inches thick. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown, mottled silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, calcareous silt loam. In some places the soil has a thinner subsoil and is calcareous within a depth of 40 inches. In other places the surface layer is thicker. In some areas the soil contains more sand. In other areas it is moderately well drained.

Included with this soil in mapping are small areas of the moderately well drained Assumption soils and the somewhat poorly drained Radford soils. Assumption soils have a perched seasonal high water table 3.0 to 4.5 feet below the surface. They are on the lower side slopes. Radford soils are on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The subsoil is slightly acid or medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and well suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop (fig. 9), by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

41A—Muscatine silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on broad upland flats and near the head of drainageways. Individual areas are irregular in shape and range from 10 to 2,000 acres in size.

Typically, the surface layer is black silt loam about 10 inches thick. The subsurface layer is very dark grayish brown silty clay loam about 4 inches thick. The subsoil is silty clay loam about 30 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown and mottled. The underlying material to a depth of 60 inches is grayish brown and mottled. The upper part is silty clay loam, and the lower part is silt loam. In some places the surface layer is silty clay loam. In other places the soil has a lighter colored subsurface layer and contains more clay in the subsoil. In some areas the subsoil contains more clay. In other areas the depth to a seasonal high water table is more than 4 feet.



Figure 9.—Hay in a crop rotation on Tama silt loam, 5 to 10 percent slopes, eroded. Elkhart soils are on the steeper slopes along drainageways.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils. Denny soils contain more clay in the subsoil than the Muscatine soil. They are in depressional areas. Sable soils are slightly lower on the landscape than the Muscatine soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Muscatine soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 2 to 4 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is strongly acid or medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It

is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

43A—Ipava silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on broad upland flats and near the head of drainageways. Individual areas are irregular in shape and range from 10 to 2,000 acres in size.

Typically, the surface layer is black silt loam about 7 inches thick. The subsurface layer is black and dark grayish brown silty clay loam about 7 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is dark grayish brown silty clay loam; the next part is brown, grayish brown, and light brownish gray silty clay loam; and the lower part is light brownish gray silt loam. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown silt loam. In places the subsurface layer is lighter colored. In some areas the soil contains less clay. In other areas the depth to a seasonal high water table is less than 1 foot.

Included with this soil in mapping are small areas of the poorly drained Denny soils and the moderately well drained Tama soils. Denny soils are in slight depressions. They are subject to ponding. Tama soils are slightly higher on the landscape than the Ipava soils. Included soils make up less than 10 percent of the unit.

Water and air move through the Ipava soil at a moderately slow rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is medium acid to neutral. The surface layer tends to puddle and crust after rains. The shrink-swell potential is high.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and the high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the seasonal high water table and the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

45—Denny silt loam. This nearly level, poorly drained soil is in depressional areas on uplands. It is subject to ponding during periods of heavy rainfall (fig. 10). Individual areas are irregular in shape or round and range from 10 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsurface layer is dark grayish brown and grayish brown silt loam about 7 inches thick. It is mottled in the lower part. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is grayish brown silty clay loam, the next part is light olive gray silty clay loam, and the lower part is light olive gray silt loam. In some areas, the surface soil contains more clay and the subsurface layer is darker. In other areas the dark surface soil is thicker.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava and Clarksdale soils on the slightly higher parts of the landscape. These soils make up less than 10 percent of the unit.

Water and air move through the Denny soil at a slow rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. The surface layer tends to puddle and crust after rains. The shrink-swell potential is high.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding, the seasonal high water table, and the high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

49—Watseka loamy fine sand. This nearly level, somewhat poorly drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 160 acres in size.

Typically, the surface layer is black loamy fine sand about 6 inches thick. The subsurface layer is black loamy fine sand about 7 inches thick. The subsoil is dark grayish brown fine sand about 20 inches thick. The upper part of the underlying material is mottled grayish brown and dark grayish brown fine sand, and the lower part to a depth of 60 inches is brown sand. In some areas the soil contains more clay.

Included with this soil in mapping are small areas of the very poorly drained Gilford soils, the poorly drained



Figure 10.—Ponding on Denny silt loam.

Orio soils, the well drained Oakville soils, and the excessively drained Sparta soils. Gilford and Orio soils contain more clay than the Watseka soil. Also, they are slightly lower on the landscape. Oakville and Sparta soils are on the more sloping parts of the landscape above the Watseka soil. Included soils make up less than 15 percent of the unit.

Water and air move through the Watseka soil at a rapid rate. Surface runoff is very slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderate. The subsoil is slightly acid.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table. It is poorly suited to septic tank absorption fields because of the seasonal high water table and the rapid permeability.

The principal cultivated crops are corn, soybeans, and small grain. Soil blowing is a hazard. Because of the low available water capacity, yields are reduced in years of normal rainfall. Crop rotations that include 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, and field windbreaks conserve moisture and help to

prevent excessive soil loss and the damage caused by windblown soil particles.

In the areas used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIIs.

67—Harpster silty clay loam. This nearly level, poorly drained, calcareous soil is on outwash plains. It is subject to ponding for brief periods during heavy rainfall. Individual areas are irregular in shape and range from 10 to 1,500 areas in size.

Typically, the surface layer is black silty clay loam about 7 inches thick. The subsurface layer is black and very dark grayish brown silty clay loam about 9 inches thick. It is mottled in the lower part. The subsoil is mottled silty clay loam about 25 inches thick. The upper part is grayish brown and olive brown, the next part is gray and dark gray, and the lower part is gray and olive brown. The underlying material to a depth of 60 inches is mottled olive brown and grayish brown silt loam. In some places the surface layer and subsurface layer are

thicker. In other places the soil contains more sand. In some areas the underlying material is loose sand. In other areas the soil contains more clay.

Included with this soil in mapping are small areas of Drummer and Pella soils and some areas of the somewhat poorly drained Joy soils. Drummer and Pella soils are not calcareous in the surface layer or subsurface layer. They are in positions on the landscape similar to those of the Harpster soil. Joy soils have a sandy substratum. They are not calcareous. They are on the slightly higher parts of the landscape. Included soils make up less than 15 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The soil is moderately alkaline throughout. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. The high content of lime in this soil decreases the availability of applied phosphorous and potassium fertilizers. Applying the fertilizers at a rate that is higher than normal helps to overcome this limitation. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

68—Sable silty clay loam. This nearly level, poorly drained soil is on broad upland flats and in drainageways. It is subject to ponding for brief periods during heavy rainfall. Individual areas are irregular in shape and range from 5 to 160 acres in size.

Typically, the surface layer is black silty clay loam about 7 inches thick. The subsurface layer is black and very dark gray silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is grayish brown silty clay loam, the next part is light olive gray silty clay loam, and the lower part is light olive gray silt loam. The underlying material to a depth of 60 inches is light gray, mottled silt loam. In some places the subsoil is thinner. In other places the surface layer is thicker. In some areas the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the slowly permeable Denny soils in shallow depressions. These soils make up less than 5 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is neutral or mildly alkaline. The surface layer is firm and becomes compact and cloddy if tilled when wet. It tends to puddle and crust after rains.

Most areas are used for cultivated crops and hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

69—Milford silty clay loam. This nearly level, poorly drained soil is on glacial lake plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is about 14 inches of black and very dark gray, firm silty clay loam and silty clay. The subsoil extends to a depth of 60 inches. It is firm and mottled. The upper part is dark gray, gray, and olive gray silty clay loam; the next part is gray silty clay; and the lower part is grayish brown sandy loam. In some places the soil contains more clay. In other places it contains less clay. In some areas calcium carbonates are throughout the soil.

Air and water move through the Milford soil at a moderately slow rate. Surface runoff is slow to ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate in the subsoil. The potential for frost action is high.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding, the seasonal high water table, and the high shrink-swell

potential. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the moderately slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

74—Radford silt loam. This nearly level, somewhat poorly drained soil is on the flood plains of small stream valleys and along drainageways. It is subject to rare flooding. Individual areas are mostly long and narrow and range from 10 to 500 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled silt loam about 8 inches thick. The underlying material is very dark grayish brown and very dark gray silt loam about 12 inches thick. Below this to a depth of 60 inches is a buried black silty clay loam surface layer. It is mottled in the lower part. In some areas the thickness of the surface soil combined with that of the underlying material is less than 20 inches or more than 40 inches. In other areas, the surface layer is stratified and some layers are sandy or loamy. In places the surface layer and underlying material are lighter colored.

Water and air move through this soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. Reaction is neutral in the underlying material and in the buried surface layer. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or pasture. This soil is well suited to cultivated crops, hay, and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the hazard of flooding.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table delays planting and reduces yields. A subsurface drainage system helps to overcome this limitation. Flooding may delay planting or damage crops. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

87A—Dickinson fine sandy loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown fine sandy loam about 7 inches thick. The subsurface layer is mixed very dark grayish brown and dark brown fine sandy loam about 11 inches thick. The subsoil is about 18 inches thick. The upper part is dark brown fine sandy loam, and the lower part is brown loamy fine sand. The underlying material to a depth of 60 inches is brown loamy fine sand. In some areas the soil contains more sand. In other areas it contains more clay. In places the subsoil is redder.

Included with this soil in mapping are small areas of the somewhat poorly drained Hoopston soils and the excessively drained Sparta soils. Hoopston soils are in the slightly lower areas. Sparta soils are in positions on the landscape similar to those of the Dickinson soil. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Soil blowing is a hazard. Because of the low available water capacity, yields are reduced in years of normal rainfall. A system of conservation tillage that leaves crop residue on the surface after planting and field windbreaks conserve moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles.

In the areas used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIs.

87B—Dickinson fine sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown fine sandy loam about 6 inches thick. The subsurface layer is very dark grayish brown and dark brown fine sandy loam about 13 inches thick. The subsoil is about 25 inches thick. The upper part is brown fine sandy loam, the next

part is dark yellowish brown sandy loam, and the lower part is dark yellowish brown and yellowish brown loamy sand and fine sand. The underlying material to a depth of 60 inches is yellowish brown sand. In some places the soil contains more sand. In other places the subsoil contains more clay. In some areas the surface layer and subsurface layer are thinner. In other areas the subsoil is redder.

Included with this soil in mapping are small areas of the somewhat poorly drained Hoopeston soils and the excessively drained Sparta soils. The nearly level Hoopeston soils are on the lower parts of the landscape. Sparta soils are in positions on the landscape similar to those of the Dickinson soil. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the lower part of the subsoil and the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion and soil blowing are hazards. Because of the low available water capacity, yields are reduced in years of normal rainfall. Crop rotations that include forage crops, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and field windbreaks help to control erosion and prevent the damage caused by windblown soil particles and conserve moisture.

In the areas used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIe.

87C2—Dickinson fine sandy loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is very dark grayish brown fine sandy loam about 11 inches thick. The subsoil is about 24 inches thick. The upper part is brown fine sandy loam and sandy loam, and the lower part is strong brown loamy sand. The underlying material to a depth of 60 inches is strong brown sand. In some areas the soil contains more sand. In other areas the subsoil contains more clay. In places the surface layer is thinner.

Included with this soil in mapping are small areas of the excessively drained Sparta soils in similar positions

on the landscape. These soils contain more sand than the Dickinson soil. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is low. Organic matter content is moderately low. The subsoil is slightly acid.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion and soil blowing are hazards. Because of the low available water capacity, yields are reduced in years of normal rainfall. Crop rotations that include forage crops and a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and field windbreaks help to control erosion and prevent the damage caused by windblown soil particles and conserve moisture.

In the areas used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIIe.

88B—Sparta loamy fine sand, 1 to 7 percent slopes. This gently sloping, excessively drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape or long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown loamy fine sand about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown loamy fine sand about 6 inches thick. The subsoil is dark yellowish brown loamy fine sand about 14 inches thick. The underlying material to a depth of 60 inches is brown and strong brown sand and fine sand. It is mottled in the lower part. In some areas the surface layer and subsurface layer are thinner. In other areas the surface soil is more than 24 inches thick. In places the upper part of the soil contains less sand.

Included with this soil in mapping are small areas of the well drained Coyne and Dickinson soils, the poorly drained Orio soils, and the somewhat poorly drained Watseka soils. Coyne soils are moderately slowly permeable in the lower part of the subsoil. Coyne and Dickinson soils are in positions on the landscape similar to those of the Sparta soil. Orio soils are in depressional areas. Watseka soils are nearly level. Included soils make up less than 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Available water capacity is low. Organic matter content is moderately low. Surface runoff is slow. The subsoil is medium acid.

Most areas are used for cultivated crops or hay. This soil is poorly suited to cultivated crops because of droughtiness. It is moderately suited to hay, pasture, and woodland. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability.

The principal cultivated crops are corn, soybeans, and small grain. Drought and soil blowing are hazards. Returning crop residue to the soil or growing a green manure crop and applying a system of conservation tillage that leaves crop residue on the surface after planting conserve moisture during dry periods. They also prevent excessive soil blowing.

In the areas used for hay and pasture, the hazard of soil blowing and the low available water capacity reduce yields. Selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

If the soil is used for woodland, seedling mortality is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is IVs.

88D—Sparta loamy fine sand, 7 to 15 percent slopes. This strongly sloping, excessively drained soil is in dunelike areas on outwash plains. Individual areas are irregular in shape or long and narrow and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown loamy fine sand about 11 inches thick. The subsoil is yellowish brown loamy fine sand about 23 inches thick. The underlying material to a depth of 60 inches is brownish yellow and pale brown fine sand and sand. In some areas the depth to carbonates is less than 60 inches. In other areas the surface layer is lighter colored and thinner. In places the upper part of the soil contains less sand.

Included with this soil in mapping are small areas of the well drained Dickinson soils, the very poorly drained Gilford soils, and the poorly drained Orio soils. Dickinson soils are in positions on the landscape similar to those of the Sparta soil. Gilford and Orio soils are in depressional areas. Included soils make up less than 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow. Available water capacity is

low. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for hay or pasture. Some are used for cultivated crops. This soil is unsuited to cultivated crops because of droughtiness. It is moderately suited to hay, pasture, and woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability.

In the areas used for hay and pasture, the hazard of soil blowing and the low available water capacity reduce yields. Selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

If this soil is used for woodland, seedling mortality is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is VI_s.

100—Palms muck. This nearly level, very poorly drained soil is on outwash plains. It is subject to ponding for long periods from November to May. Individual areas are irregular in shape or long and range from 10 to 300 acres in size.

Typically, the surface soil is black muck about 24 inches thick. The underlying material to a depth of 60 inches is silt loam. The upper part is very dark gray, the next part is grayish brown, and the lower part is dark gray. In some areas the muck is thicker. In other areas the lower part of the soil contains more sand. In places the soil has free carbonates.

Included with this soil in mapping are small areas of the poorly drained Canisteo, Harpster, and Pella soils, small areas of the Gilford soils, and small areas of the somewhat poorly drained Watseka soils. These included soils did not form in organic material. They are slightly higher on the landscape than the Palms soil. They make up less than 15 percent of the unit.

Water and air move through the organic material of the Palms soil at a moderately rapid rate and through the underlying material at a moderate rate. Surface runoff is very slow. A seasonal high water table is 1.0 foot above the surface to 1.0 foot below during the spring. Available water capacity is very high. Organic matter content also is very high. The underlying material is neutral. This soil is subject to subsidence.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is poorly suited to hay, pasture, and woodland because of the ponding and the seasonal high water table. It is generally

unsuited to dwellings and septic tank absorption fields because of the hazards of flooding and subsidence.

The principal cultivated crops are corn and soybeans. The seasonal high water table delays planting, damages crops, and reduces yields. A drainage system has been installed in many areas. Measures that maintain the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Tile drains do not function so well, however, because the soil is subject to subsidence. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

The land capability classification is IIIw.

102A—La Hogue loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on stream terraces and outwash plains. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is black loam about 7 inches thick. The subsurface layer is black loam about 8 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is very dark grayish brown, dark grayish brown, pale brown, and brown gray loam; the next part is light brownish gray, pale brown, and strong brown sandy clay loam; and the lower part is brown and yellowish brown, stratified sandy loam and loamy sand. In some areas the soil contains less clay. In other areas the subsoil is thinner.

Included with this soil in mapping are the well drained Dickinson and Jasper soils on the slightly higher parts of the landscape. Also included are the poorly drained Orio and Selma soils in depressions. These soils are subject to ponding. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the La Hogue soil at a moderate rate and through the lower part of the subsoil at a moderately rapid rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid or neutral.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods from March to June. Individual areas are irregular in shape or long and range from 10 to 400 acres in size.

Typically, the surface layer is very dark gray silty clay loam about 7 inches thick. The subsurface layer is black silty clay loam about 25 inches thick. The subsoil to a depth of 60 inches is silty clay loam. The upper part is dark gray, and the lower part is olive gray and mottled. In some areas the surface soil is thinner. In other areas the soil is calcareous. In places the surface layer and subsoil are silt loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion soils in similar positions on the landscape. These soils make up less than 5 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. A seasonal high water table is within a depth of 2 feet during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral or mildly alkaline. The surface layer becomes compact and cloddy if tilled when wet.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the hazard of flooding.

This soil is sufficiently drained for corn and soybeans. The flooding is not a serious problem because it generally occurs early in spring. Measures that maintain the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

107+—Sawmill silt loam, overwash. This nearly level, poorly drained soil is on flood plains and the bottom of drainageways. It is frequently flooded for brief periods from March to June. Individual areas are long or irregular in shape and range from 20 to 500 acres in size.

Typically, the surface layer is dark grayish brown silt loam overwash about 8 inches thick. The next 7 inches is mottled grayish brown and yellowish brown, stratified silt loam and very fine sandy loam overwash. The next layer to a depth of 60 inches is a buried soil of silty clay loam. The upper part is a black buried surface layer. The next part is very dark gray and mottled. The lower part is a dark gray, mottled subsoil. In some areas the

overwash is thicker. In other areas it does not occur. In places the lower part of the subsoil and the underlying material contain more sand.

Water and air move through this soil at a moderate rate. Surface runoff is slow. A seasonal high water table is within a depth of 2 feet during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the hazard of flooding.

This soil is sufficiently drained for corn and soybeans. The flooding is not a serious problem because it generally occurs early in spring. Measures that maintain the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

119D2—Elco silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, moderately well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark yellowish brown silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown, friable silt loam; the next part is yellowish brown, friable and firm silty clay loam; and the lower part is grayish brown and mottled grayish brown and yellowish brown, very firm silty clay loam. In some areas the subsoil is gray. In other areas it contains less sand. In places it contains more clay and sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the bottom of narrow drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the upper part of the Elco soil at a moderate rate and through the lower part of the subsoil at a moderately slow rate. Surface runoff is rapid. A perched seasonal high water table is 1.5 to 3.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The subsoil is slightly acid or neutral.

Most areas are used for hay or pasture. Some remain in native timber. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is

moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the perched seasonal high water table and the moderately slow permeability.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Applying chemicals, plowing contoured furrows, which removes the competing vegetation before the trees are planted, or clearing by other mechanical means helps to control the initial plant competition. Cutting helps to control the subsequent competition. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

119D3—Elco silty clay loam, 10 to 18 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is along drainageways on dissected uplands. Individual areas are long and narrow or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed brown and yellowish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown silty clay loam, the next part is brown, mottled silty clay loam, and the lower part is mottled brown and grayish brown clay loam. In some areas the subsoil is gray. In other areas it contains less sand. In places it contains more clay and sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the bottom of narrow drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the upper part of the Elco soil at a moderate rate and through the lower part of the subsoil at a moderately slow rate. Surface runoff is rapid. A perched seasonal high water table is 1.5 to 3.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is low. The subsoil is neutral. The surface layer tends to crust after rains and forms clods if tilled when wet.

Most areas are used for cultivated crops. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the perched seasonal high water table and the moderately slow permeability.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help

to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

125—Selma clay loam. This nearly level, poorly drained soil is on outwash plains. It is subject to ponding for brief periods from March to June. Individual areas are irregular in shape and range from 20 to 400 acres in size.

Typically, the surface layer is black clay loam about 8 inches thick. The subsurface layer is black clay loam about 7 inches thick. The subsoil is about 33 inches thick. It is mottled. The upper part is very dark gray and dark grayish brown clay loam; the next part is grayish brown, yellowish brown, and gray clay loam and silty clay loam; and the lower part is light brownish gray clay loam. The underlying material to a depth of 60 inches is mottled grayish brown, light brownish gray, yellowish brown, gray, and dark grayish brown, stratified sandy loam, sand, and loam. In places the soil is calcareous. In some areas it contains less sand. In other areas it contains less clay. In some places the subsurface layer is dark grayish brown. In other places the surface layer and subsurface layer are thicker. In some areas the subsoil is stratified. In others the depth to a seasonal high water table is more than 2 feet.

Water and air move through the upper part of this soil at a moderate rate and through the underlying material at a moderately rapid rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral or mildly alkaline. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is wet, stocking at a proper rate, applying fertilizer, and

rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

148B—Proctor silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 11 inches thick. The subsurface layer is dark brown silt loam about 4 inches thick. The subsoil is about 32 inches thick. The upper part is brown and dark yellowish brown silty clay loam, the next part is yellowish brown loam, and the lower part is yellowish brown, stratified loam and loamy sand. The underlying material to a depth of 60 inches is yellowish brown, mottled, stratified sandy loam, loamy sand, and loam. In some areas stratified material is at a depth of more than 40 inches. In other areas the underlying material is loose sand. In some places the upper part of the subsoil contains more sand. In other places the surface layer is thinner. In places the soil is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained Brenton and Millbrook soils and the poorly drained Drummer soils. These included soils are nearly level. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Proctor soil at a moderate rate and through the lower part of the subsoil and the underlying material at a moderately rapid rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It also is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include 1 or more years of forage crops, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

148C2—Proctor silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on outwash plains and stream terraces along draineways. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 8 inches thick. The subsoil is about 40 inches thick. The upper part is brown and dark yellowish brown silty clay loam, and the lower part is light olive brown and yellowish brown, stratified silty clay loam, clay loam, and loam. The underlying material to a depth of 60 inches is mottled light olive brown and yellowish brown, stratified sandy loam, silt loam, and loam. In some areas the sandy material is at a depth of more than 40 inches. In other areas the subsoil is underlain by loose sand. In some places the underlying material contains more clay and less sand. In other places the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer soils and the somewhat poorly drained Millbrook soils. Drummer soils are in the slightly depressional areas or on the bottom of narrow drainageways. Millbrook soils are nearly level. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Proctor soil at a moderate rate and through the underlying material at a moderately rapid rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops and well suited to hay and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include forage crops and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

149A—Brenton silt loam, 0 to 3 percent slopes.

This nearly level, somewhat poorly drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray silt loam about 6 inches thick. The subsurface layer is silt loam about 13 inches thick. The upper part is very dark gray, and the lower part is very dark grayish brown. The subsoil is about 27 inches thick. It is mottled brown, grayish brown, and yellowish brown. The upper part is silty clay loam, the next part is clay loam, and the lower part is sandy loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, calcareous silt

loam. In some areas the subsoil is thicker. In other areas the subsurface layer is lighter colored. In places the depth to a seasonal high water table is less than 1 foot.

Included with this soil in mapping are small areas of the well drained Proctor soils on the more sloping parts of the landscape. These soils make up less than 5 percent of the unit.

Water and air move through the Brenton soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is slightly acid or neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

152—Drummer silty clay loam. This nearly level, poorly drained soil is on outwash plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 10 to 400 acres in size.

Typically, the surface layer is black silty clay loam about 8 inches thick. The subsurface layer is black and very dark gray silty clay loam about 14 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is grayish brown and light brownish gray silty clay loam; the next part is light olive gray and brownish yellow silty clay loam; and the lower part is olive gray, light brownish gray, and yellowish brown, stratified loam and sandy loam. In places the subsoil contains more clay. In some areas the soil is shallower to carbonates. In other areas it contains more sand. In some places the surface layer and subsurface layer are thicker. In other places the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of Harpster soils in similar positions on the landscape. These soils are calcareous at the surface. They make up less than 5 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet

below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the ponding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, installing a drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

153—Pella silty clay loam. This nearly level, poorly drained soil is on outwash plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is black, firm silty clay loam about 8 inches thick. The subsurface layer is black silty clay loam about 7 inches thick. The subsoil is about 23 inches thick. The upper part is very dark gray, gray, and olive gray, mottled silty clay loam, and the lower part is gray, calcareous, stratified loam and sandy loam. The underlying material extends to a depth of 60 inches. It is calcareous. The upper part is dark gray, stratified loam and silty clay loam; the next part is dark gray, mottled silt loam; and the lower part is mottled dark gray and brown, stratified silt loam and sandy loam. In places the subsoil is not calcareous. In some places the surface layer and subsurface layer are calcareous. In other places the subsoil contains more sand or more clay. In some areas the depth to a seasonal high water table is more than 2 feet. In other areas the surface layer and subsurface layer are thicker.

Water and air move through this soil at a moderate rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is mildly alkaline or moderately alkaline. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption

fields because of the ponding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

171A—Catlin silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on loess-covered till plains. Individual areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is very dark gray silt loam about 8 inches thick. The subsurface layer is also very dark gray silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown, dark brown, and yellowish brown silty clay loam; the next part is olive brown, mottled silty clay loam; and the lower part is light olive brown, mottled silt loam and clay loam. In some places the lower part of the subsoil contains more sand. In other places the subsoil is thinner. In some areas the depth to a seasonal high water table is less than 4 feet. In other areas it is more than 6 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are lower on the landscape than the Catlin soil. They make up less than 5 percent of the unit.

Water and air move through the Catlin soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, timely deferment of grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

171B—Catlin silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on loess-covered till

plains. Individual areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is very dark gray and dark brown silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown, dark yellowish brown, and yellowish brown silt loam and silty clay loam, and the lower part is light olive brown silty clay loam. In some places the lower part of the subsoil contains more sand. In other places the subsoil is thinner.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn soils and the poorly drained Drummer soils. These soils are lower on the landscape than the Catlin soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Catlin soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to moderately alkaline. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include forage crops, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

172—Hoopeston sandy loam. This nearly level, somewhat poorly drained soil is on outwash plains. Individual areas are irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is black sandy loam about 7 inches thick. The subsurface layer is very dark gray sandy loam about 10 inches thick. The subsoil is dark brown, dark grayish brown, and brown, mottled sandy loam about 14 inches thick. The upper part of the underlying material is brown, dark grayish brown, and grayish brown loamy sand. The next part is light brownish gray sand. The lower part to a depth of 60 inches is grayish brown loamy sand. In some areas the soil contains more clay. In other areas it contains more sand.

Included with this soil in mapping are small areas of the well drained Dickinson soils and the very poorly drained Gilford soils. Dickinson soils are on the slightly higher, more sloping parts of the landscape. Gilford soils

are in the slightly lower, slightly depressional areas. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Hoopeston soil at a moderately rapid rate and through the underlying material at a rapid rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and to septic tank absorption fields because of the seasonal high water table and the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Soil blowing is a hazard. Because of the moderate available water capacity, yields are reduced in years of normal rainfall. A system of conservation tillage that leaves crop residue on the surface after planting and field windbreaks conserve moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles.

If this soil is used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIs.

198A—Elburn silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark brown and dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown, mottled silty clay loam; the next part is grayish brown, mottled silty clay loam; and the lower part is mottled grayish brown, yellowish brown, and dark yellowish brown, stratified loam and sandy loam. In some places the subsoil is thinner. In other places the depth to a seasonal high water table is less than 1 foot or more than 3 feet. In some areas, the surface layer is thinner and the subsurface layer is grayish brown. In other areas the lower part of the subsoil contains less sand. In a few areas it contains more sand.

Included with this soil in mapping are small areas of the well drained Catlin and Plano soils. These soils are on slight rises above the Elburn soil. They make up less than 10 percent of the unit.

Water and air move through the Elburn soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter

content also is high. The subsoil is medium acid or slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, seeding adapted forage species, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

199A—Plano silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are long or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown silty clay loam, the next part is dark yellowish brown silt loam, and the lower part is mottled dark yellowish brown and yellowish brown sandy loam and loam. In some areas the lower part of the subsoil and the underlying material contain more clay. In other areas the underlying material contains more sand. In places, the subsoil contains less clay and the underlying material contains more sand. In some places the subsoil is thinner. In other places the lower part of the subsoil contains less sand.

Included with this soil in mapping are the poorly drained Drummer soils and the somewhat poorly drained Elburn and Millbrook soils on the slightly lower parts of the landscape. The subsurface layer of Millbrook soils is lighter colored than that of the Plano soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is slow. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral or slightly acid. This soil tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and well suited to septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. In the areas

used for hay and pasture, timely deferment of grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

199B—Plano silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are long or irregular in shape and range from 5 to 100 acres in size.

Typically, the surface soil is very dark grayish brown silt loam about 12 inches thick. The subsoil is about 43 inches thick. It is brown. It is silty clay loam in the upper part and clay loam in the lower part. The underlying material to a depth of 60 inches is dark yellowish brown loamy sand. In some areas the lower part of the subsoil and the underlying material contain more clay. In other areas the underlying material contains more sand. In some places the surface soil is thinner. In other places, the subsoil contains less clay and the underlying material contains more sand. In places the part of the subsoil within a depth of 40 inches contains more sand. In some areas the lower part of the subsoil contains less sand.

Included with this soil in mapping are the poorly drained Drummer and somewhat poorly drained Elburn and Millbrook soils. These soils are nearly level. The subsurface layer of Millbrook soils is lighter colored than that of the Plano soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid or neutral. This soil tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It also is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include forage crops, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

199C2—Plano silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on outwash plains and stream terraces. Individual areas are long or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil extends to a

depth of 60 inches. The upper part is brown silty clay loam; the next part is dark yellowish brown silty clay loam; and the lower part is yellowish brown, stratified loam, sandy loam, and silt loam. In some areas the lower part of the subsoil and the underlying material contain more clay. In other areas the underlying material contains more sand. In places, the subsoil contains less clay and the underlying material contains more sand. In some places the subsoil is thinner. In other places the lower part of the subsoil contains less sand.

Included with this soil in mapping are areas of the poorly drained Drummer and somewhat poorly drained Elburn and Millbrook soils on the slightly lower parts of the landscape. These soils are nearly level. The subsurface layer of Millbrook soils is lighter colored than that of the Plano soil. Included soils make up less than 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. This soil tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

200—Orlo loam. This nearly level or depressional, poorly drained soil is on stream terraces or outwash plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 2 to 200 acres in size.

Typically, the surface layer is very dark gray loam about 9 inches thick. The subsurface layer is grayish brown, dark gray, and light brownish gray, mottled fine sandy loam about 9 inches thick. The subsoil is about 23 inches thick. It is mottled. The upper part is dark grayish brown and olive gray clay loam, and the lower part is grayish brown sandy loam. The underlying material to a depth of 60 inches is grayish brown sand. In some areas the subsurface layer is darker. In other areas the soil contains more sand and less clay. In some places, the upper part of the soil contains less sand and the dark surface layer is thicker. In other places the depth to a seasonal high water table is more than 1 foot.

Water and air move through the upper part of this soil at a moderately slow rate and through the underlying material at a rapid rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding and the seasonal high water table. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the moderately slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used for hay and pasture, seeding adapted forage species, installing a surface drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

201—Gilford fine sandy loam. This nearly level, very poorly drained soil is on outwash plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from about 20 to 300 acres in size.

Typically, the surface layer is black fine sandy loam about 8 inches thick. The subsurface layer is mixed black and very dark gray fine sandy loam about 4 inches thick. The subsoil is about 22 inches thick. The upper part is dark grayish brown, mottled fine sandy loam; the next part is grayish brown, mottled sandy loam; and the lower part is mottled light brownish gray and grayish brown loamy sand. The underlying material to a depth of 60 inches is light brownish gray and grayish brown fine sand and sand. In some places the subsoil contains more clay. In other places the surface layer and subsoil contain more sand. In some areas the surface soil is more than 24 inches thick. In other areas the depth to a seasonal high water table is more than 1 foot.

Included with this soil in mapping are small areas of Adrian and Canisteo soils. The Adrian soils formed in organic material underlain by sandy material. They are in depressional areas. The poorly drained Canisteo soils contain more clay in the subsoil than the Gilford soil. They are calcareous. They are on the slightly higher parts of the landscape. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Gilford soil at a moderately rapid rate and through the underlying material at a rapid rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to woodland. It is poorly suited to dwellings because of the ponding and the seasonal high water table. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the rapid permeability in the underlying material.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used for hay and pasture, seeding adapted forage species, installing a surface drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

206—Thorp silt loam. This nearly level or depressional, poorly drained soil is on outwash plains and stream terraces. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape or long and range from 5 to 100 acres in size.

Typically, the surface layer is black silt loam about 10 inches thick. The subsurface layer is dark grayish brown silt loam about 4 inches thick. The subsoil is about 44 inches thick. It is mottled. The upper part is dark gray and gray silty clay loam; the next part is olive gray and grayish brown silty clay loam; and the lower part is dark gray, grayish brown, and yellowish brown, stratified silt loam, sandy loam, and sandy clay loam. The underlying material to a depth of 60 inches is mottled dark gray, grayish brown, and yellowish brown, stratified sand, loam, and sandy clay loam. In some areas the underlying material contains more sand, and in others it contains less sand. In places the depth to a seasonal high water table is more than 1 foot. In some places the soil contains more sand. In other places the surface soil is more than 24 inches thick.

Water and air move through the upper part of this soil at a slow rate and through the lower part of the subsoil and the underlying material at a moderately rapid rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter

content also is high. The subsoil is medium acid or slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding and the seasonal high water table and to septic tank absorption fields because of the ponding, the seasonal high water table, and the slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, installing a surface or subsurface drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

219A—Millbrook silt loam, 0 to 3 percent slopes.

This nearly level, somewhat poorly drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is grayish brown and light brownish gray silt loam about 8 inches thick. The subsoil is about 25 inches thick. It is mottled. The upper part is light brownish gray silty clay loam; the next part is brown, grayish brown, and light brownish gray silty clay loam; and the lower part is grayish brown silt loam. The underlying material to a depth of 60 inches is light olive brown and brown, mottled, stratified fine sandy loam and loamy sand. In some places the subsurface layer is darker. In other places, the subsoil is thicker and the subsurface layer is darker. In some areas the underlying material is sand. In other areas the subsoil is thicker and contains more clay. In places a seasonal high water table is at a depth of 1 foot or less.

Included with this soil in mapping are small areas of the well drained Plano and Proctor soils on the higher parts of the landscape. These soils make up less than 15 percent of the unit.

Water and air move through the Millbrook soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid or slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, pasture, and

woodland. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

250C2—Velma silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is dark brown silt loam about 5 inches thick. The subsoil is clay loam about 32 inches thick. The upper part is yellowish brown and friable, and the lower part is yellowish brown, mottled, and firm. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm clay loam. In some areas the lower part of the subsoil contains more clay. In other areas the soil contains less sand. In places the surface soil is thinner and is lighter colored.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the bottom of drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the Velma soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid or medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay and pasture. This soil is moderately suited to cultivated crops, hay, and pasture. It also is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

250D2—Velma silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on uplands. Individual areas are long or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface soil is mixed very dark gray and dark brown silt loam about 13 inches thick. The subsoil is clay loam about 31 inches thick. The upper part is dark yellowish brown and yellowish brown, the next part is yellowish brown and mottled, and the lower part is mottled pale brown and yellowish brown. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm clay loam. In some areas the lower part of the subsoil contains more clay. In other areas the soil contains less sand. In places the surface soil is lighter colored.

Included with this soil in mapping are the somewhat poorly drained Radford soils on the bottom of drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the Velma soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to neutral.

Most areas are used for hay or pasture. This soil is moderately suited to cultivated crops, hay, and pasture. It also is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations dominated by small grain and hay, by a system of conservation tillage that leaves crop residue on the surface after planting, and by a combination of contour farming, terraces, and stripcropping.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

250E2—Velma loam, 15 to 20 percent slopes, eroded. This moderately steep, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsoil is firm clay loam about 36 inches thick. The upper part is yellowish brown, and the lower part is strong brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm clay loam. In some areas the lower part of the subsoil contains more clay. In other areas the soil contains less sand. In places the surface soil is lighter colored.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the

bottom of drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the Velma soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to slightly acid.

Most areas are used for hay or pasture. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is poorly suited to hay because of the erosion hazard and the moderately steep slopes. It is moderately suited to pasture. It is poorly suited to dwellings and septic tank absorption fields because of the moderately steep slopes.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IVe.

257A—Clarksdale silt loam, 0 to 3 percent slopes.

This nearly level, somewhat poorly drained soil is on broad upland ridgetops. Individual areas are irregular in shape and range from 5 to about 100 acres in size.

Typically, the surface layer is black silt loam about 9 inches thick. The subsurface layer is dark grayish brown silt loam about 5 inches thick. The subsoil is about 32 inches thick. It is mottled. The upper part is dark grayish brown silty clay loam, the next part is brown and grayish brown silty clay loam, and the lower part is grayish brown silt loam. The underlying material to a depth of 60 inches is grayish brown, mottled silt loam. In some areas the surface layer is lighter colored. In other areas the surface layer and the subsurface layer are darker. In some places the subsoil contains less clay. In other places the depth to a seasonal high water table is less than 1 foot.

Included with this soil in mapping are small areas of the well drained Downs and Fayette soils. These soils contain less clay in the subsoil than the Clarksdale soil. Also, they are slightly higher on the landscape. They make up less than 10 percent of the unit.

Water and air move through the Clarksdale soil at a moderately slow rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to mildly alkaline. The shrink-swell potential is high. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops and hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and the high shrink-swell potential and to septic tank absorption fields because of the seasonal high water table and the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay

planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, installing a subsurface drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

259B—Assumption silt loam, 2 to 5 percent slopes.

This gently sloping, moderately well drained soil is on upland ridgetops and side slopes. Individual areas are irregular in shape or long and range from 5 to 30 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 6 inches thick. The subsurface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown silty clay loam; the next part is brown, mottled silty clay loam; and the lower part is yellowish brown and brown, mottled clay loam and silty clay loam. In some areas the surface layer is thinner. In other areas the lower part of the subsoil contains less sand. In some places the middle and lower parts of the subsoil are grayer and contain more clay. In other places the depth to carbonates is less than 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on flood plains along drainageways. These soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Assumption soil at a moderate rate and through the lower part of the subsoil and the underlying material at a moderately slow rate. Surface runoff is medium. A perched seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the seasonal high water table and the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

259C2—Assumption silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on ridgetops and along drainageways on dissected uplands. Individual areas are long and narrow or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is about 45 inches thick. The upper part is dark yellowish brown, firm silty clay loam; the next part is yellowish brown, firm clay loam; and the lower part is yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm clay loam. In some areas the surface layer is thicker. In other areas the lower part of the subsoil is grayer and contains more clay. In places the depth to carbonates is less than 60 inches. In some places the subsoil contains less sand, and in other places the surface layer and subsoil contain more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the bottom of drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the upper part of the Assumption soil at a moderate rate and through the lower part of the subsoil and the underlying material at a moderately slow rate. Surface runoff is medium. A perched seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the seasonal high water table and the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

259D2—Assumption silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is along drainageways on dissected uplands. Individual areas are long and narrow or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is about 42

inches thick. The upper part is brown and yellowish brown, firm silty clay loam; the next part is grayish brown and gray, firm clay loam; and the lower part is grayish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches is grayish brown, mottled, firm clay loam. In places the surface layer is thicker. In some places the lower part of the subsoil contains less sand, and in other places the upper part of the subsoil contains more sand. In some areas the lower part of the subsoil is grayer and contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on the bottom of drainageways. These soils make up less than 5 percent of the unit.

Water and air move through the upper part of the Assumption soil at a moderate rate and through the lower part of the subsoil and the underlying material at a moderately slow rate. Surface runoff is rapid. A perched seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid.

Most areas are used for hay or pasture. Some are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It also is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the seasonal high water table and the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations dominated by small grain and hay, by a system of conservation tillage that leaves crop residue on the surface after planting, and by a combination of contour farming, terraces, and stripcropping.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

261—Niota silt loam. This nearly level, poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 10 to 300 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsurface layer is dark grayish brown, mottled silt loam about 4 inches thick. The subsoil is mottled, firm silty clay about 40 inches thick. The upper part is dark grayish brown and grayish brown; the next part is light brownish gray, grayish brown, and light olive gray; and the lower part is reddish brown. The underlying material to a depth of 60 inches is light olive gray, mottled silt loam. In some places the surface layer is thicker and contains more clay. In other places the surface layer and subsurface layer are darker.

Included with this soil in mapping are small areas of the well drained Coyne soils on the higher terraces. The upper part of Coyne soils contains less clay than that of the Niota soil. Included soils make up less than 5 percent of the unit.

Water and air move through the Niota soil at a very slow rate. Surface runoff is slow. A perched seasonal high water table is within a depth of 2 feet during the spring. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is strongly acid or medium acid. The shrink-swell potential is high. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and the high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the seasonal high water table and the very slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Open drainage ditches reduce the wetness. The slow runoff frequently delays planting or results in crop damage. Surface inlets into tile drains and open drainage ditches help to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, open drainage ditches, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

262—Denrock silt loam. This nearly level, somewhat poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 10 to 100 acres in size.

Typically, the surface layer is very dark brown silt loam about 8 inches thick. The subsurface layer is very dark brown silt-clay loam about 5 inches thick. The subsoil is about 41 inches thick. The upper part is reddish brown, firm clay, and the lower part is mottled reddish brown, dark grayish brown, strong brown, and light brownish gray, friable, stratified clay loam and sandy loam. The underlying material to a depth of 60 inches is reddish brown, mottled loamy sand. In some places the subsurface layer is lighter colored. In other places the depth to a perched seasonal high water table is less than 1 foot.

Included with this soil in mapping are some areas of the well drained Coyne soils on the slightly higher parts of the landscape. These soils contain less clay in the surface layer and the upper part of the subsoil than the Denrock soil. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Denrock soil at a very slow rate and through the underlying material at a rapid rate. Surface runoff is slow. A perched seasonal high water table is 1 to 2 feet below the surface during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is strongly acid to slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and to septic tank absorption fields because of the seasonal high water table, the very slow permeability in the subsoil, and the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table delays planting and reduces yields. Open drainage ditches help to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, open drainage ditches, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is 1lw.

274B—Seaton silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridgetops. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsurface layer is dark brown, dark yellowish brown, and yellowish brown silt loam about 6 inches thick. The subsoil is dark yellowish brown silt loam about 42 inches thick. The underlying material to a depth of 60 inches is dark yellowish brown silt loam. In places the surface layer and the subsurface layer are darker. In some areas the soil is moderately well drained.

Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Joy soils in slight depressions. These soils make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. Some remain in native timber. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland. It is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include 1 or more years of forage crops, contour farming, a system of

conservation tillage that leaves crop residue on the surface after planting, and terraces.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IIe.

274C2—Seaton silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridgetops and along drainageways on uplands. Individual areas are irregular in shape or long and narrow and range from 10 to 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is brown, dark yellowish brown, and yellowish brown silt loam about 39 inches thick. The underlying material to a depth of 60 inches is light yellowish brown silt loam. In some places the surface layer is darker and thicker. In other places it is thinner. In some areas the soil is moderately well drained. In other areas, the subsoil contains less clay and calcium carbonates are within a depth of 36 inches.

Included with this soil in mapping are small areas of Tell soils in similar positions on the landscape. These soils contain more sand in the underlying material than the Seaton soil. They make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The subsoil is medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops. Some are used for residential development. A few remain in native timber. This soil is moderately suited to cultivated crops. It is well suited to hay, pasture, and woodland. It also is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help

to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting adapted species on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IIIe.

274D2—Seaton silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on uplands. Individual areas are long and narrow and range from 5 to 20 acres in size.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is silt loam about 46 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is olive yellow silt loam. In places the surface layer is darker and thicker. In some areas the subsoil contains more sand and clay. In other areas, it contains less clay and calcium carbonates are within a depth of 36 inches.

Included with this soil in mapping are small areas of Oakville soils in similar positions on the landscape. These soils are sandy and have a low available water capacity. They make up less than 5 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil is medium acid.

Most areas are used for hay or pasture. Some are used for residential development. Some remain in native timber. This soil is very poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IVe.

275—Joy silt loam. This nearly level, somewhat poorly drained soil is on broad upland flats. Individual areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is black silt loam about 5 inches thick. The subsurface layer is black and very dark grayish brown silt loam about 12 inches thick. The subsoil is silt loam about 32 inches thick. The upper part is dark brown, the next part is grayish brown, brown, and yellowish brown and is mottled, and the lower part is mottled light brownish gray and yellowish brown. The underlying material to a depth of 60 inches is light brownish gray, mottled silt loam. In some places the surface soil is thicker. In other places the depth to a seasonal high water table is more than 4 feet.

Included with this soil in mapping are some areas of the poorly drained Sable soils on the slightly lower parts of the landscape. These soils are subject to ponding. They make up less than 5 percent of the unit.

Water and air move through the Joy soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 2 to 4 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The subsoil is neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, installing a subsurface drainage system, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

277A—Port Byron silt loam, 0 to 2 percent slopes.

This nearly level, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is very dark gray silt loam about 10 inches thick. The subsurface layer is mixed very dark gray and very dark grayish brown silt loam about 5 inches thick. The subsoil to a depth of 60 inches is silt loam. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown. In some areas the surface soil is thinner. In other areas the depth to a seasonal high water table is less than 4 feet.

Water and air move through this soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 4 to 6 feet below the surface during the spring.

Available water capacity is very high. Organic matter content is high. The subsoil is medium acid to neutral. This soil tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is well suited to dwellings and moderately suited to septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

277B—Port Byron silt loam, 2 to 5 percent slopes.

This gently sloping, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from about 5 to 120 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsurface layer is very dark grayish brown and dark brown silt loam about 12 inches thick. The subsoil is silt loam about 35 inches thick. The upper part is dark yellowish brown, the next part is yellowish brown, and the lower part is brown and mottled. The underlying material to a depth of 60 inches is brown, mottled silt loam. In some areas the surface soil is thinner. In other areas a seasonal high water table is within a depth of 4 feet. In places the surface layer is lighter colored and contains less clay.

Water and air move through this soil at a moderate rate. Surface runoff is medium. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The subsoil is neutral. This soil tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is well suited to dwellings and moderately suited to septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

277C2—Port Byron silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is along

drainageways on uplands. Individual areas are irregular in shape or long and range from about 5 to 30 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is silt loam about 39 inches thick. The upper part is brown, the next part is dark yellowish brown, and the lower part is brown and mottled. The underlying material to a depth of 60 inches is mottled brown and strong brown silt loam. In some areas the surface layer is lighter colored. In other areas the slope is less than 5 percent.

Included with this soil in mapping are small areas of Tell soils and the poorly drained Sawmill soils. Tell soils contain loose sand within a depth of 40 inches and have a moderate available water capacity. They are in positions on the landscape similar to those of the Port Byron soil. Sawmill soils contain more clay than the Port Byron soil. They are on the bottom of drainageways. Included soils make up less than 10 percent of the unit.

Water and air move through the Port Byron soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The subsoil is medium acid or slightly acid. This soil tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

279A—Rozetta silt loam, 0 to 3 percent slopes.

This nearly level, moderately well drained soil is on broad upland ridgetops. Individual areas are irregular in shape or long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 46 inches thick. The upper part is dark yellowish brown silt loam; the next part is yellowish brown silty clay loam; and the lower part is mottled pale brown, yellowish brown, and light brownish gray silty clay loam. The underlying material to a depth of 60 inches is mottled pale brown, yellowish brown, and light brownish gray silt loam. In some areas the surface layer is darker. In other areas the depth to a seasonal high water table is more than 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarksdale and Keomah soils in similar positions on the landscape. These soils contain more clay in the subsoil than the Rozetta soil. They make up less than 10 percent of the unit.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid to neutral. This soil tends to puddle and crust after rains.

Most areas are used for cultivated crops. Some remain in native timber. This soil is well suited to cultivated crops, hay, pasture, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. If this soil is used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

In the areas used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is I.

280B—Fayette silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridgetops. Individual areas are irregular in shape or long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown. The upper part is silty clay loam, and the lower part is silt loam. In some areas the surface layer is darker. In other areas the soil is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained Keomah and Clarksdale soils. These nearly level soils contain more clay than the Fayette soil. They make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. Some remain in native timber. This soil is well suited to cultivated crops, hay, pasture, and woodland. It is

moderately suited to dwellings and well suited to septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

In the areas used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is along drainageways and on upland ridgetops. Individual areas are irregular in shape or long and narrow and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown silty clay loam, and the lower part is yellowish brown silt loam. In some areas the surface layer is darker. In other areas the subsoil is thinner and the underlying material is calcareous.

Included with this soil in mapping are small areas of the moderately well drained Elco soils on the lower side slopes. These soils have a perched seasonal high water table at a depth of 1.5 to 3.5 feet. They make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. Some remain in native timber. This soil is moderately suited to cultivated crops, hay, and pasture and well suited to woodland. It is moderately suited to dwellings and well suited to septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

In the areas used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIIe.

280D2—Fayette silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and narrow and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is about 42 inches thick. The upper part is dark yellowish brown silty clay loam, the next part is dark yellowish brown and yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled silt loam. In some areas, the subsoil is thinner and the underlying material is calcareous. In places the soil contains more sand.

Included with this soil in mapping are small areas of the Elco and Marseilles soils on the lower side slopes. The moderately well drained Elco soils have a perched seasonal high water table at a depth of 1.5 to 3.5 feet. Marseilles soils are underlain by shale at a depth of 20 to 40 inches. Included soils make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for hay or pasture. Some remain in native timber. This soil is moderately suited to cultivated crops, hay, and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that are dominated by small grain and hay, by a system of conservation tillage that leaves crop residue on the surface after planting, and by a combination of contour farming, terraces, and stripcropping.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Applying chemicals, plowing contoured furrows, which removes the competing vegetation before the trees are planted, or clearing by other mechanical means helps to control initial plant competition. Cutting helps to control

subsequent competition. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IIIe.

280D3—Fayette silty clay loam, 10 to 18 percent slopes, severely eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil is about 40 inches thick. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is brown, mottled silt loam. In some areas, the subsoil is thinner and the underlying material is calcareous. In other areas the soil contains more sand.

Included with this soil in mapping are small areas of Elco, Marseilles, Radford, and Atlas soils. The moderately well drained Elco soils have a perched seasonal high water table at a depth of 1.5 to 3.5 feet. Marseilles soils are underlain by shale at a depth of 20 to 40 inches. The somewhat poorly drained Atlas soils contain more sand and clay than the Fayette soil. They are very slowly permeable. Atlas, Elco, and Marseilles soils are along the lower drainageways. The somewhat poorly drained Radford soils are on the bottom of narrow drainageways. Included soils make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is low. The subsoil is strongly acid or medium acid. The surface layer tends to crust after rains and forms clods if tilled when wet.

Most areas are used for cultivated crops. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture and well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

280E2—Fayette silt loam, 15 to 20 percent slopes, eroded. This moderately steep, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil is about 50 inches thick. The upper part is dark yellowish brown silty clay loam, the next part is yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is mottled yellowish brown and pale brown silt loam. In some areas, the subsoil is thinner and the underlying material is calcareous. In other areas the soil contains more sand.

Included with this soil in mapping are small areas of Marseilles and Radford soils. Marseilles soils are underlain by shale at a depth of 20 to 40 inches. They are lower on the landscape than the Fayette soil. Also, they are more sloping in some areas. The somewhat poorly drained Radford soils are on the bottom of narrow drainageways. Included soils make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil is strongly acid or medium acid.

Most areas are used for pasture or remain in native timber. This soil is unsuited to cultivated crops and poorly suited to hay because of the erosion hazard and the moderately steep slopes. It is moderately suited to pasture and well suited to woodland. It is poorly suited to dwellings and septic tank absorption fields because of the moderately steep slopes.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit

flat rocks or roots. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

386A—Downs silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on upland ridgetops. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsurface layer is dark grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown and yellowish brown silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is yellowish brown, mottled silt loam. In some areas the surface layer is lighter colored. In other areas the dark surface soil is thicker.

Included with this soil in mapping are areas of the somewhat poorly drained Clarksdale soils on the slightly lower parts of the landscape. These soils have a seasonal high water table at a depth of 1 to 3 feet. They make up less than 10 percent of the unit.

Water and air move through the Downs soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, pasture, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

If this soil is used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is I.

386B—Downs silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridgetops, along drainageways, or near the head of drainageways on uplands. Individual areas are irregular in shape or long and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsurface layer is dark grayish brown silt loam about 4 inches thick. The subsoil is about 46 inches thick. The upper part is dark

yellowish brown silty clay loam; the next part is yellowish brown silty clay loam; and the lower part is yellowish brown, mottled silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled silt loam. In some areas the surface layer is lighter colored. In other areas the dark surface soil is thicker.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarksdale soils on the slightly lower parts of the landscape. These soils contain more clay in the subsoil than the Downs soil. They make up less than 10 percent of the unit.

Water and air move through the Downs soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, pasture, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIe.

386C2—Downs silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridgetops, along drainageways, or at the head of drainageways on uplands. Individual areas are irregular in shape or long and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 45 inches thick. The upper part is dark yellowish brown silt loam; the next part is yellowish brown silty clay loam; and the lower part is yellowish brown, mottled silty clay loam and silt loam. The underlying material to a depth of 60 inches is light yellowish brown, mottled silt loam. In some places the surface layer is lighter colored. In other places the dark surface soil is thicker. In some areas the depth to carbonates is less than 40 inches. In other areas the lower part of the subsoil contains more sand and clay.

Water and air move through this soil at a moderate rate. Surface runoff is medium. Available water capacity

is very high. Organic matter content is moderately low. The subsoil is medium acid. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops. It is well suited to hay, pasture, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a conservation tillage system that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If this soil is used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIIe.

400—Calco silty clay loam. This nearly level, poorly drained, calcareous soil is on flood plains and low benches. It is occasionally flooded for brief periods from March to May. Individual areas are irregular in shape and range from 20 to 500 acres in size.

Typically, the surface layer is black silty clay loam about 8 inches thick. The subsurface layer is silty clay loam about 38 inches thick. The upper part is black, and the lower part is very dark gray and mottled. The underlying material to a depth of 60 inches is dark gray silt loam. In some places the surface soil is thinner. In other places the soil contains more sand. In some areas the upper part of the soil does not have carbonates.

Water and air move through this soil at a moderately slow rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The surface soil is moderately alkaline. The surface layer tends to puddle and crust after rains and forms clods if tilled when wet. The shrink-swell potential is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

The principal cultivated crops are corn, soybeans, and small grain. Flooding is only occasional because a levee system has been installed. The floodwater may delay planting or damage crops. The seasonal high water table delays planting and reduces yields. A subsurface drainage system helps to overcome this limitation. The

high content of lime in this soil decreases the availability of applied phosphorous and potassium fertilizers.

Applying fertilizers at a rate that is higher than normal helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and improves tilth.

If this soil is used for hay and pasture, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

415—Orion silt loam. This nearly level, somewhat poorly drained soil is on flood plains and stream bottoms. It is frequently flooded for brief periods from March to June (fig. 11). Individual areas are long and narrow or irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The underlying material to a depth of 36 inches is silt loam. The upper part is brown and mottled, and the lower part is stratified very dark grayish brown, very dark gray, and yellowish brown. The next 12 inches is a buried surface layer of black silty clay loam. Below this to a depth of 60 inches is a buried subsurface layer of very dark gray silty clay loam. In some areas the surface layer and the underlying material are darker.

Included with this soil in mapping are some areas of the poorly drained Sawmill soils in similar positions on the landscape. These soils have a dark surface layer that contains more clay than that of the Orion soil. They make up less than 10 percent of the unit.

Water and air move through the Orion soil at a moderate rate. Surface runoff is slow. A seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The soil is neutral or mildly alkaline throughout. It tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

The principal cultivated crops are corn and soybeans. The seasonal high water table delays planting and reduces yields. A subsurface drainage system helps to overcome this limitation. The early spring flooding frequently delays planting and may damage crops in some years. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

In the areas used for hay and pasture, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.



Figure 11.—Flooding on Orion silt loam.

439A—Jasper loam, sandy substratum, 0 to 2 percent slopes. This nearly level, well drained soil is on stream terraces and outwash plains. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown loam about 5 inches thick. The subsurface layer is very dark grayish brown fine sandy loam about 6 inches thick. The subsoil is about 35 inches thick. The upper part is dark brown loam, the next part is brown clay loam and loam, and the lower part is brown and strong brown sandy loam. The underlying material to a depth of 60 inches is strong brown sand. In some places the soil contains less clay. In other places the upper part of the soil contains less sand. In some areas the surface and subsurface layers are thinner. In other areas the soil is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils and the poorly drained Selma soils. These soils are in the slightly lower areas on outwash plains. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Jasper soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is moderate. Organic matter

content is moderately low. The subsoil is strongly acid to slightly acid.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It also is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

439B—Jasper loam, sandy substratum, 2 to 5 percent slopes. This gently sloping, well drained soil is on stream terraces and outwash plains. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown loam about 7 inches thick. The subsurface layer is dark brown loam about 4 inches thick. The subsoil is about 30 inches thick. The upper part is dark yellowish brown clay loam, the next part is yellowish brown sandy clay loam

and clay loam, and the lower part is brown clay loam. The underlying material to a depth of 60 inches is yellowish brown sand. In some places the soil contains less clay. In other places the upper part of the soil contains less sand. In some areas the surface and subsurface layers are thinner. In other areas the soil is moderately well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils and the poorly drained Selma soils. These soils are nearly level. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Jasper soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is medium acid or slightly acid.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It also is well suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

439D3—Jasper loam, sandy substratum, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on dissected uplands and stream terraces. Individual areas are irregular in shape or long and range from 2 to 30 acres in size.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is about 39 inches thick. The upper part is brown and yellowish brown clay loam, the next part is yellowish brown sandy loam, and the lower part is strong brown loam. The underlying material to a depth of 60 inches is strong brown loamy sand. In some places the soil contains less clay. In other places the surface layer and the upper part of the subsoil contain less sand. In places the slope is more than 15 percent.

Water and air move through the upper part of this soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is low. The subsoil is medium acid or slightly acid.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops because of the erosion hazard. It is moderately suited to hay and pasture. It also

is moderately suited to dwellings and septic tank absorption fields.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that are dominated by small grain and hay, by a system of conservation tillage that leaves crop residue on the surface after planting, and by a combination of contour farming, terraces, and strip cropping.

If this soil is used for hay and pasture, renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IVe.

447—Canisteo loam, sandy substratum. This nearly level, poorly drained, calcareous soil is on outwash plains. Individual areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is very dark gray loam about 9 inches thick. The subsurface layer is about 9 inches of very dark gray loam and clay loam. The subsoil is mottled clay loam about 22 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches is light brownish gray, mottled loamy sand and sand. The soil is calcareous throughout. In some places it contains less sand. In other places the surface layer and subsurface layer are not calcareous. In some areas the sandy underlying material is within 40 inches of the surface.

Included with this soil in mapping are some areas of the somewhat poorly drained La Hogue soils and the very poorly drained Palms soils. La Hogue soils are not calcareous. They are on the slightly higher parts of the landscape. Palms soils have a very high content of organic matter. They are on the lower parts of the landscape. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Canisteo soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is slow. A seasonal high water table is within a depth of 1 foot during the spring. Available water capacity is moderate. Organic matter content is high. The soil is mildly alkaline or moderately alkaline throughout.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. The high content of lime in this soil decreases the availability of applied phosphorous and potassium fertilizers. Applying

the fertilizers at a rate that is higher than normal helps to overcome this limitation. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIw.

457—Booker silty clay. This nearly level or depressional, very poorly drained soil is on broad lake plains and terraces. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 50 to 500 acres in size.

Typically, the surface layer is very dark gray, very firm silty clay about 8 inches thick. The subsurface layer is about 10 inches of very dark gray, very firm silty clay and clay. The subsoil is olive gray, mottled, very firm clay about 26 inches thick. The underlying material to a depth of 60 inches is mottled olive gray, reddish brown, and yellowish brown, firm silty clay. In some places the lower part of the subsoil is calcareous and reddish brown. In other places the soil contains less clay. In some areas the surface layer is calcareous. In other areas the surface layer and the subsurface layer are thinner.

Included with this soil in mapping are some areas of the moderately permeable Harpster soils in similar positions on the landscape. These soils make up less than 5 percent of the unit.

Water and air move through the Booker soil at a very slow rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the spring. Available water capacity is moderate. Organic matter content is high. The subsoil is neutral. The surface layer is very firm and becomes compact and cloddy if plowed when wet. It tends to puddle and crust after rains. The shrink-swell potential is very high.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding, the seasonal high water table, and the very high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the very slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, establishing open drainage

ditches, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIIw.

465—Montgomery silty clay. This nearly level, very poorly drained soil is on broad lake plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 10 to 300 acres in size.

Typically, the surface layer is black, firm silty clay about 8 inches thick. The subsurface layer is black and very dark gray, firm silty clay about 9 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is dark gray and grayish brown silty clay loam; the next part is light olive gray, calcareous silty clay loam; and the lower part is olive gray and light olive gray, calcareous clay and silty clay. The underlying material to a depth of 60 inches is light olive gray, mottled, calcareous silty clay. In places the lower part of the subsoil is not calcareous. In some places the surface layer and the subsurface layer are silt loam. In other places they are calcareous. In some areas the soil contains less clay. In other areas the surface layer and the subsurface layer are thicker.

Water and air move through this soil at a slow rate. Surface runoff is ponded. A seasonal high water table is 1 foot above the surface to 1 foot below during the spring. Available water capacity is moderate. Organic matter content is high. The subsoil is neutral or mildly alkaline. The surface layer is firm and becomes compact and cloddy if tilled when wet. It tends to puddle and crust after rains. The shrink-swell potential is high.

Most areas are used for cultivated crops or hay (fig. 12). This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding, the seasonal high water table, and the high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, seeding adapted forage species, establishing open drainage ditches, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIIw.

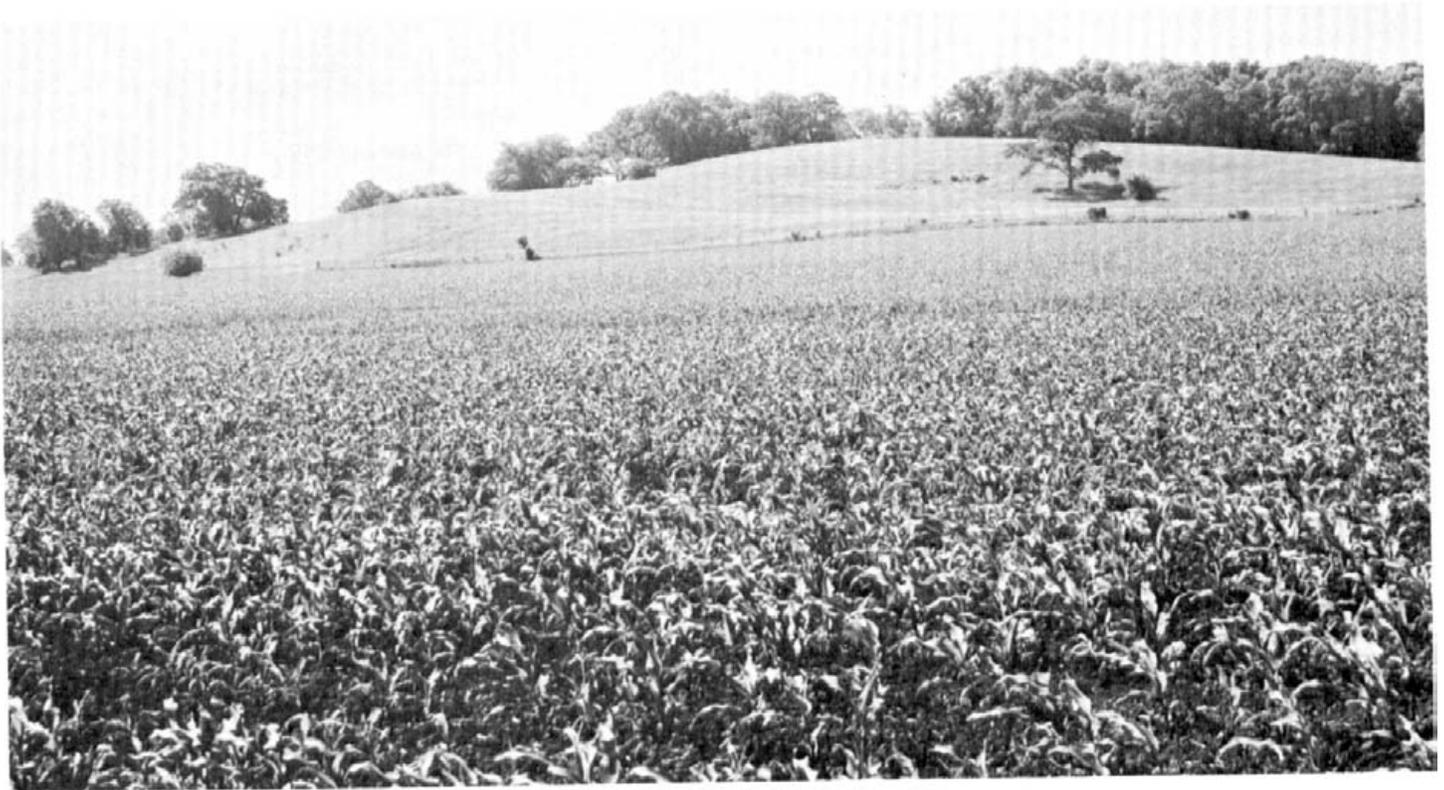


Figure 12.—Corn in an area of Montgomery silty clay. Oakville soils are in the background.

546B—Keltner silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on terraces. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is black silt loam about 7 inches thick. The subsurface layer is silt loam about 10 inches thick. The upper part is black, and the lower part is very dark brown and dark yellowish brown. The subsoil is about 36 inches thick. The upper part is dark yellowish brown and yellowish brown silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is mottled light olive brown and brownish yellow silty clay. Mottled olive, grayish brown, light olive brown, and brownish yellow clayey shale is at a depth of about 53 inches. In places the lower part of the subsoil contains less clay and more sand. In some areas the soil is moderately well drained.

Included with this soil in mapping are the somewhat poorly drained Loran soils in similar positions on the landscape. These soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Keltner soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium. Available water capacity is high. Organic matter

content is moderate. The subsoil is medium acid to moderately alkaline. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the slow permeability in the lower part of the subsoil.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is 1Ie.

546C2—Keltner silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on terraces along drainageways. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 11 inches thick. The subsoil is about 32 inches thick. The upper part is yellowish brown silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is grayish brown, mottled clay. Dark grayish brown, mottled clayey shale is at a depth of about 43 inches. In some places the lower part of the subsoil contains less clay and more sand. In other places the surface layer is thinner. In some areas the soil is moderately well drained. In other areas silty clay is within a depth of 30 inches.

Included with this soil in mapping are areas of the somewhat poorly drained Loran soils in similar positions on the landscape. Also included are the poorly drained Sawmill soils on the bottom of drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Keltner soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to mildly alkaline. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the slow permeability in the lower part of the subsoil.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

549D2—Marseilles silt loam, 12 to 18 percent slopes, eroded. This moderately steep, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 10 to 40 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is mottled, very firm silty clay loam about 13 inches thick. The upper part is pale brown and yellowish brown, and the lower part is light yellowish brown and yellowish brown. Mottled, very firm silty shale is at a depth of about 20 inches. In some places the soil contains more clay. In other places the shale is calcareous. In some areas the soil is very strongly acid.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas, Orion, and Radford soils and small areas of Hickory and Sylvan soils. Atlas,

Hickory, and Sylvan soils are on the upper side slopes. They do not have weathered shale within 40 inches of the surface. Orion and Radford soils are on the bottom of narrow drainageways and are subject to flooding. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the subsoil at a slow rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is slightly acid. The depth to weathered shale is 20 to 40 inches. The shrink-swell potential is moderate.

Most areas are used either for pasture or native timber. This soil is unsuited to cultivated crops because of the erosion hazard. It is moderately suited to hay, pasture, and woodland. It is poorly suited to dwellings because of the moderate shrink-swell potential and the moderately steep slopes. It is poorly suited to septic tank absorption fields because of the depth to weathered shale, the slow permeability, and the moderately steep slopes.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

549F2—Marseilles silt loam, 18 to 35 percent slopes, eroded. This steep, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 10 to 40 acres in size.

Typically, the surface layer is mixed dark brown and yellowish brown silt loam about 5 inches thick. The subsoil is about 32 inches thick. It is dark yellowish brown silt loam in the upper part; light olive brown,

mottled silty clay loam in the next part; and olive, mottled silty clay loam in the lower part. Olive silty shale is at a depth of about 37 inches. In some places the soil contains more clay. In other places the shale is calcareous. In some areas the soil is very strongly acid.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas, Orion, and Radford soils and small areas of Hickory and Sylvan soils. Atlas, Hickory, and Sylvan soils are on the upper side slopes. They do not have weathered shale within 40 inches of the surface. Orion and Radford soils are on the bottom of drainageways and are subject to flooding. Included soils make up less than 15 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is medium acid or strongly acid. The depth to weathered shale is 20 to 40 inches. The shrink-swell potential is moderate.

Most areas are used either for pasture or native timber. This soil is unsuited to cultivated crops and poorly suited to hay because of the erosion hazard and the steep slopes. It is moderately suited to pasture and woodland. It is poorly suited to dwellings because of the moderate shrink-swell potential and the steep slopes. It is poorly suited to septic tank absorption fields because of the depth to weathered shale, the slow permeability, and the steep slopes.

In the areas used for pasture, seeding on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Plant competition can be controlled by applying chemicals.

The land capability classification is VIIe.

562A—Port Byron silt loam, sandy substratum, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray silt loam about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown silt loam about 5 inches thick. The subsoil is silt loam about 43 inches thick. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is brown and pale brown sand. In some areas the subsoil is thinner. In a few areas the lower part of the subsoil contains more clay. In other areas the surface soil and subsoil contain more sand.

Included with this soil in mapping are some areas of the somewhat poorly drained Joy soils that have a sandy substratum. These soils are on the slightly lower parts of the landscape. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Port Byron soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is very high. Organic matter content is high. The subsoil is neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture and to dwellings. It also is well suited to septic tank absorption fields, but the effluent can contaminate ground water because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

562B—Port Byron silt loam, sandy substratum, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is very dark grayish brown silt loam about 5 inches thick. The subsoil is silt loam about 37 inches thick. The upper part is dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is brown sand. In some places the subsoil is thinner. In other places the surface soil and subsoil contain more sand.

Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Joy soils that have a sandy substratum. These soils are on the lower parts of the landscape. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Port Byron soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The subsoil is slightly acid or neutral. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is well suited to cultivated crops, hay, and pasture and to dwellings. It also is well suited to septic tank absorption fields, but the effluent can contaminate ground water because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

564A—Waukegan silt loam, 0 to 2 percent slopes.

This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is black silt loam about 9 inches thick. The subsurface layer is black and very dark grayish brown silt loam about 10 inches thick. The subsoil is about 23 inches thick. The upper part is brown silt loam, and the lower part is dark yellowish brown loamy sand. The underlying material to a depth of 60 inches is dark yellowish brown sand. In some areas the lower part of the subsoil contains less sand. In other areas the surface layer and the upper part of the subsoil contain more sand. In places the surface layer is lighter colored.

Included with this soil in mapping are some areas of the somewhat poorly drained Joy soils that have a sandy substratum. These soils are in the lower areas. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Waukegan soil at a moderate rate and through the lower part of the subsoil and the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is moderate. Organic matter content is high. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. The moderate available water capacity is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting conserves moisture. In areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing conserve moisture and increase forage production.

The land capability classification is IIs.

564B—Waukegan silt loam, 2 to 5 percent slopes.

This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is very dark gray and very dark brown silt loam about 12 inches thick. The subsoil is about 22 inches thick. The upper part is brown silt loam, and the lower part is dark yellowish brown sandy loam and sand. The underlying material to a depth of 60 inches is dark yellowish brown sand. In places the lower part of the subsoil contains less sand. In some areas the surface layer and the upper part of the subsoil contain more sand. In other areas the surface layer is lighter colored.

Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Joy soils that have a sandy substratum. These soils are in the lower areas. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Waukegan soil at a moderate rate and through the lower part of the subsoil and the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is medium acid or slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard, and the moderate available water capacity is a limitation. Crop rotations that include 1 or more years of forage crops, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion and conserve moisture.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help

to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

565A—Tell silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 24 inches thick. The upper part is dark yellowish brown silt loam, the next part is brown silt loam, and the lower part is brown sandy loam. The underlying material to a depth of 60 inches is yellowish brown sand. In places the upper part of the soil contains more sand. In some areas the surface layer is darker. In other areas the lower part of the subsoil contains more silt.

Included with this soil in mapping are small areas of the somewhat poorly drained Joy soils that have a sandy substratum and small areas of Oakville soils. Joy soils are lower on the landscape than the Tell soil. Oakville soils contain more sand in the upper part than the Tell soil and have a low available water capacity. They are in the more sloping areas. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Tell soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is slow. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is strongly acid to slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. The moderate available water capacity is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting conserves moisture. In the areas used for hay and pasture, deferred grazing, proper stocking rates, applications of fertilizer, and rotation grazing conserve moisture and increase forage production.

The land capability classification is IIe.

565B—Tell silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed dark brown and dark grayish brown silt loam about 7 inches thick. The subsoil is about 24 inches thick. The upper part is brown silt loam, the next part is yellowish brown silt loam, and the lower part is strong brown sandy loam. The underlying material to a depth of 60 inches is yellowish

brown sand. In places the upper part of the soil contains more sand. In some areas the surface layer is darker. In other areas the lower part of the subsoil contains more silt.

Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Joy soils that have a sandy substratum and small areas of Oakville soils. Oakville soils are in positions on the landscape similar to those of the Tell soil or are in the more sloping areas. They contain more sand in the upper part than the Tell soil and have a low available water capacity. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Tell soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is medium acid or slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard, and the moderate available water capacity is a limitation. Crop rotations that include a forage crop, contour farming, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion and conserve moisture.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIe.

565C2—Tell silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape or long and narrow and range from about 2 to 40 acres in size.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil is about 29 inches thick. It is brown. The upper part is silt loam, and the lower part is sandy loam. The underlying material to a depth of 60 inches is brown sand. In some areas the upper part of the soil contains more sand. In other areas the lower part of the soil contains more silt. In places the surface layer is darker.

Included with this soil in mapping are small areas of Oakville and Thorp soils. Oakville soils contain more sand in the upper part than the Tell soil and have a low available water capacity. They are in positions on the landscape similar to those of the Tell soil or are in the more sloping areas. The poorly drained Thorp soils

contain more clay in the upper part than the Tell soil. They are in nearly level or depressional areas. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Tell soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is slightly acid or medium acid. This soil tends to crust after rains.

Most areas are used for cultivated crops. Some remain in native timber. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the rapid permeability in the underlying material.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard, and the moderate available water capacity is a limitation. Crop rotations that include a forage crop and a combination of contour farming and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion and conserve moisture.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the main management problem is competing vegetation. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting.

The land capability classification is IIIe.

567D2—Elkhart silt loam, 8 to 15 percent slopes, eroded. This strongly sloping, well drained soil is along drainageways on dissected uplands. Individual areas are irregular in shape or long and range from 10 to 150 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is about 20 inches thick. The upper part is dark yellowish brown silty clay loam; the next part is yellowish brown silty clay loam; and the lower part is pale brown, mottled silt loam. The underlying material to a depth of 60 inches is mottled, calcareous silt loam. The upper part is light yellowish brown, and the lower part is light brownish gray. In some areas the surface layer is lighter colored. In other areas the lower part of the subsoil contains more sand and clay. In some places the soil contains more sand. In other places the subsoil is thicker.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are on the bottom of narrow drainageways. They make up less than 5 percent of the unit.

Water and air move through the Elkhart soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderate. The subsoil is neutral. The surface layer tends to crust after rains.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and well suited to hay and pasture. It is only moderately suited to dwellings and septic tank absorption fields because of the shrink-swell potential and the slope.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces.

If this soil is used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

The land capability classification is IIIe.

572A—Loran silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on low lying uplands. Individual areas are irregular in shape and range from about 5 to 60 acres in size.

Typically, the surface layer is very dark gray silt loam about 6 inches thick. The subsurface layer is about 8 inches of very dark gray and very dark grayish brown silt loam and silty clay loam. The subsoil is about 39 inches thick. It is mottled. The upper part is dark grayish brown and brown silty clay loam; the next part is grayish brown silty clay loam; and the lower part is light brownish gray and yellowish brown, firm silty clay. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown, firm silty clay. In some areas the subsoil contains more sand. In other areas it is grayer.

Included with this soil in mapping are small areas of the well drained Plano and Proctor soils. These soils contain more sand in the lower part than the Loran soil. Also, they generally are more sloping and are higher on the landscape. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Loran soil at a moderately slow rate and through the lower part of the subsoil and the underlying material at a slow rate. Surface runoff is slow. A perched seasonal high water table is 1 to 3 feet below the surface during the winter and spring. Available water capacity is high. Organic matter content also is high. The subsoil is slightly acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the

seasonal high water table and to septic tank absorption fields because of the seasonal high water table and the moderately slow and slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. In the areas used for hay and pasture, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

572B—Loran silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on low lying uplands. Individual areas are irregular in shape or long and range from about 5 to 80 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsurface layer is very dark grayish brown silt loam about 5 inches thick. The subsoil is about 39 inches thick. The upper part is brown and dark brown, friable silty clay loam; the next part is light brownish gray, mottled, firm silty clay loam; and the lower part is mottled grayish brown, light olive brown, yellowish brown, and light olive gray, very firm clay. The underlying material to a depth of 60 inches is mottled light brownish gray, light olive gray, and yellowish brown, very firm, calcareous clay. In some areas the subsoil contains more sand and less clay. In other areas the underlying material is not calcareous. In places the soil is moderately well drained.

Included with this soil in mapping are small areas of the well drained Plano and Proctor soils. These soils contain more sand in the lower part than the Loran soil. Also, they are higher on the landscape and in some areas are more sloping. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Loran soil at a moderately slow rate and through the lower part of the subsoil and the underlying material at a slow rate. Surface runoff is medium. A perched seasonal high water table is 1 to 3 feet below the surface during the winter and spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to mildly alkaline. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and to septic tank absorption fields because of the seasonal high water table and the moderately slow and slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop,

contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces. The seasonal high water table delays planting and reduces yields. A subsurface drainage system helps to overcome this limitation.

In the areas used for hay and pasture, seeding and renovating on the contour, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction. A subsurface drainage system helps to overcome the wetness.

The land capability classification is IIe.

572C2—Loran silt loam, 5 to 10 percent slopes, eroded. This sloping, somewhat poorly drained soil is on low lying uplands along drainageways. Individual areas are irregular in shape or long and range from about 5 to 80 acres in size.

Typically, the surface layer is very dark gray silt loam about 9 inches thick. The subsoil is about 37 inches thick. It is mottled. The upper part is dark brown, friable silty clay loam; the next part is brown and grayish brown, friable silty clay loam; and the lower part is grayish brown and yellowish brown, very firm clay. The underlying material to a depth of 60 inches is gray, mottled, very firm, calcareous clay. In some areas the subsoil contains more sand. In other areas the soil is moderately well drained.

Included with this soil in mapping are small areas of the well drained Plano and Proctor soils in similar positions on the landscape. These soils contain more sand in the lower part than the Loran soil. They make up less than 15 percent of the unit.

Water and air move through the upper part of the Loran soil at a moderately slow rate and through the lower part of the subsoil and the underlying material at a slow rate. Surface runoff is medium. A perched seasonal high water table is 1 to 3 feet below the surface during the winter and spring. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral or mildly alkaline. The surface layer tends to crust after rains.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the seasonal high water table and to septic tank absorption fields because of the seasonal high water table and the moderately slow and slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion is a hazard. It can be controlled, however, by crop rotations that include a forage crop and by a combination of contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and terraces. The seasonal high water table delays planting and reduces yields. A

subsurface drainage system helps to overcome this limitation.

In the areas used for hay and pasture, seeding and renovating on the contour, delaying grazing when the soil is too wet, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction. A subsurface drainage system helps to overcome the wetness.

The land capability classification is IIIe.

575—Joy silt loam, sandy substratum. This nearly level, somewhat poorly drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black silt loam about 7 inches thick. The subsurface layer is black and very dark gray silt loam about 13 inches thick. The subsoil is silt loam about 21 inches thick. The upper part is dark grayish brown, the next part is brown, and the lower part is pale brown and mottled. The underlying material to a depth of 60 inches is brown sand. In some areas the surface soil is more than 24 inches thick. In other areas the depth to sand is less than 40 inches. In a few areas the depth to a seasonal high water table is less than 2 feet.

Included with this soil in mapping are small areas of the well drained Port Byron soils that have a sandy substratum and small areas of the well drained Waukegan soils. Both of these soils are in the slightly higher areas. Also included are the poorly drained, calcareous Harpster soils in the slightly lower, slightly depressional areas. Included soils make up less than 10 percent of the unit.

Water and air move through the upper part of the Joy soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is slow. A seasonal high water table is 2 to 4 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is medium acid. The surface layer tends to puddle and crust after rains.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table.

The principal cultivated crops are corn, soybeans, and small grain. The seasonal high water table may delay planting and reduce yields. A subsurface drainage system helps to overcome this limitation. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. If this soil is used for hay and pasture, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is I.

670—Aholt silty clay. This nearly level or depressional, very poorly drained, calcareous soil is on broad lake plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is black, very firm silty clay about 8 inches thick. The subsurface layer is black and very dark gray, mottled, very firm clay about 15 inches thick. The subsoil is mottled, very firm clay about 28 inches thick. The upper part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is olive gray, mottled, very firm silty clay. The soil is calcareous throughout. In places it contains less clay. In some areas the surface layer and the subsurface layer do not have carbonates. In other areas they are thicker.

Water and air move through this soil at a very slow rate. Surface runoff is ponded. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the winter and spring. Available water capacity is moderate. Organic matter content is high. The soil is moderately alkaline throughout. The surface layer is very firm and becomes compact and cloddy if tilled when wet. It tends to puddle and crust after rains. The shrink-swell potential is very high.

Most areas are used for cultivated crops or hay. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings because of the ponding, the seasonal high water table, and the very high shrink-swell potential. It is poorly suited to septic tank absorption fields because of the ponding, the seasonal high water table, and the very slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at minimum and returning crop residue to the soil help to maintain tilth and fertility.

In the areas used for hay and pasture, open drainage ditches, deferred grazing when the soil is too wet, proper stocking rates, applications of fertilizer, and rotation grazing increase forage production and help to prevent surface compaction.

The land capability classification is IIIw.

741B—Oakville loamy fine sand, 1 to 7 percent slopes. This gently sloping, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown loamy fine sand about 6 inches thick. The subsoil is fine sand about 30 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is yellowish brown fine sand. In places the surface layer is

darker and thicker. In some areas the underlying material is calcareous. In other areas the soil contains more clay.

Included with this soil in mapping are small areas of the poorly drained Orio soils and small areas of Tell soils. Orio soils are in depressions. Tell soils have a silt loam surface layer and subsoil. They are in positions on the landscape similar to those of the Oakville soil. Included soils make up less than 15 percent of the unit.

Water and air move through the Oakville soil at a very rapid rate. Surface runoff is very slow. Available water capacity is low. Organic matter content also is low. The subsoil is neutral.

Most areas are used for cultivated crops or remain in native timber. This soil is poorly suited to cultivated crops because of droughtiness. It is moderately suited to hay, pasture, and woodland. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the very rapid permeability.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity is a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Leaving crop residue on the surface conserves moisture and helps to maintain tilth and fertility.

If this soil is used for pasture or hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

In the areas used for woodland, seedling mortality is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is IVs.

741D—Oakville loamy fine sand, 7 to 15 percent slopes. This strongly sloping, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark brown loamy fine sand about 3 inches thick. The subsoil is fine sand about 20 inches thick. The upper part is brown and dark brown, and the lower part is yellowish brown and dark yellowish brown. The underlying material to a depth of 60 inches is light yellowish brown fine sand. In some areas the surface layer is thicker. In some places the underlying material is calcareous. In other places the soil contains more clay.

Included with this soil in mapping are some areas of the poorly drained Orio soils and some areas of Tell soils. Orio soils are in depressions. Tell soils have a silt loam surface layer and subsoil. They are in positions on the landscape similar to those of the Oakville soil. Included soils make up less than 15 percent of the unit.

Water and air move through the Oakville soil at a very rapid rate. Surface runoff is very slow. Available water capacity is low. Organic matter content also is low. The subsoil is medium acid.

Most areas are used for pasture or remain in native timber. This soil is unsuited to cultivated crops because of droughtiness and the slope. It is moderately suited to hay, pasture, and woodland. It is moderately suited to dwellings, but it is poorly suited to septic tank absorption fields because of the very rapid permeability.

In the areas used for pasture and hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the plants reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

In the areas used for woodland, seedling mortality is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is VI_s.

741E—Oakville loamy fine sand, 15 to 30 percent slopes. This steep, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown loamy fine sand about 3 inches thick. The subsurface layer is dark grayish brown fine sand about 4 inches thick. The subsoil is fine sand about 21 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is brown fine sand. In some areas the surface layer is thicker. In some places the underlying material is calcareous. In other places the soil contains more clay.

Included with this soil in mapping are small areas of the poorly drained Orio soils and small areas of Tell soils. Orio soils are in depressions. Tell soils have a silt loam surface layer and subsoil. They are in positions on the landscape similar to those of the Oakville soil. Included soils make up less than 15 percent of the unit.

Water and air move through the Oakville soil at a very rapid rate. Surface runoff is very slow. Available water capacity is low. Organic matter content also is low. The subsoil is slightly acid or neutral.

Most areas are used either for pasture or native timber. This soil is unsuited to cultivated crops and poorly suited to hay because of droughtiness and the steep slopes. It is moderately suited to pasture and woodland. It is poorly suited to dwellings because of the steep slopes. It is poorly suited to septic tank absorption fields because of the very rapid permeability and the steep slopes.

In the areas used for pasture, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the plants reach a minimum grazing height,

and applications of fertilizer help to keep the pasture and the soil in good condition.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Seedling mortality can be controlled by planting drought-tolerant species and by mulching. Mulching also conserves moisture. Plant competition can be controlled by applying chemicals.

The land capability classification is VII_s.

764A—Coyne fine sandy loam, 0 to 2 percent slopes. This nearly level, well drained soil is on stream terraces. Individual areas are irregular in shape and range from about 5 to 200 acres in size.

Typically, the surface layer is dark brown fine sandy loam about 10 inches thick. The subsurface layer is very dark gray, very dark grayish brown, and dark brown sandy loam about 13 inches thick. The subsoil extends to a depth of 60 inches. The upper part is brown and dark yellowish brown sandy loam and fine sandy loam, the next part is dark yellowish brown silt loam, and the lower part is reddish brown silty clay. In some areas the lower part of the subsoil contains less sand. In other areas the surface layer, the subsurface layer, and the upper part of the subsoil contain more sand. In places the stratified material is not red. In a few areas a perched seasonal high water table is above the layer of silt loam in the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Denrock soils on the lower parts of the landscape. These soils contain more clay in the upper part of the subsoil than the Coyne soil. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Coyne soil at a moderately rapid rate and through the lower part of the subsoil at a moderately slow rate. Surface runoff is slow. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid.

Most areas are used for cultivated crops or hay. Some are used for residential development. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Soil blowing is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting and field windbreaks conserve moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles.

In the areas used for hay and pasture, selection of drought-tolerant forage species for seeding, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is II_s.

764B—Coyne loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on stream terraces. Individual areas are irregular in shape and range from about 5 to 200 acres in size.

Typically, the surface layer is very dark brown loam about 7 inches thick. The subsurface layer is very dark brown, dark brown, very dark grayish brown, and brown very fine sandy loam about 19 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown very fine sandy loam and loam; the next part is yellowish brown and strong brown silt loam; and the lower part is reddish brown, mottled silty clay. In some areas the silty stratified material in the lower part of the subsoil does not occur. In other areas the surface layer, the subsurface layer, and the upper part of the subsoil contain more sand. In places the stratified material is not red. In a few areas a perched seasonal high water table is above the layer of silty clay in the subsoil.

Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Denrock soils. These soils contain more clay in the upper part of the subsoil than the Coyne soil. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Coyne soil at a moderately rapid rate and through the lower part of the subsoil at a moderately slow rate. Surface runoff is slow. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid or neutral.

Most areas are used for cultivated crops or hay. Some are used for residential development. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings, but it is poorly suited to septic tank absorption fields because of the moderately slow permeability.

The principal cultivated crops are corn, soybeans, and small grain. Erosion and soil blowing are hazards. Crop rotations that include a forage crop, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and field windbreaks help to control erosion. They also conserve moisture and help to prevent the damage caused by windblown soil particles.

In the areas used for hay and pasture, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, and an adequate ground cover reduce the hazard of soil blowing, conserve moisture, and increase forage production.

The land capability classification is IIe.

777—Adrian muck. This nearly level, very poorly drained soil is on outwash plains. It is subject to ponding during periods of heavy rainfall. Individual areas are irregular in shape or long and range from about 50 to 600 acres in size.

Typically, the surface soil is black muck about 24 inches thick. The underlying material to a depth of 60 inches is sand. The upper part is light brownish gray, and the lower part is brown and yellowish brown and is mottled. In some areas the muck is underlain by loamy mineral deposits. In other areas it is thicker.

Included with this soil in mapping are small areas of Gilford soils and small areas of the poorly drained Selma and somewhat poorly drained Watseka soils. All of the included soils are slightly higher on the landscape than the Adrian soil. They are mineral soils. They make up less than 10 percent of the unit.

Water and air move through the organic layer of the Adrian soil at a moderately slow to moderately rapid rate and through the underlying sand at a rapid rate. Surface runoff is ponded. A seasonal high water table is 1 foot above the surface to 1 foot below during the winter and spring. Available water capacity is high. Organic matter content is very high. Reaction is slightly acid or neutral in the organic layer and neutral or mildly alkaline in the underlying material. This soil is subject to subsidence.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops and to hay, pasture, and woodland. It generally is unsuited to dwellings and septic tank absorption fields because of the ponding and the subsidence.

The principal cultivated crops are corn and soybeans. The seasonal high water table delays planting and reduces yields. A drainage system has been installed in many areas. Measures that maintain the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Tile drains do not function so well, however, because the soil is subject to subsidence. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

The land capability classification is IVw.

800C—Psammets, sloping. These somewhat poorly drained to excessively drained, coarse textured soils are in areas that have been mixed by filling and leveling. Slopes range from 4 to 11 percent.

The mixed soil material in this map unit is mostly sand and loamy sand. It commonly is more than 5 feet thick.

Included with these soils in mapping are some borrow areas near highways. Also included are some sand pits, where sand is extracted for construction, and a few small undisturbed areas of Oakville, Tell, and Sparta soils. Included areas make up 10 to 25 percent of the unit.

Water and air generally move through these soils at a rapid rate, but the rate varies because the soils have been compacted by construction equipment. Surface runoff is medium or rapid. Available water capacity varies but generally is low. The content of organic matter and plant nutrients generally is low. The hazard of erosion is severe in areas not protected by a plant cover.

The plant cover ranges from none in newly exposed areas to a good cover of sod in some developed areas. Sparse to dense stands of weeds are on the older exposures. Most areas are idle or are highway interchanges, urban developments, construction sites, or sites for other nonfarm uses.

In the idle areas species that are suited to a variety of soil conditions should be planted. If trees and shrubs are planted, special precautions generally are needed because these coarse textured soils have been altered and compacted. Mulching and maintaining an adequate ground cover help to overcome droughtiness. Eastern white pine, red pine, and jack pine are suitable for planting.

These soils generally are well suited to roadfill and dwellings. They generally are poorly suited to septic tank absorption fields because of the rapid permeability. Backfilling with suitable material helps to overcome this limitation. If the limitation cannot be overcome, the septic tank system should be connected to municipal utilities. Erosion and sedimentation are the major concerns on construction sites, especially in areas where a bare surface has been exposed for a considerable time. Maintaining an adequate plant cover and mulching help to control erosion, and debris basins help to control sedimentation.

No land capability classification is assigned.

802B—Orthents, loamy, gently sloping. These well drained, moderately fine textured to moderately coarse textured soils are on terraces and uplands that have been cut, leveled, or filled during the construction of highways and urban structures. Slopes range from 1 to 7 percent.

The mixed soil material in this unit consists mostly of a silty and loamy surface layer and sandy loam, clay loam, loam, or silty clay loam underlying material. The soil material commonly is more than 5 feet thick.

Included with these soils in mapping are some borrow pits near highways, a few undisturbed areas of Hickory, Elco, and Radford soils, and some sand and gravel pits, where sand and gravel are extracted for construction. Also included are areas that have been or are sanitary landfills. Included areas make up less than 10 percent of the unit.

Water and air movement through these soils varies because of compaction by construction equipment and because of the diverse soil material. Surface runoff is medium. Available water capacity varies but generally is moderately low. The content of organic matter and plant nutrients generally is low. The hazard of erosion is severe in areas not protected by a plant cover.

The plant cover ranges from none in newly exposed areas to a good cover of sod in developed areas. Sparse to dense stands of weeds are on the older exposures. Most areas are pastured or used for urban development. Some remain idle.

Limitations vary in the areas used for pasture or as sites for buildings because of the diverse soil material and soil conditions. In the areas used for pasture, seeding and renovating on the contour, adding green manure, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help prevent surface compaction.

No land capability classification is assigned.

871B—Lenzburg silt loam, 1 to 7 percent slopes.

This gently sloping, well drained soil is in graded surface mine areas. Individual areas are irregular in shape and range from 50 to 500 acres in size.

Typically, the surface layer is mixed very dark grayish brown and yellowish brown silt loam about 3 inches thick. The upper part of the underlying material is mixed yellowish brown and grayish brown clay loam. The lower part to a depth of 60 inches is mixed dark brown and very dark grayish brown clay loam. In some areas the content of coarse fragments is more than 35 percent. In a few areas the soil is not calcareous.

Included with this soil in mapping are small areas of somewhat poorly drained and poorly drained soils. Also included are some steep areas. Included areas make up less than 10 percent of the unit.

Water and air move through the Lenzburg soil at a moderately slow rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is low. The soil is strongly alkaline throughout. Effervescence is strong to violent.

Most areas are used for pasture. Some are used for recreation and woodland. This soil is moderately suited to cultivated crops, hay, pasture, woodland, dwellings, and septic tank absorption fields.

In the areas used for hay and pasture, a system of conservation tillage that leaves crop residue on the surface after planting, timely deferment of grazing,

proper stocking rates, applications of fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, seedling mortality, competing vegetation, and erosion are the main management problems. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is IIe.

871G—Lenzburg clay loam, 30 to 60 percent slopes. This very steep, well drained soil is in ungraded surface mine areas. Individual areas are irregular in shape and range from 100 to 1,500 acres in size.

Typically, the surface layer is black clay loam about 7 inches thick. The upper part of the underlying material is mixed black and dark brown shaly clay loam. The next part is mixed very dark grayish brown and dark brown shaly loam. The lower part to a depth of 60 inches is brown shaly sandy loam. In some areas the content of coarse fragments is more than 35 percent. In a few areas the soil is not calcareous.

Included with this soil in mapping are small areas of less sloping soils on ridgetops. Also included, in depressions between ridges, are long, very narrow areas of very poorly drained soils that are seasonally flooded. Included areas make up less than 10 percent of the unit.

Water and air move through the Lenzburg soil at moderately slow rate. Surface runoff is medium or rapid. Available water capacity is moderate. Organic matter content is low. The soil is moderately alkaline throughout. Effervescence is weak to violent.

Most areas are wooded and have naturally revegetated (fig. 13). Some are used for recreation and wetland wildlife habitat. This soil is moderately suited to woodland. It is poorly suited to camp and picnic areas, paths, and trails because of the very steep slopes.

In the areas used for woodland, erosion and competing vegetation are the main management problems. Also, the use of equipment is limited by the slope. Planting trees on the contour and establishing or maintaining an adequate ground cover help to control erosion. Applying chemicals or cutting before the trees are planted helps to control initial plant competition. Cutting helps to control subsequent competition.

The land capability classification is VIIe.

910G—Timula-Miami complex, 30 to 60 percent slopes. These very steep, well drained soils are along drainageways on dissected uplands. The Timula soil is higher on the landscape than the Miami soil. Individual



Figure 13.—A wooded area of Lenzburg clay loam, 30 to 60 percent slopes.

areas are long and range from 10 to 60 acres in size. They are about 55 percent Timula soil and 30 percent Miami soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Timula soil is very dark grayish brown silt loam about 3 inches thick. The subsurface layer is yellowish brown silt loam about 4 inches thick. The subsoil is silt loam about 20 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is light yellowish brown, mottled, calcareous silt loam. In some areas the soil is calcareous.

Typically, the surface layer of the Miami soil is very dark grayish brown loam about 3 inches thick. The subsurface layer is brown and light yellowish brown loam about 12 inches thick. The subsoil is about 18 inches thick. The upper part is strong brown, brown, and yellowish brown clay loam, and the lower part is yellowish brown loam. The underlying material to a depth of 60 inches is yellowish brown and dark yellowish brown, calcareous sandy loam. In places, the soil contains less sand and the subsoil is thicker. In some areas the subsoil is thicker. In other areas it is thinner.

Included with these soils in mapping are small areas of Marseilles soils on the lower side slopes and small areas of the somewhat poorly drained Orion soils on the bottom of narrow drainageways. Marseilles soils have shale bedrock at a depth of 20 to 40 inches. Included soils make up less than 15 percent of the unit.

Water and air move through the Timula soil at a moderate rate. They move through the upper part of the Miami soil at a moderate rate and through the underlying material at a moderately slow rate. Surface runoff is rapid on both soils. Available water capacity is very high in the Timula soil and high in the Miami soil. Organic matter content is moderately low in both soils. The subsoil is slightly acid or neutral.

Most areas remain in native timber. These soils are unsuited to cultivated crops and poorly suited to hay and pasture because of the erosion hazard and the very steep slopes. They are moderately suited to woodland. They are poorly suited to dwellings because of the very steep slopes and to septic tank absorption fields because of the moderately slow permeability of the Miami soil and the very steep slopes of both soils.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing.

Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and side trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Plant competition can be controlled by applying chemicals.

The land capability classification is VIIe.

913D—Marseilles-Hickory silt loams, 10 to 18 percent slopes. These strongly sloping, well drained soils are along drainageways on dissected uplands. The Hickory soil is higher on the landscape than the Marseilles soil. Individual areas are long and range from 10 to 80 acres in size. They are about 40 percent Marseilles soil and 40 percent Hickory soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Marseilles soil is dark brown silt loam about 5 inches thick. The subsurface layer is brown and dark yellowish brown silt loam about 4 inches thick. The subsoil is light olive brown silty clay loam about 25 inches thick. It is mottled in the lower part. Silty shale is at a depth of about 34 inches. In some areas the soil contains more clay. In some places it is calcareous. In other places it is very strongly acid.

Typically, the surface layer of the Hickory soil is mixed dark brown and dark grayish brown silt loam about 5 inches thick. The subsurface layer is dark grayish brown and dark brown silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown silt loam, the next part is yellowish brown silty clay loam, and the lower part is yellowish brown clay loam and loam. In some areas the soil contains less sand. In other areas the subsoil is thinner. In places the soil is somewhat poorly drained.

Included with these soils in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Also included are the somewhat poorly drained, very slowly permeable Atlas soils on the upper side slopes. Included soils make up about 20 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the

subsoil at a slow rate. They move through the Hickory soil at a moderate rate. Surface runoff is rapid on both soils. Available water capacity is moderate in the Marseilles soil and high in the Hickory soil. Organic matter content is moderately low in both soils. The subsoil is strongly acid to slightly acid. The depth to weathered shale is 20 to 40 inches in the Marseilles soil.

Most areas are used for hay or pasture. Some remain in native timber. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to hay, pasture, and woodland. They are only moderately suited to dwellings because of the shrink-swell potential, the slope, and the depth to bedrock in the Marseilles soil. The Hickory soil is moderately suited to septic tank absorption fields, but the Marseilles soil is poorly suited because of the depth to bedrock and the slow permeability.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by proper site preparation and by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIe.

913D3—Marseilles-Hickory complex, 10 to 18 percent slopes, severely eroded. These strongly sloping, well drained soils are along drainageways on dissected uplands. The Hickory soil is higher on the landscape than the Marseilles soil. Individual areas are long and range from 10 to 120 acres in size. They are about 40 percent Marseilles soil and 40 percent Hickory soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Marseilles soil is yellowish brown, firm silty clay loam about 4 inches thick. The subsoil is firm silty clay loam about 20 inches thick. The upper part is light olive brown, and the lower part is gray and light olive brown. Silty shale is at a depth of about 24 inches. In some places the subsoil contains more clay. In other places the shale is calcareous. In some areas the soil is very strongly acid.

Typically, the surface layer of the Hickory soil is mixed yellowish brown and dark yellowish brown clay loam about 6 inches thick. The subsoil is about 50 inches of yellowish brown clay loam and loam. The underlying material to a depth of 60 inches is light yellowish brown loam. In places the subsoil is thinner. In some areas the

soil contains less sand. In other areas it is somewhat poorly drained.

Included with these soils in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Also included are the somewhat poorly drained Atlas soils on the upper side slopes. Included soils make up about 20 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the subsoil at a slow rate. They move through the Hickory soil at a moderate rate. Surface runoff is rapid on both soils. Available water capacity is moderate in the Marseilles soil and high in the Hickory soil. Organic matter content is low in both soils. The subsoil is strongly acid to neutral. The depth to weathered shale is 20 to 40 inches in the Marseilles soil. The surface layer of both soils becomes compact and cloddy if tilled when wet. Also, it tends to crust after rains.

Most areas are used for cultivated crops or hay. These soils are unsuited to cultivated crops because of the erosion hazard (fig. 14). They are moderately suited to pasture and woodland and poorly suited to hay. They are only moderately suited to dwellings because of the shrink-swell potential, the slope, and the depth to bedrock in the Marseilles soil. The Hickory soil is moderately suited to septic tank absorption fields, but the Marseilles soil is poorly suited because of the depth to bedrock and the slow permeability.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If these soils are used for woodland, competing vegetation is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or plowing contoured furrows, which removes the competing vegetation before the trees are planted. Subsequent competition can be controlled by cutting. Planting the trees on the contour and establishing or maintaining an adequate ground cover help to control erosion.

The land capability classification is VIIe.

913F2—Marseilles-Hickory complex, 18 to 35 percent slopes, eroded. These steep, well drained soils are along drainageways on dissected uplands. The Hickory soil is higher on the landscape than the Marseilles soil. Individual areas are long and range from 10 to 160 acres in size. They are about 40 percent Marseilles soil and 40 percent Hickory soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Marseilles soil is dark grayish brown silty clay loam about 8 inches thick. The subsoil is silty clay loam about 19 inches thick. The



Figure 14.—Severe gully erosion of the Marseilles soil in an area of Marseilles-Hickory complex, 10 to 18 percent slopes, severely eroded.

upper part is dark grayish brown, and the lower part is grayish brown and mottled. Silty shale is at a depth of about 27 inches. In some areas the soil contains more clay. In some places the shale contains more clay. In other places it is calcareous. In places the soil is very strongly acid.

Typically, the surface layer of the Hickory soil is dark grayish brown loam about 9 inches thick. The subsoil to

a depth of 60 inches is yellowish brown and brown clay loam. It is mottled in the lower part. In some areas the subsoil is thinner. In other areas, the soil contains less sand and the subsoil is thinner. In places the soil is somewhat poorly drained.

Included with these soils in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Also included are the somewhat poorly drained, very slowly permeable Atlas soils on the upper side slopes. Included soils make up about 20 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the subsoil at a slow rate. They move through the Hickory soil at a moderate rate. Surface runoff is rapid on both soils. Available water capacity is moderate in the Marseilles soil and high in the Hickory soil. Organic matter content is low in the Marseilles soil and moderately low in the Hickory soil. The subsoil of both soils is strongly acid to neutral. The depth to weathered shale is 20 to 40 inches in the Marseilles soil.

Most areas either are used for pasture or remain in native timber. These soils are unsuited to cultivated crops and poorly suited to hay because of the erosion hazard and the steep slopes. They are moderately suited to pasture and woodland. They are poorly suited to dwellings because of the steep slopes. They are poorly suited to septic tank absorption fields because of the depth to bedrock and slow permeability in the Marseilles soil and the steep slopes of both soils.

In the areas used for pasture, seeding on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Plant competition can be controlled by applying chemicals.

The land capability classification is VIIe.

917B—Oakville-Tell complex, 1 to 7 percent slopes.

These gently sloping, well drained soils are on outwash plains. The Oakville soil is higher on the landscape than the Tell soil. Individual areas are irregular in shape and range from 10 to 200 acres in size. They are about 60 percent Oakville soil and 30 percent Tell soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Oakville soil is very dark grayish brown loamy fine sand about 5 inches thick. The subsoil is about 25 inches thick. The upper part is dark brown loamy fine sand, and the lower part is dark yellowish brown sand. The underlying material to a depth of 60 inches is yellowish brown sand. In places the surface layer is darker and thicker. In some areas the underlying material is calcareous.

Typically, the surface layer of the Tell soil is mixed dark brown and dark grayish brown silt loam about 7 inches thick. The subsoil is about 24 inches thick. The upper part is brown silt loam, the next part is yellowish brown silt loam, and the lower part is strong brown sandy loam. The underlying material to a depth of 60 inches is yellowish brown sand. In places the upper part of the subsoil contains more sand. In some areas the surface layer is darker and thicker.

Included with these soils in mapping are small areas of the poorly drained Orio soils in depressions. These included soils make up less than 10 percent of the unit.

Water and air move through the Oakville soil at a rapid rate. They move through the upper part of the Tell soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is very slow on the Oakville soil and medium on the Tell soil. Available water capacity is low in the Oakville soil and moderate in the Tell soil. Organic matter content is low in the Oakville soil and moderately low in the Tell soil. The subsoil of the Oakville soil is neutral, and that of the Tell soil is medium acid or slightly acid.

Most areas are used for cultivated crops or hay. These soils are poorly suited to cultivated crops because of droughtiness. They are moderately suited to hay, pasture, and woodland. They are well suited to dwellings, but they are poorly suited to septic tank absorption fields because of the rapid permeability.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the low or moderate available water capacity is a limitation. Leaving crop residue on the surface conserves moisture and helps to maintain tilth and fertility. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles.

In the areas used for hay and pasture, the hazard of soil blowing and the low or moderate available water capacity reduce yields. Selection of drought-resistant forage species for seeding, timely deferment of grazing, proper applications of fertilizer, rotation grazing, an adequate ground cover, and field windbreaks reduce the

hazard of soil blowing, conserve moisture, and increase forage production.

If these soils are used for woodland, seedling mortality on the Oakville soil is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is IVs.

917D—Oakville-Tell complex, 7 to 15 percent slopes. These strongly sloping, well drained soils are on outwash plains. The Oakville soil is higher on the landscape than the Tell soil. Individual areas are irregular in shape and range from 10 to 250 acres in size. They are about 60 percent Oakville soil and 30 percent Tell soil. The two soils occur as areas so closely intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Oakville soil is very dark brown loamy fine sand about 3 inches thick. The subsoil is fine sand about 20 inches thick. The upper part is brown and dark brown, the next part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is light yellowish brown fine sand. In some areas the surface layer is thicker and darker. In places the underlying material is calcareous.

Typically, the surface layer of the Tell soil is dark brown silt loam about 5 inches thick. The subsoil is about 33 inches thick. It is yellowish brown. The upper part is silt loam, and the lower part is sandy loam. The underlying material to a depth of 60 inches is yellowish brown sand. In some areas the upper part of the subsoil contains more sand. In other areas the surface layer is darker and thicker.

Included with these soils in mapping are small areas of the poorly drained Orio soils in depressions. These included soils make up less than 10 percent of the unit.

Water and air move through the Oakville soil at a rapid rate. They move through the silty material of the Tell soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is very slow on the Oakville soil and rapid on the Tell soil. Available water capacity is low in the Oakville soil and moderate in the Tell soil. Organic matter content is low in the Oakville soil and moderately low in the Tell soil. The subsoil of the Oakville soil is medium acid, and that of the Tell soil is medium acid or slightly acid.

Most areas are used for cultivated crops. Some remain in native timber. These soils are unsuited to cultivated crops because of droughtiness and the slope. They are moderately suited to hay, pasture, and woodland. They are moderately suited to dwellings, but they are poorly suited to septic tank absorption fields because of the rapid permeability.

If these soils are used for hay and pasture, the hazard of soil blowing and the low or moderate available water capacity reduce yields. Selection of drought-tolerant forage species for planting, timely deferment of grazing, proper stocking rates, applications of fertilizer, rotation grazing, an adequate ground cover, and field windbreaks reduce the hazard of soil blowing, conserve moisture, and increase forage production.

In the areas used for woodland, seedling mortality on the Oakville soil is the main management problem. It can be controlled by planting drought-tolerant species. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing.

The land capability classification is VI.

918D3—Marseilles-Atlas silty clay loams, 12 to 18 percent slopes, severely eroded. These moderately steep soils are along drainageways on uplands. The well drained Marseilles soil is higher on the landscape than the somewhat poorly drained Atlas soil. Individual areas are long or irregular in shape and range from 10 to 100 acres in size. They are about 50 percent Marseilles soil and 30 percent Atlas soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Marseilles soil is mixed brown and yellowish brown, firm silty clay loam about 4 inches thick. The subsoil is mottled, firm silty clay loam about 35 inches thick. The upper part is yellowish brown, and the lower part is light yellowish brown. Silty shale is at a depth of about 39 inches. In places the soil contains more clay. In some areas the shale is calcareous. In other areas the soil is very strongly acid.

Typically, the surface layer of the Atlas soil is yellowish brown, firm silty clay loam about 3 inches thick. The subsoil to a depth of 60 inches is very firm, mottled silty clay. The upper part is yellowish brown; the next part is light brownish gray, olive gray, and light olive gray; and the lower part is gray and yellowish brown. In places the soil contains less clay.

Included with these soils in mapping are small areas of the well drained, moderately permeable Hickory and Sylvan soils and small areas of the somewhat poorly drained Orion and Radford soils. Hickory soils are higher on the landscape than the Marseilles soil and lower than the Atlas soil. Hickory and Sylvan soils do not have bedrock within a depth of 60 inches. Orion and Radford soils are on the bottom of narrow drainageways. Sylvan soils are on the upper side slopes. Included soils make up less than 20 percent of the unit.

Water and air move through the upper part of the Marseilles soil at a moderate rate and through the subsoil at a slow rate. They move through Atlas soil at a very slow rate. Surface runoff is rapid on both soils. The Atlas soil has a perched seasonal high water table within

a depth of 2 feet during the spring. Available water capacity is low in the Marseilles soil and moderate in the Atlas soil. Organic matter content is low in both soils. The subsoil is strongly acid to neutral. The depth to weathered shale is 20 to 40 inches in the Marseilles soil. The shrink-swell potential is moderate in the Marseilles soil and high in the Atlas soil. The surface layer of both soils is firm and becomes compact and cloddy if tilled when wet. Also, it tends to puddle and crust after rains.

Most areas are used for cultivated crops or hay. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to pasture and woodland and poorly suited to hay. They are poorly suited to dwellings because of the seasonal high water table in the Atlas soil and the shrink-swell potential and moderately steep slopes of both soils. They are poorly suited to septic tank absorption fields because of the seasonal high water table and very slow permeability in the Atlas soil and the depth to bedrock and slow permeability in the Marseilles soil.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If these soils are used for woodland, seedling mortality, the windthrow hazard, and plant competition are the main management problems. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced help to prevent windthrow. Plant competition can be controlled by applying chemicals. Woodland should be protected from fire and grazing.

The land capability classification is VIIe.

943D3—Seaton-Timula silt loams, 10 to 20 percent slopes, severely eroded. These strongly sloping, well drained soils are on ridges and side slopes in the uplands. The Seaton soil is lower on the landscape than the Timula soil. Individual areas are long and narrow or irregular in shape and range from 5 to 40 acres in size. They are about 50 percent Seaton soil and 40 percent Timula soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Seaton soil is brown silt loam about 6 inches thick. The subsoil is yellowish brown silt loam about 39 inches thick. The underlying material to a depth of 60 inches is brown silt loam. In some areas the soil contains more clay.

Typically, the surface layer of the Timula soil is brown silt loam about 8 inches thick. The subsoil is about 14 inches thick. It is yellowish brown. It is silt loam in the upper part and silt in the lower part. The underlying material to a depth of 60 inches is light yellowish brown,

calcareous silt. In some areas the surface layer and the subsoil are calcareous.

Included with these soils in mapping are some areas of the somewhat poorly drained Joy soils and some areas of Oakville soils. Joy soils are in depressions. Oakville soils are in positions on the landscape similar to those of the Seaton and Timula soils. They contain more sand than the Seaton and Timula soils. Included soils make up less than 10 percent of the unit.

Water and air move through the Seaton and Timula soils at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil of the Seaton soil is strongly acid or medium acid, and that of the Timula soil is neutral.

Most areas are used for cultivated crops or hay. Some are used for residential development. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to hay, pasture, woodland, dwellings, and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If these soils are used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

943G—Seaton-Timula silt loams, 20 to 60 percent slopes. These very steep, well drained soils are along drainageways on dissected uplands. The Seaton soil is higher on the landscape than the Timula soil. Individual areas are long and range from 20 to 300 acres in size. They are about 50 percent Seaton soil and 40 percent Timula soil. The two soils occur as areas so closely

intermingled or so small that mapping them separately is not practical.

Typically, the surface layer of the Seaton soil is very dark grayish brown silt loam about 4 inches thick. The subsurface layer is dark grayish brown silt loam about 5 inches thick. The subsoil to a depth of 60 inches is silt loam. The upper part is dark yellowish brown, and the lower part is yellowish brown. In some areas, the soil contains more sand and the subsoil is thinner.

Typically, the surface layer of the Timula soil is very dark grayish brown silt loam about 4 inches thick. The subsurface layer is dark grayish brown and brown silt loam about 4 inches thick. The subsoil is yellowish brown silt loam about 20 inches thick. The underlying material to a depth of 60 inches is light olive brown, mottled, calcareous silt loam. In some areas the surface soil and the subsoil are calcareous.

Included with these soils in mapping are some areas of Marseilles and Oakville soils and the somewhat poorly drained Orion soils. Marseilles soils have shale 20 to 40 inches below the surface. They are on the lower side slopes. Oakville soils are in positions on the landscape similar to those of the Seaton and Timula soils. They contain more sand than the Seaton and Timula soils. Orion soils are on the bottom of narrow drainageways. Included soils make up less than 10 percent of the unit.

Water and air move through the Seaton and Timula soils at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The subsoil of the Seaton soil is strongly acid, and that of the Timula soil is slightly acid or neutral.

Most areas remain in native timber. Some are used for residential development. These soils are unsuited to cultivated crops and poorly suited to hay and pasture because of the erosion hazard and the very steep slopes. They are moderately suited to woodland. They are poorly suited to dwellings and septic tank absorption fields because of the very steep slopes.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could

overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Plant competition can be controlled by applying chemicals.

The land capability classification is VIIe.

946D2—Hickory-Atlas silt loams, 12 to 20 percent slopes, eroded. These moderately steep soils are along drainageways on dissected uplands. The somewhat poorly drained Atlas soil is higher on the landscape than the well drained Hickory soil. Individual areas are long or irregular in shape and range from 10 to 50 acres in size. They are about 50 percent Hickory soil and 35 percent Atlas soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Hickory soil is dark brown and brown silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is firm. The upper part is dark yellowish brown clay loam and sandy clay loam, and the lower part is yellowish brown clay loam. In some areas the soil contains less sand.

Typically, the surface layer of the Atlas soil is very dark grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown, yellowish brown, and dark grayish brown, friable and firm silty clay loam; the next part is dark grayish brown, grayish brown, gray, light olive gray, and olive gray, firm silty clay; and the lower part is mottled olive gray, dark gray, yellowish brown, and gray, firm clay loam. In some areas the soil contains less clay.

Included with these soils in mapping are small areas of the well drained Marseilles soils. These included soils have shale 20 to 40 inches below the surface. They are along the lower drainageways. Also included are small areas of the somewhat poorly drained Radford and Orion soils on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate and through the Atlas soil at a very slow rate. Surface runoff is rapid on both soils. The Atlas soil has a perched seasonal high water table within a depth of 2 feet during the spring. Available water capacity is high in the Hickory soil and moderate in the Atlas soil. Organic matter content is moderately low in both soils. The subsoil is strongly acid to neutral. The shrink-swell potential is high in the Atlas soil.

Most areas are used for hay or pasture. Some remain in native timber. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to hay, pasture, and woodland. They are poorly suited to dwellings because of the seasonal high water table and high shrink-swell potential in the Atlas soil and the slope of both soils. They are poorly suited to septic tank absorption fields because of the

seasonal high water table and very slow permeability in the Atlas soil and the slope of both soils.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced help to prevent windthrow. Plant competition can be controlled by applying chemicals.

The land capability classification is VIe.

946D3—Hickory-Atlas complex, 12 to 20 percent slopes, severely eroded. These moderately steep soils are along drainageways on dissected uplands. The somewhat poorly drained Atlas soil is higher on the landscape than the well drained Hickory soil. Individual areas are long and irregular in shape and range from 10 to 80 acres in size. They are about 50 percent Hickory soil and 35 percent Atlas soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Hickory soil is brown clay loam about 7 inches thick. The subsoil is firm clay loam about 35 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is yellowish brown, firm clay loam. In some areas the soil contains less sand.

Typically, the surface layer of the Atlas soil is brown silty clay loam about 6 inches thick. The subsoil is about 49 inches thick. It is firm. The upper part is yellowish brown silty clay loam; the next part is light olive gray and light brownish gray, mottled silty clay; and the lower part is yellowish brown, mottled clay loam. The underlying

material to a depth of 60 inches is yellowish brown, firm sandy clay loam. In places the soil contains less clay.

Included with these soils in mapping are small areas of the well drained Marseilles soils. These included soils have shale 20 to 40 inches below the surface. They are along the lower drainageways. Also included are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Included soils make up less than 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate and through the Atlas soil at a very slow rate. Surface runoff is rapid on both soils. The Atlas soil has a perched seasonal high water table within a depth of 2 feet during the spring. Available water capacity is high in the Hickory soil and moderate in the Atlas soil. Organic matter content is low in both soils. The subsoil is strongly acid to neutral. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to crust after rains. The shrink-swell potential is high in the Atlas soil.

Most areas are used for cultivated crops or hay. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to pasture and woodland and poorly suited to hay. They are poorly suited to dwellings because of the seasonal high water table and high shrink-swell potential in the Atlas soil and the slope of both soils. They are poorly suited to septic tank absorption fields because of the seasonal high water table and very slow permeability in the Atlas soil and the slope of both soils.

In the areas used for pasture, seeding and renovating on the contour, deferred grazing, stocking at a proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Harvesting methods

that do not isolate the remaining trees or leave them widely spaced help to prevent windthrow. Plant competition can be controlled by applying chemicals.

The land capability classification is VIIe.

957D3—Elco-Atlas silty clay loams, 10 to 18 percent slopes, severely eroded. These strongly sloping soils are in narrow bands along drainageways and near the head of drainageways on dissected uplands. The moderately well drained Elco soil is higher on the landscape than the somewhat poorly drained Atlas soil. Individual areas are long or irregular in shape and range from 3 to 30 acres in size. They are about 45 percent Elco soil and 40 percent Atlas soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Elco soil is dark grayish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is dark yellowish brown and light olive brown, mottled silty clay. In places the lower part of the subsoil is clay loam, silty clay loam, or silt loam. In some areas, the soil is less eroded and the surface layer is darker and is silt loam.

Typically, the surface layer of the Atlas soil is brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is brown, friable silty clay loam; the next part is dark gray and gray, firm silty clay; and the lower part is gray, yellowish brown, and grayish brown, firm clay loam. In places the subsoil is gray clay loam. In some areas, the soil is less eroded and the surface layer is darker and is silt loam.

Included with these soils in mapping are some areas of the well drained Hickory soils. These included soils contain more sand than the Elco and Atlas soils. They are on the lower side slopes. They make up about 15 percent of the unit.

Water and air move through the upper part of the Elco soil at a moderate rate and through the lower part of the subsoil at a moderately slow rate. They move through the Atlas soil at a very slow rate. Surface runoff is rapid on both soils. During the spring a seasonal high water table is 1.5 to 3.5 feet below the surface of the Elco soil and is within a depth of 2 feet in the Atlas soil. Available water capacity is high in the Elco soil and moderate in the Atlas soil. Organic matter content is low in both soils. The subsoil is strongly acid to neutral. The surface layer becomes compact and cloddy if tilled when wet. Also, it tends to crust after rains. The shrink-swell potential is moderate in the Elco soil and high in the Atlas soil.

Most areas are used for cultivated crops. Some are used for hay and pasture. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to pasture and woodland and poorly

suited to hay. They are poorly suited to dwellings because of the perched seasonal high water table and the shrink-swell potential. They are poorly suited to septic tank absorption fields because of the perched seasonal high water table and the moderately slow or very slow permeability.

In the areas used for pasture, seeding on the contour, deferred grazing, stocking at the proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If these soils are used for woodland, seedling mortality, the windthrow hazard, and plant competition are the main management problems. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced help to prevent windthrow. Plant competition can be controlled by applying chemicals. Woodland should be protected from fire and grazing.

The land capability classification is VIe.

962D3—Sylvan-Bold complex, 10 to 18 percent slopes, severely eroded. These strongly sloping, well drained soils are on side slopes and at the head of drainageways on dissected uplands. The Sylvan soil is higher on the landscape than the Bold soil. Individual areas are irregular in shape or long and narrow and range from 10 to 100 acres in size. They are about 60 percent Sylvan soil and 30 percent Bold soil. The two soils occur as areas so small or so closely intermingled that mapping them separately is not practical.

Typically, the surface layer of the Sylvan soil is mixed dark brown and dark yellowish brown silty clay loam about 8 inches thick. The subsoil is about 23 inches thick. The upper part is yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, calcareous silt loam. In some areas the subsoil is thicker. In other areas it contains more sand.

Typically, the surface layer of the Bold soil is mixed dark brown, dark grayish brown, and yellowish brown, calcareous silt loam about 8 inches thick. The underlying material to a depth of 60 inches is calcareous silt loam. The upper part is yellowish brown, and the lower part is light brownish gray and yellowish brown. In some areas the depth to carbonates is more than 10 inches.

Included with these soils in mapping are small areas of the somewhat poorly drained Orion and Radford soils on the bottom of narrow drainageways. Also included are the somewhat poorly drained Atlas and moderately well drained Elco soils on the lower side slopes. Atlas and Elco soils contain more clay and sand in the lower part than the Sylvan and Bold soils. Included soils make up less than 10 percent of the unit.

Water and air move through the Sylvan and Bold soils at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is very low. The subsoil of the Sylvan soil is neutral, and the Bold soil is moderately alkaline throughout. The surface layer of the Sylvan soil becomes compact and cloddy if tilled when wet. The surface layer of both soils tends to crust after rains.

Most areas are used for cultivated crops or hay. These soils are unsuited to cultivated crops because of the erosion hazard. They are moderately suited to hay and pasture and well suited to woodland. They are moderately suited to dwellings and septic tank absorption fields.

In the areas used for hay and pasture, seeding and renovating on the contour, deferred grazing, stocking at the proper rate, applying fertilizer, and rotation grazing help to control erosion, increase forage production, and help to prevent surface compaction.

If these soils are used for woodland, plant competition is the main management problem. Initial plant competition can be controlled by applying chemicals, by cutting, or by plowing contoured furrows, which removes the competing vegetation before the trees are planted.

Subsequent competition can be controlled by cutting. Woodland should be protected from fire and grazing.

The land capability classification is Vle.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the supply of high quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cropland, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber or is available for those uses. The soil qualities, growing season, and moisture supply are those needed for a well managed soil economically to produce a sustained high yield of crops. Prime farmland produces



Figure 15.—Encroachment of urban development onto prime farmland in an area of Seaton silt loam, 2 to 5 percent slopes.

the highest yields with minimum inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at local offices of the Soil Conservation Service.

About 331,400 acres in Henry County, or nearly 65 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial

and urban uses (fig. 15). The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in Henry County that meet the requirements for prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some map units meet the requirements for prime farmland only in areas where the soil is drained or protected from flooding. In table 5, the need for measures that overcome these limitations is indicated in parentheses after the name of these map units. Onsite evaluation is needed to determine whether or not a specific area of the soil is adequately drained or protected. In Henry County most of the naturally wet soils have been adequately drained.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.



Figure 16.—Severe erosion in an area of the strongly sloping Fayette soils that was planted to row crops.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the

local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1978, about 411,765 acres in Henry County was cropland, 42,797 acres was pasture, 14,160 acres was woodland, and 27,930 acres was used for roads and other built-up areas (10).

The soils in Henry County have good potential for continued crop production, particularly if the latest crop production technology is applied to the cropland. This soil survey can greatly facilitate the application of such technology. It also provides valuable information for land use planning. Land use planners can use this information in making decisions which will lead to the orderly growth and development of urban and rural areas.

The chief management needs in the county are measures that maintain or improve natural fertility, remove excess water, help to control erosion and soil blowing, maintain good tilth, and increase the rate of water infiltration. A cropping system that keeps a plant cover and crop residue on the surface for extended periods helps to control erosion and maintains the productive capacity of the soils. Including grasses and legumes in the crop rotation helps to prevent surface crusting, improves tilth, and provides nitrogen for the following crop.

Soil erosion is the major management concern on about 55 percent of the cropland and pasture in Henry County (fig. 16). It is adequately controlled on about 37 percent of the land. Erosion is a hazard on some soils that have a slope of more than 2 percent. It is more severe on the longer slopes.

Loss of the surface layer, or sheet erosion, is damaging for three reasons. First, the organic matter content and natural fertility level are lowered as the surface layer is lost and part of the subsoil is incorporated into the plow layer. As a result, soil productivity is reduced. Second, severe erosion on sloping soils results in deterioration of tilth in the surface soil and reduces the rate of water intake. Heavier textured surface soils tend to be cloddy if worked when wet. Preparing a good seedbed is difficult on these soils. Also, these soils tend to crust after hard rains. As a result, the runoff rate is increased. Third, soil erosion on farmland results in sediments entering streams, rivers, ponds, and road ditches. Erosion control helps to prevent the pollution by sediments and improves the quality of water available for municipal use, for recreation, and for fish and wildlife.

Contour farming, contour stripcropping, terraces, and diversions help to control erosion and reduce the rate of runoff. They are most effective on soils that have uniform and regular slopes, such as Tama and Downs soils. In areas where the slopes are short and irregular, such as areas of Sylvan soils, a crop rotation that provides an adequate plant cover is needed to control erosion.

A conservation tillage system, such as chisel plowing, zero tillage, and ridge planting, helps to prevent excessive soil loss, reduces the runoff rate, and increases the rate of water infiltration. Chisel plowing is suitable on most of the tillable soils in the county. Zero tillage is more successful on well drained soils, such as Tama and Elkhart soils, than on poorly drained soils, such as Sable soils, because the wet conditions delay planting and hinder seed germination. Ridge planting is suitable on most nearly level, tillable soils.

Grassed waterways help to carry excess rainwater safely downslope to the nearest creek, stream, or other watercourse. When established in natural drainageways, they remove the water at a nonerosive velocity (fig. 17). They generally are installed in conjunction with other conservation practices, such as terraces, diversions, conservation tillage systems, and contour farming. These conservation practices help to manage rainfall effectively, improve the available water capacity, and help to prevent excessive soil loss on cropland and in other areas. Grassed waterways are most effective on slopes of 2 percent or more.

Crop rotations that include oats, wheat, or other small grain and hay are needed to control erosion in the sloping to steep areas, such as many areas of Hickory and Sylvan soils. They not only help to prevent excessive soil losses, but also increase the content of organic matter and soil nitrogen and improve the available water capacity and tilth. The number of crop-damaging weeds and insects in the soil may be reduced by crop rotations because of the annually changing soil environment.

Soil blowing is a hazard on the sandy Dickinson and Sparta soils. Field windbreaks, a conservation tillage system that leaves crop residue on the surface after planting, and an adequate plant cover help to prevent excessive soil loss and the damage caused by windblown soil particles. In the areas used for row crops, conservation tillage systems are becoming more common in Henry County. They are effective in controlling erosion on sloping soils and can be used on most of the soils in the county.

Further information about the erosion-control measures suitable for each kind of soil is provided in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil drainage benefits crop production on the somewhat poorly drained and poorly drained soils in Henry County. If the poorly drained soils are used for the crops commonly grown in the county, some kind of drainage system is needed. In Henry County drainage systems have been installed on these soils. Additional drainage systems can improve crop production in some areas of these soils. Examples of poorly drained soils are Denny, Drummer, Pella, Sable, and Selma soils. The wetness of the somewhat poorly drained soils can delay planting and thus reduce yields in some years. Drainage



Figure 17.—Grassed waterway and grade stabilization structure in an area of Hickory soils.

systems have been installed in most areas of these soils. Examples of somewhat poorly drained soils are Brenton, Clarksdale, Elburn, and Ipava soils.

Troublesome seepy spots are common in areas of the moderately well drained Assumption and Elco soils on side slopes, especially in wet years. Also, small areas of wetter soils along drainageways are included with Assumption and Elco soils in mapping. An artificial drainage system is needed in these areas.

The design of surface and subsurface drainage systems varies with the kind of soil. Tile drains alone are inadequate on many soils. A combination of open drainage ditches and tile is needed in some areas of poorly drained soils, such as Drummer, Harpster, and Selma soils. Tile drains are not effective in slowly permeable or very slowly permeable soils, such as Aholt, Booker, Montgomery, and Niota soils. Open drainage ditches are used to drain these soils (fig. 18). Moderately permeable and moderately slowly permeable soils, such as Ipava and Joy soils, can be adequately drained by tile if suitable outlets are available.

Further information about the drainage system suitable for each kind of soil is provided in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil droughtiness limits the productivity of some of the soils used for crops and pasture in the county. The physical composition of some soils limits the amount of available water, which is needed for the optimum growth of plants during dry periods. Dickinson and Sparta soils are examples. Droughtiness can be minimized by increasing the rate of water intake, reducing the runoff rate, and planting crops which are drought tolerant. Zero tillage and crop residue management increase the rate of water intake and reduce the runoff rate.

Natural fertility in the soils in Henry County ranges from low to very high. It is low, for example, in Hickory soils and very high in Sable soils. Crops on most of the soils in the county respond well to additions of nitrogen, phosphorous, and potassium fertilizers and certain micronutrients. The soils are acid to calcareous in reaction. On the acid Fayette and Hickory soils,



Figure 18.—Open drainage ditch in an area of the Booker soils.

applications of ground limestone are needed to raise the pH level sufficiently for good crop production. On the calcareous Canisteo and Harpster soils, applications of lime are not needed because the pH level is naturally high. On all soils, the kind and amount of lime and fertilizer to be applied should be based on the results of soil tests, the needs of the crop, and the expected level of yields. The Cooperative Extension Service can help in determining the kind and amount needed.

Soil tillth is an important factor affecting the germination of seeds, the amount of runoff, and the intake of water into the soil. It is good in soils that are granular and porous.

Most of the soils used for crops in the county have a silt loam or silty clay loam surface layer. Some of the soils have a lower content of organic matter than others. Generally, the structure of such soils is weak, and a crust forms on the surface during periods of intensive rainfall. The crust is hard when dry and is nearly impervious to water. It decreases the infiltration rate and increases the runoff rate. Regular additions of crop residue, manure, and other organic material improve soil structure and reduce the likelihood of crusting.

Poor tillth is a problem in the very poorly drained and poorly drained, clayey Aholt, Booker, Milford, and

Montgomery soils. Clods form if these soils are tilled when wet. As a result of the cloddiness, preparing a good seedbed is difficult. The opportunity for primary tillage commonly is limited because these soils often stay wet until late in spring. If the soils are tilled in the fall, enough crop residue should be left on the surface to prevent excessive soil blowing.

The main field crops grown in the county are corn and soybeans. Small grain and forage crops also are grown. They could be grown more extensively on nearly all of the cropland for effective erosion control and improvement of natural soil fertility.

The latest information about growing crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Measures that help to control erosion, improve fertility, and prevent overgrazing are needed in the areas used for pasture. Applications of lime and fertilizer should be based on the results of soil tests. Annual applications of fertilizer help to keep the pasture productive and maintain a dense stand of grasses and legumes.

Pastures should not be grazed when soils are wet. Rotation grazing and measures that prevent overgrazing help to keep the stand productive. Seeding and maintaining legumes, such as alfalfa, red clover, or

birdsfoot trefoil, in the stand of grasses improve the quality and productivity of the pasture and provide nitrogen for the grasses.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents (3). Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (8). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Matthew Seimert, district forester, Illinois Department of Conservation, prepared this section.

When the first settlers arrived, virgin forest covered nearly half of the acreage in Henry County. Cottonwood, silver maple, black walnut, ash, gum, and other species covered the lowlands. The rolling hills supported white oak, bur oak, red oak, black oak, shagbark hickory, pignut hickory, basswood, sugar maple, elm, and other species. Since the settlers arrived, the trees have been removed from most of the land suitable for cultivation.

This trend has slowed, and only an estimated 400 acres a year is presently being converted. As the large metropolitan areas in the northwestern part of the county grew, much of the forested land that was too steep for farming was used for housing developments.

About 14,160 acres, or only 2.7 percent of the acreage in the county, is woodland (10). Most areas that support trees are too wet or too steep for farming or urban development. The largest areas of woodland are in associations 3, 4, and 7, which are described in the section "General Soil Map Units." Some areas are used for wood production and provide wildlife habitat and esthetic value.

Most of the woodland can be improved by measures that exclude livestock and improve the timber stands. In a few areas trees of commercial value should be harvested. Removing poorly formed trees, undesirable species, and crowding trees improves the stand. Measures that prevent fires and control insects and diseases also are needed to improve the quality of the woodland.

According to the "Illinois Soil and Water Conservation Needs Inventory," tree planting is needed on 4,420 acres in Henry County. The inventory also indicates that 20,246 acres in the county is not used as cropland, pasture, or forest. Much of this acreage is suitable for trees and should be planted to the species that are used for wood products.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each suitable soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: *x*, *w*, *t*, *d*, *c*, *s*, *f*, and *r*.

In table 7, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or

special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity of merchantable or common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The

plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Recreation

In Henry County, several areas of scenic and historic interest are used for camping, cross-country skiing, hiking, hunting, fishing, sightseeing, picnicking, and boating. Public lands available for recreation include Johnson Sauk Trail State Park, the Illinois and Mississippi Feeder Canal, Francis Park, Bishop Hill Historical Area, and Rock River.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Dan Towery, soil conservationist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are

suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for

planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, white-tailed deer, and coyote.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and white-tailed deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, muskrat, and beaver.

In most areas in the county, the wildlife habitat can be improved by providing additional food, cover, or water or a combination of these. In the following paragraphs, the soil associations described in the section "General Soil Map Units" are grouped into four wildlife areas.

Wildlife Area 1

This wildlife area consists of the Tama-Muscatine, Tama-Ipava, Plano-Elburn, Drummer-Harpster, and Sawmill-Radford associations. The soils are nearly level to sloping and are poorly drained to well drained. The Sawmill-Radford association is subject to flooding.

This area is mainly cropland. In much of the area, corn and soybeans are grown year after year. Many of the soils are fall-plowed. The chief wildlife species are ring-necked pheasant, bobwhite quail, raccoon, cottontail, a few white-tailed deer and coyotes, and other nongame openland species. Also, muskrat, beaver, mink, and ducks inhabit the areas along creeks or open drainage

ditches. Wildlife habitat generally is poor because of a lack of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows. The habitat can be improved by not mowing the grassy cover on roadsides, ditchbanks, and waterways until after the nesting season; protecting the woody cover; and leaving crop residue on the surface.

Wildlife Area 2

This wildlife area consists of the Downs-Sylvan-Fayette and Seaton-Port Byron associations. The soils are nearly level to very steep and are well drained or moderately well drained.

This area is very diversified. It is used as cropland, pasture, and woodland. As a result, the habitat generally favors a variety of wildlife. The chief wildlife species are white-tailed deer, raccoon, squirrel, cottontail, ring-necked pheasant, mourning dove, a few gray foxes and coyotes, and other nongame woodland species. The habitat can be improved by properly managing the pastured areas, excluding livestock from the wooded areas, leaving crop residue on the surface, and not mowing the grassy cover until after the nesting season.

Wildlife Area 3

This wildlife area consists of the Oakville-Tell-Waukegan and Dickinson-Sparta associations. The soils are nearly level to steep and are well drained and excessively drained.

This area is used as cropland, pasture, and woodland. As a result, the habitat tends to favor a variety of wildlife. The chief wildlife species are squirrel, cottontail, white-tailed deer, mourning dove, bobwhite quail, ring-necked pheasant, and other nongame species. Droughtiness may reduce the quality of the habitat. Properly managing the pastured areas, excluding livestock from the wooded areas, leaving crop residue on the surface, and not mowing the grassy cover until after the nesting season improve the habitat.

Wildlife Area 4

This wildlife area consists of the Niota-Coyne-Denrock and Booker-Aholt-Montgomery associations. The soils are nearly level and gently sloping and are very poorly drained to well drained.

This area is mainly cropland. Many of the soils are fall-plowed. The chief wildlife species are muskrat, mink, ducks, cottontail, and other nongame species. Wildlife habitat generally is poor because of a lack of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows. Suitable wildlife habitat is limited mainly to areas around open drainage ditches. The habitat can be improved by protecting the woody cover, by leaving crop residue on the surface, by establishing strips of suitable grasses along ditchbanks, and by not mowing the grassy cover until after the nesting season.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the

performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a

flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the

effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a

high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of

suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction.

Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines (fig. 19). This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.



Figure 19.—An area of Oakville soils, which are a probable source of sand.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high,

constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a

cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such

as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of

plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops.

They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

In table 17, some soils are assigned to two hydrologic groups. The first letter is for drained areas, and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than

that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey

soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (9). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER: Ten 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; 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 have a humid moisture regime).

SUBGROUP. Each great group has a typical subgroup. Other subgroups are intergrades or extragrades. The typical is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties

and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Hapludolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other 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* (7). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (9). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adrian Series

The Adrian series consists of very poorly drained soils in lake basins on outwash plains. These soils formed in deposits of organic material underlain by sandy mineral deposits. Permeability is moderately slow to moderately rapid in the organic layers and rapid in the underlying sand. Slope ranges from 0 to 2 percent.

Adrian soils are similar to Palms soils and are commonly adjacent to Gilford, Palms, Selma, and Watseka soils. Gilford, Selma, and Watseka soils do not have organic surface deposits. They are higher on the landscape than the Adrian soils. Palms soils are

underlain by loamy material. They are in positions on the landscape similar to those of the Adrian soils.

Typical pedon of Adrian muck, 300 feet west and 510 feet south of the northeast corner of sec. 10, T. 18 N., R. 4 E., in a cultivated field:

- Oap—0 to 9 inches; black (N 2/0) rubbed sapric material, black (10YR 2/1) dry; about 10 percent fiber, less than 5 percent rubbed; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
- Oa—9 to 24 inches; black (10YR 2/1) rubbed sapric material, black (10YR 2/1) dry; about 10 percent fiber, less than 5 percent rubbed; massive; friable; slightly acid; abrupt smooth boundary.
- 2C1—24 to 35 inches; light brownish gray (10YR 6/2) sand; single grain; loose; neutral; clear wavy boundary.
- 2C2—35 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) sand; common medium faint yellowish brown (10YR 5/6) and common medium distinct light gray (10YR 7/2) mottles; single grain; loose; mildly alkaline.

The depth to sand ranges from 16 to 50 inches. Free carbonates are in some pedons. The organic material is derived primarily from herbaceous plants.

The surface tier typically is neutral in hue or has hue of 10YR or 2.5Y. It has value of 2 and chroma of 1 or less. The subsurface tier is neutral in hue or has hue of 10YR, 7.5YR, or 5YR. It has value of 2 or 3 and chroma of 0 through 3. The organic layer directly above the sandy 2C horizon commonly has a high content of mineral material, ranging to 50 percent in some pedons. The 2C horizon dominantly has hue of 10YR, value of 5 or 6, and chroma of 1 through 3. It is sand or loamy sand.

Aholt Series

The Aholt series consists of very poorly drained, very slowly permeable soils on glacial lake plains. These soils formed in calcareous lacustrine material. Slope ranges from 0 to 2 percent.

Aholt soils are similar to Booker soils and are commonly adjacent to Booker, Milford, and Montgomery soils. The adjacent soils do not have free carbonates in the surface layer. They are in positions on the landscape similar to those of the Aholt soils. Milford soils contain less clay than the Aholt soils. They are poorly drained.

Typical pedon of Aholt silty clay, 30 feet west and 2,400 feet north of the southeast corner of sec. 36, T. 18 N., R. 4 E., in a cultivated field:

- Ap—0 to 8 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate fine and medium angular and subangular blocky structure parting to moderate medium granular; very firm; common snail

shell fragments and lime concretions; violent effervescence; moderately alkaline; abrupt smooth boundary.

- A1—8 to 18 inches; black (10YR 2/1) clay, very dark gray (10YR 3/1) dry; few fine prominent yellowish brown (10YR 5/8) mottles; strong medium subangular blocky structure; very firm; common snail shell fragments and lime concretions; violent effervescence; moderately alkaline; gradual smooth boundary.
- A2—18 to 23 inches; very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; common medium prominent brownish yellow (10YR 6/8) mottles; strong medium subangular blocky structure; very firm; few snail shell fragments and lime concretions; weak effervescence; moderately alkaline; gradual wavy boundary.
- Bg1—23 to 35 inches; dark grayish brown (2.5Y 4/2) clay; many coarse prominent brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to strong medium subangular blocky; very firm; few snail shell fragments and lime concretions; weak effervescence; moderately alkaline; clear wavy boundary.
- Bg2—35 to 51 inches; olive gray (5Y 5/2) clay; common coarse prominent brownish yellow (10YR 6/8) mottles; strong medium subangular blocky structure; very firm; few snail shell fragments and lime concretions; weak effervescence; moderately alkaline; clear wavy boundary.
- Cg—51 to 60 inches; olive gray (5Y 5/2) silty clay; common medium prominent brownish yellow (10YR 6/8) mottles; massive; very firm; common snail shell fragments and lime concretions; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The mollic epipedon is 16 to 24 inches thick. The content of clay in the control section ranges from 60 to 80 percent. Free carbonates are throughout the control section. Lime concretions or snail shells or both are commonly throughout the profile.

The Ap horizon is neutral in hue or has hue of 10YR. It has value of 2 or 3 and chroma of 0 or 1. It is silty clay or silty clay loam. The Bg horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 or 2. It is commonly mottled. It is silty clay or clay. The Cg horizon is silty clay loam, silty clay, or clay.

Assumption Series

The Assumption series consists of moderately well drained soils on uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slope ranges from 2 to 15 percent.

Assumption soils are similar to Elco, Elkhart, Tama, and Velma soils and are commonly adjacent to Elkhart, Tama, and Velma soils. Elco soils do not have a mollic epipedon. Elkhart and Tama soils are higher on the landscape than the Assumption soils. Their solum formed entirely in loess. Velma soils are lower on the landscape than the Assumption soils. Also, they formed in a thinner layer of loess and in underlying glacial till.

Typical pedon of Assumption silt loam, 2 to 5 percent slopes, 100 feet north and 300 feet east of the southwest corner of sec. 29, T. 15 N., R. 2 E., in a cornfield:

- Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; neutral; abrupt smooth boundary.
- A—6 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; clear smooth boundary.
- AB—13 to 16 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some dark brown (10YR 4/3) in the lower part; mixed grayish brown (10YR 5/2) and brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; slightly acid; clear wavy boundary.
- Bt1—16 to 26 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick brown (10YR 5/3) clay films on faces of peds; slightly acid; clear wavy boundary.
- Bt2—26 to 35 inches; brown (10YR 5/3) silty clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick light gray (2.5Y 7/2) clay films on faces of peds; slightly acid; abrupt wavy boundary.
- 2Bt3—35 to 51 inches; yellowish brown (10YR 5/4) clay loam; many coarse faint yellowish brown (10YR 5/8) and common medium prominent light olive gray (5Y 6/2) mottles; weak medium subangular blocky structure; firm; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear wavy boundary.
- 2Bt4—51 to 60 inches; brown (10YR 5/3) silty clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick light gray (2.5Y 7/2) clay films on faces of peds; slightly acid.

The thickness of the solum ranges from 48 to more than 60 inches. The thickness of the loess ranges from 20 to 40 inches. The mollic epipedon is 10 to 16 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bt horizon has hue of 10YR,

value of 4 or 5, and chroma of 3 through 6. The 2Bt horizon has hue of 5Y, 2.5Y, or 10YR, value of 5 or 6, and chroma of 1 through 6 and is mottled.

Assumption silt loam, 5 to 10 percent slopes, eroded, and Assumption silt loam, 10 to 15 percent slopes, eroded, have a thinner and lighter colored surface soil than is defined as the range for the Assumption series. This difference, however, does not significantly affect the use or behavior of the soils.

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on uplands. These soils formed in a thin layer of loess and in the underlying paleosol, which formed in Illinoian till. Slope ranges from 10 to 20 percent.

The Atlas soils in this county do not have the low chroma mottles in the Bt1 horizon that are definitive for the Atlas series. This difference, however, does not significantly affect the use or behavior of the soils.

Atlas soils are commonly adjacent to Elco, Hickory, and Marseilles soils. Elco soils are moderately well drained. They are higher on the landscape than the Atlas soils. Also, they are deeper to a paleosol. Hickory soils are well drained. Their solum contains more sand than that of the Atlas soils. Marseilles soils formed in a thin layer of loess and in the underlying material weathered from shale. They are moderately well drained. Hickory and Marseilles soils are lower on the landscape than the Atlas soils.

Typical pedon of Atlas silt loam, in an area of Hickory-Atlas silt loams, 12 to 20 percent slopes, eroded, 190 feet north and 2,080 feet west of the southeast corner of sec. 15, T. 14 N., R. 1 E., in a grass field:

- Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (2.5Y 6/2) dry; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.
- Bt—5 to 16 inches; mixed dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common moderately thick dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.
- 2Btg1—16 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate fine and medium subangular and angular blocky structure; firm; many moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; medium acid; clear smooth boundary.
- 2Btg2—21 to 28 inches; dark grayish brown (2.5Y 4/2) and grayish brown (2.5Y 5/2) silty clay; moderate fine angular blocky structure; firm; many moderately thick dark grayish brown (2.5Y 4/2) clay films on

- faces of peds; strongly acid; abrupt smooth boundary.
- 2Btg3—28 to 32 inches; gray (5Y 5/1) silty clay; moderate fine and medium angular and subangular blocky structure; firm; many moderately thick dark gray (5Y 4/1) clay films on faces of peds; medium acid; abrupt smooth boundary.
- 2Btg4—32 to 39 inches; light olive gray (5Y 6/2) silty clay; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common moderately thick olive gray (5Y 5/2) clay films on faces of peds; medium acid; clear smooth boundary.
- 2Btg5—39 to 48 inches; olive gray (5Y 5/2) silty clay; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few thin dark gray (5Y 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.
- 2Bg—48 to 57 inches; mottled olive gray (5Y 5/2), dark gray (5Y 4/1), and yellowish brown (10YR 5/6) clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; neutral; abrupt smooth boundary.
- 2BCg—57 to 60 inches; mottled gray (5Y 5/1) and yellowish brown (10YR 5/6) clay loam; weak coarse prismatic structure; firm; neutral.

The thickness of the solum is commonly more than 60 inches. The thickness of the loess ranges from 5 to 20 inches. The surface soil is 4 to 10 inches thick.

The Ap or A horizon has value of 3 or 4 and chroma of 1 through 3. The 2Bt horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 or 2 and is commonly mottled. It is silty clay loam, silty clay, clay, or clay loam.

Bold Series

The Bold series consists of well drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slope ranges from 10 to 18 percent.

Bold soils are commonly adjacent to Elco, Orion, Radford, and Sylvan soils. Elco soils formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately well drained and are lower on the landscape than the Bold soils. Orion and Radford soils formed in recently deposited alluvium. They are on bottom land and are somewhat poorly drained. Sylvan soils are deeper to carbonates than the Bold soils. Their position on the landscape is similar to that of the Bold soils.

Typical pedon of Bold silt loam, in an area of Sylvan-Bold complex, 10 to 18 percent slopes, severely eroded, 900 feet east and 660 feet north of the southwest corner of sec. 7, T. 16 N., R. 3 E., in a soybean field:

- Ap—0 to 8 inches; mixed dark brown (10YR 4/3), dark grayish brown (10YR 4/2), and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) and

light yellowish brown (10YR 6/4) dry; weak very fine and fine granular structure; friable; slight effervescence; moderately alkaline; abrupt smooth boundary.

- C1—8 to 16 inches; yellowish brown (10YR 5/6) silt loam; massive; friable; strong effervescence; moderately alkaline; abrupt smooth boundary.
- C2—16 to 37 inches; light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silt loam; massive; friable; few dark stains (iron and manganese oxides); strong effervescence; moderately alkaline; clear smooth boundary.
- C3—37 to 60 inches; yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silt loam; massive; friable; few dark stains (iron and manganese oxides); strong effervescence; moderately alkaline.

Reaction is mildly alkaline or moderately alkaline throughout the profile. The surface layer is 4 to 8 inches thick.

The Ap horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 6. The C horizon is light brownish gray (10YR 6/2), light gray (10YR 7/2), yellowish brown (10YR 5/6 or 5/8).

Booker Series

The Booker series consists of very poorly drained, very slowly permeable soils on glacial lake plains. These soils formed in clayey lacustrine material. Slope ranges from 0 to 2 percent.

Booker soils are similar to Aholt, Milford, and Montgomery soils and are commonly adjacent to Aholt, Milford, Montgomery, and Niota soils. Aholt soils are calcareous throughout. Milford soils contain less clay in the solum than the Booker soils. Also, they contain stratified lacustrine material in the lower part of the subsoil. Montgomery soils are calcareous at a depth of 20 to 40 inches. Niota soils have an albic horizon. Their dark surface layer is thinner than that of the Booker soils. Aholt and Niota soils are higher on the landscape than the Booker soils. Milford and Montgomery soils are in positions on the landscape similar to those of the Booker soils.

Typical pedon of Booker silty clay, 100 feet south and 1,270 feet east of the northwest corner of sec. 3, T. 17 N., R. 4 E., in a cultivated field:

- Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; very firm; common roots; neutral; abrupt smooth boundary.
- A1—8 to 12 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; very firm; common roots; neutral; gradual wavy boundary.

- A2—12 to 18 inches; very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; very firm; common dark gray (10YR 4/1) pressure faces on peds; neutral; clear wavy boundary.
- Bg1—18 to 22 inches; olive gray (5Y 4/2) clay; common medium distinct brown (10YR 5/3) mottles; moderate fine and medium subangular blocky structure; very firm; many dark gray (10YR 4/1) pressure faces on peds; neutral; clear wavy boundary.
- Bg2—22 to 33 inches; olive gray (5Y 5/2) clay; many medium faint olive (5Y 5/3) mottles; moderate medium subangular blocky structure; very firm; many dark gray (10YR 4/1) pressure faces on peds; neutral; gradual wavy boundary.
- Bg3—33 to 44 inches; olive gray (5Y 5/2) clay; moderate fine subangular blocky structure; very firm; many dark gray (10YR 4/1) pressure faces on peds; few lime concretions in the lower part; neutral; gradual wavy boundary.
- Cg—44 to 60 inches; mottled olive gray (5Y 5/2), reddish brown (5YR 5/3), and yellowish brown (10YR 5/6) silty clay; massive; firm; few dark gray (10YR 4/1) pressure faces on weak cleavage planes; neutral.

The thickness of the solum commonly ranges from 33 to 60 inches. The mollic epipedon is 10 to 24 inches thick. The content of clay in the control section ranges from 60 to 75 percent.

The Ap horizon is neutral in hue or has hue of 10YR. It has value of 2 or 3 and chroma of 0 or 1. It is commonly silty clay or clay. The Bg horizon commonly has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 or 2, but hue of 10YR and chroma of 2 or less are within the range. This horizon is silty clay or clay. In some pedons it does not have lime concretions in the lower part. The Cg horizon is commonly silty clay loam, silty clay, or clay.

Brenton Series

The Brenton series consists of somewhat poorly drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess or silty material and in the underlying loamy outwash. Slope ranges from 0 to 3 percent.

Brenton soils are similar to Elburn soils and are commonly adjacent to Drummer, Elburn, Millbrook, and Proctor soils. Drummer soils are poorly drained and are lower on the landscape than the Brenton soils. Elburn soils formed in 40 to 60 inches of loess or silty material and in the underlying loamy outwash. Millbrook soils have an albic horizon. Their dark surface soil is thinner than that of the Brenton soils. Elburn and Millbrook soils are in positions on the landscape similar to those of the

Brenton soils. Proctor soils are well drained and are on the higher, more sloping parts of the landscape.

Typical pedon of Brenton silt loam, 0 to 3 percent slopes, 300 feet west and 1,700 feet north of the southeast corner of sec. 24, T. 17 N., R. 4 E., in a cultivated field:

- Ap—0 to 6 inches; very dark gray (10YR 3/1) silt loam, very dark grayish brown (10YR 3/2) dry; weak very fine and fine granular structure; friable; neutral; abrupt smooth boundary.
- A—6 to 10 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.
- AB—10 to 19 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure parting to weak very fine and fine granular; very friable; common very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
- Bt1—19 to 29 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; few dark stains and concretions (iron and manganese oxides); neutral; clear smooth boundary.
- 2Bt2—29 to 39 inches; mottled brown (10YR 5/3), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6 and 5/8) clay loam; moderate fine and medium subangular blocky structure; friable; many moderately thick grayish brown (10YR 5/2) clay films on faces of peds; few dark stains and concretions (iron and manganese oxides); neutral; clear smooth boundary.
- 2BC—39 to 46 inches; brown (10YR 5/3) and grayish brown (2.5Y 5/2) sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak fine and medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few dark stains and concretions (iron and manganese oxides); mildly alkaline; clear smooth boundary.
- 2C—46 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few dark stains (iron and manganese oxides); weak effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess ranges from 25 to 40 inches. The mollic epipedon is 10 to 18 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The 2B horizon is loam, sandy loam, or clay loam. The 2C

horizon is stratified silt loam, loam, clay loam, or sandy loam. The Bt, 2B, and 2C horizons are commonly mottled.

Calco Series

The Calco series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in calcareous silty alluvium. Slope ranges from 0 to 2 percent.

Calco soils are similar to Harpster and Sawmill soils and are commonly adjacent to Sawmill soils. Harpster soils have a calcic horizon and have a mollic epipedon that is less than 24 inches thick. They are on terraces. Sawmill soils do not have free carbonates in the solum. They are lower on the landscape than the Calco soils.

Typical pedon of Calco silty clay loam, 600 feet north and 1,320 feet west of the southeast corner of sec. 30, T. 18 N., R. 2 E., in a cornfield:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; few snail shell fragments; slight effervescence; moderately alkaline; abrupt smooth boundary.

A1—8 to 13 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; few snail shell fragments; strong effervescence; moderately alkaline; gradual smooth boundary.

A2—13 to 32 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure; friable; few snail shell fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

A3—32 to 46 inches; very dark gray (5Y 3/1) silty clay loam, grayish brown (10YR 5/2) dry; few fine faint dark grayish brown (2.5Y 4/2) mottles; weak fine and medium subangular blocky structure; friable; few snail shell fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

Cg—46 to 60 inches; dark gray (5Y 4/1) silt loam; massive; friable; few snail shell fragments; strong effervescence; mildly alkaline.

The thickness of the solum and the thickness of the mollic epipedon range from 40 to 50 inches. Snail shell fragments commonly are throughout the profile. Reaction is mildly alkaline or moderately alkaline throughout the profile.

The Ap horizon is neutral in hue or has hue of 10YR, 2.5Y, or 5Y. It has value of 2 or 3 and chroma of 0 or 1. The Cg horizon commonly is neutral in hue or has hue of 2.5Y or 5Y. It has value of 3 or 4 and chroma of 0 or 1. It is silt loam or silty clay loam.

Canisteo Series

The Canisteo series consists of poorly drained soils on outwash plains. These soils formed in calcareous loamy outwash sediments. Permeability is moderate in the upper part of the profile and rapid in the underlying material. Slope ranges from 0 to 2 percent.

Canisteo soils are similar to Harpster and Selma soils and are commonly adjacent to Drummer, Harpster, and Selma soils. Drummer and Harpster soils contain less sand in the solum than the Canisteo soils. Harpster soils are in positions on the landscape similar to those of the Canisteo soils. Drummer and Selma soils do not have free carbonates in the solum. They are lower on the landscape than the Canisteo soils.

Typical pedon of Canisteo loam, sandy substratum, 1,650 feet east and 250 feet south of the northwest corner of sec. 2, T. 17 N., R. 5 E., in a cultivated field:

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine and medium granular; friable; violent effervescence; moderately alkaline; clear smooth boundary.

A—9 to 13 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; violent effervescence; moderately alkaline; clear smooth boundary.

AB—13 to 18 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; common fine faint very dark grayish brown (10YR 3/2) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; slight effervescence; moderately alkaline; clear smooth boundary.

Bg1—18 to 25 inches; dark grayish brown (2.5Y 4/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; strong effervescence; moderately alkaline; gradual smooth boundary.

Bg2—25 to 33 inches; grayish brown (2.5Y 5/2) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; slight effervescence; mildly alkaline; abrupt smooth boundary.

Bg3—33 to 40 inches; grayish brown (2.5Y 5/2) clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium and fine subangular blocky structure; friable; very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) krotovinas; slight effervescence; mildly alkaline; abrupt smooth boundary.

2Cg1—40 to 51 inches; light brownish gray (2.5Y 6/2) loamy sand; few medium prominent yellowish brown

(10YR 5/6) mottles; single grain; loose; a thin band of dark gray (10YR 4/1) sandy loam; slight effervescence; mildly alkaline; clear smooth boundary.

2Cg2—51 to 60 inches; light brownish gray (2.5Y 6/2) sand; few medium faint dark grayish brown (10YR 4/2) mottles; single grain; loose; violent effervescence; moderately alkaline.

The solum ranges from 40 to 60 inches in thickness. It is mildly alkaline or moderately alkaline throughout. The mollic epipedon is 14 to 24 inches thick.

The Ap horizon is neutral in hue or has hue of 10YR or 2.5Y. It has value of 2 or 3 and chroma of 0 or 1. It is typically loam or clay loam, but the range includes silty clay loam and silt loam. The Bg horizon is commonly mottled. It has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 or 2 or has hue of 10YR, value of 4 or 5, and chroma of 1. It is typically clay loam, loam, silty clay loam, silt loam, or sandy loam. The 2Cg horizon typically is loamy sand or sand.

Catlin Series

The Catlin series consists of well drained and moderately well drained, moderately permeable soils on till plains. These soils formed in loess and in the underlying glacial till. Slope ranges from 0 to 5 percent.

Catlin soils are similar to Plano and Tama soils and are commonly adjacent to Drummer, Elburn, and Plano soils. The adjacent soils formed in loess and in the underlying stratified outwash. The poorly drained Drummer and somewhat poorly drained Elburn soils are on the lower parts of the landscape. Plano soils are in positions on the landscape similar to those of the Catlin soils. Tama soils formed entirely in loess.

Typical pedon of Catlin silt loam, 2 to 5 percent slopes, 1,220 feet north and 1,340 feet west of the southeast corner of sec. 15, T. 17 N., R. 3 E., in a cultivated field:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

A1—7 to 14 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; medium acid; gradual smooth boundary.

A2—14 to 18 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; friable; medium acid; clear smooth boundary.

BA—18 to 22 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—22 to 28 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; common moderately thick dark brown (10YR 3/3) clay films on faces of peds; neutral; gradual wavy boundary.

Bt2—28 to 39 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common moderately thick brown (10YR 4/3) clay films on faces of peds; neutral; gradual wavy boundary.

Bt3—39 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear wavy boundary.

2BC—49 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate medium subangular blocky structure; friable; about 5 percent gravel; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 12 to 23 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. In some pedons it is mottled in the lower part. It is dominantly silty clay loam but in some pedons grades to silt loam in the lower part. The 2B horizon formed in till. It is loam, clay loam, silt loam, or silty clay loam.

Clarksdale Series

The Clarksdale series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

Clarksdale soils are similar to Ipava and Keomah soils and are commonly adjacent to Downs, Ipava, Keomah, and Rozetta soils. Downs soils are moderately well drained and well drained. They contain less clay in the solum than the Clarksdale soils. They are on narrow ridgetops or on the more sloping parts of the landscape. Ipava and Keomah soils are in positions on the landscape similar to those of the Clarksdale soils. Ipava soils have a mollic epipedon. Keomah soils have value of 4 in the epipedon. Rozetta soils are moderately well drained. They contain less clay in the solum than the Clarksdale soils. Also, they are on the narrower ridgetops.

Typical pedon of Clarksdale silt loam, 0 to 3 percent slopes, 1,149 feet north and 132 feet west of the southeast corner of sec. 14, T. 14 N., R. 1 E., in a cultivated field:

- Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; weak very fine and fine granular structure; friable; slightly acid; abrupt smooth boundary.
- E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam; common medium faint very dark gray (10YR 3/1) mottles; moderate medium platy structure parting to moderate fine granular; friable; slightly acid; abrupt smooth boundary.
- Bt1—14 to 19 inches; dark grayish brown (10YR 4/2) silty clay loam; many medium faint brown (10YR 4/3) mottles; weak fine and medium prismatic structure parting to strong very fine and fine subangular blocky; firm; many thin grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.
- Bt2—19 to 26 inches; brown (10YR 5/3) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong fine and medium subangular blocky; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.
- Btg1—26 to 32 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong fine and medium subangular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.
- Btg2—32 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium distinct strong brown (7.5YR 5/6) and few medium prominent reddish brown (5YR 4/4) mottles; moderate medium prismatic structure parting to moderate coarse subangular and angular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; gradual smooth boundary.
- BCg—38 to 46 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct strong brown (7.5YR 5/6) and few medium prominent reddish brown (5YR 4/4) mottles; moderate medium prismatic structure parting to moderate coarse subangular and angular blocky; firm; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; gradual smooth boundary.
- C—46 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct strong brown (7.5YR 5/6) and few medium prominent reddish brown (5YR 4/4) mottles; massive; firm; neutral.

The thickness of the solum ranges from 45 to 60 inches. The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 4 through 6, and chroma of 2. The Bt horizon has hue of 10YR in the upper part and hue of

2.5Y in the lower part. It has value of 4 through 6 and chroma of 2 or 3. It is mottled throughout. It is silty clay loam or silty clay.

Coyne Series

The Coyne series consists of well drained soils on stream terraces. These soils formed in loamy material and in the underlying reddish lacustrine material. Permeability is moderately rapid in the upper part of the profile and moderately slow in the lower part. Slope ranges from 0 to 5 percent.

The Coyne soils in this county contain less sand in the upper part of the solum and more clay in the lacustrine sediments than is defined as the range for the Coyne series. These differences, however, do not significantly affect the use or behavior of the soils.

Coyne soils are similar to Dickinson soils and are commonly adjacent to Denrock, Dickinson, Oakville, and Sparta soils. Denrock soils are somewhat poorly drained. They contain more clay and less sand in the solum than the Coyne soils. Also, they are lower on the landscape. Dickinson, Oakville, and Sparta soils are not underlain by reddish lacustrine material and have coarser sand in the solum than the Coyne soils. Also, they are on higher, more sloping parts of the landscape. Oakville soils do not have a mollic epipedon. Sparta soils are excessively drained.

Typical pedon of Coyne loam, 2 to 5 percent slopes, 2,400 feet south and 40 feet west of the northeast corner of sec. 25, T. 18 N., R. 3 E., in a hayfield:

- Ap—0 to 7 inches; very dark brown (10YR 2/2) loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; neutral; abrupt smooth boundary.
- A1—7 to 17 inches; very dark brown (10YR 2/2) very fine sandy loam, grayish brown (10YR 5/2) dry; common fine faint dark brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.
- A2—17 to 20 inches; dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) very fine sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very pale brown (10YR 7/3) silt grains on faces of peds; neutral; clear wavy boundary.
- AB—20 to 26 inches; brown (10YR 4/3) very fine sandy loam; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.
- BA—26 to 32 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; weak medium subangular blocky structure; friable; few light gray (10YR 7/2) silt grains on faces of peds; slightly acid; clear wavy boundary.
- Bt1—32 to 42 inches; dark yellowish brown (10YR 4/4) loam; moderate medium and coarse subangular

blocky structure; friable; many moderate thick dark reddish brown (5YR 3/4) clay films and few light gray (10YR 7/2) silt grains on faces of peds; slightly acid; gradual wavy boundary.

Bt2—42 to 50 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; many moderately thick strong brown (7.5YR 5/6) clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt3—50 to 55 inches; strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; common thin brown (7.5YR 4/4) clay films and few light gray (10YR 7/2) silt grains on faces of peds; neutral; abrupt wavy boundary.

2BC—55 to 60 inches; reddish brown (5YR 5/3) silty clay; common medium distinct yellowish red (5YR 4/8) and common medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; firm; slightly acid.

The solum ranges from 48 to more than 60 inches in thickness. It is medium acid to neutral. The depth to lacustrine material ranges from 40 to 60 inches. The mollic epipedon is 10 to 23 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is very fine sandy loam, sandy loam, or loam. The BA and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. They are fine sandy loam, very fine sandy loam, sandy loam, silt loam, or loam. The 2B horizon has hue of 5YR through 2.5YR, value of 4 or 5, and chroma of 4 through 6. It is loam, silt loam, silty clay loam, or silty clay.

Denny Series

The Denny series consists of poorly drained, slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Denny soils are similar to Thorp soils and are commonly adjacent to Ipava, Sable, and Tama soils. The adjacent soils have a mollic epipedon and do not have an albic horizon. Sable, Tama, and Thorp soils contain less clay in the subsoil than the Denny soils. The somewhat poorly drained Ipava and well drained and moderately well drained Tama soils are in the higher landscape positions. Sable soils are in the broader areas. Thorp soils have a mollic epipedon. They formed in loess and in the underlying loamy outwash.

Typical pedon of Denny silt loam, 210 feet south and 210 feet west of the northeast corner of sec. 8, T. 16 N., R. 2 E., in a cornfield:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; medium acid; abrupt smooth boundary.

E1—7 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium platy structure; friable; many very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

E2—10 to 14 inches; grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium platy structure; friable; many light brownish gray (10YR 6/2) silt grains on faces of peds; medium acid; clear smooth boundary.

Btg1—14 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many moderately thick gray (10YR 5/1) clay films on faces of peds; medium acid; gradual wavy boundary.

Btg2—24 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds; medium acid; gradual wavy boundary.

Btg3—36 to 47 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and few fine prominent reddish brown (5YR 5/4) mottles; moderate coarse subangular blocky structure; common thin grayish brown (10YR 5/2) clay films on faces of peds; friable; slightly acid; gradual wavy boundary.

BCg—47 to 60 inches; light olive gray (5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse and medium subangular blocky structure; friable; few thin dark gray (10YR 4/1) clay films on faces of peds; neutral.

The thickness of the solum ranges from 40 to about 60 inches. The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 or 2. It is commonly mottled. It is silty clay loam or silty clay.

Denrock Series

The Denrock series consists of somewhat poorly drained soils on terraces. These soils formed in loess or silty material and lacustrine clay underlain by silt and sand. Permeability is very slow in the subsoil and rapid in the underlying material. Slope ranges from 0 to 2 percent.

Denrock soils are commonly adjacent to Coyne and Niota soils. Coyne soils are well drained. They contain less clay and more sand in the upper part of the solum

than the Denrock soils. Also, they are higher on the landscape. Niota soils are poorly drained and are lower on the landscape than the Denrock soils. Also, they have a thinner dark surface soil and have an albic horizon.

Typical pedon of Denrock silt loam, 1,520 feet west and 2,100 feet south of the northeast corner of sec. 31, T. 18 N., R. 2 E., in a cornfield:

- Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
- A—8 to 13 inches; very dark brown (10YR 2/2) silty clay loam mixed with reddish brown (5YR 5/3) in the lower part; grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.
- 2Bt1—13 to 22 inches; reddish brown (5YR 4/3) clay; strong medium prismatic structure; firm; many moderately thick dark reddish gray (5YR 4/2) clay films on faces of peds; very dark brown (10YR 2/2) worm casts and root channel linings; few fine concretions (iron and manganese oxides); strongly acid; gradual wavy boundary.
- 2Bt2—22 to 36 inches; reddish brown (5YR 4/4 and 4/3) clay; strong medium and coarse prismatic structure; firm; many moderately thick dark reddish gray (5YR 4/2) clay films on faces of peds; few fine concretions (iron and manganese oxides); strongly acid; abrupt wavy boundary.
- 3Bt3—36 to 54 inches; mottled reddish brown (5YR 4/4), dark grayish brown (2.5Y 4/2), strong brown (7.5YR 5/6), and light brownish gray (2.5Y 6/2) stratified clay loam and sandy loam; moderate medium subangular blocky structure; friable; common moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear wavy boundary.
- 3C—54 to 60 inches; reddish brown (5YR 4/3) loamy sand; common medium distinct brown (10YR 5/3) mottles; single grain; loose; neutral.

The thickness of the solum ranges from 40 to 60 inches. The mollic epipedon is 10 to 17 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The 2Bt horizon has hue of 5YR, value of 4 or 5, and chroma of 3 through 6. It is silty clay or clay. The 3Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 3 through 6 and commonly has grayish mottles. It is clay loam, loam, or sandy loam. The texture of the 3C horizon ranges from loam to sand.

Dickinson Series

The Dickinson series consists of well drained soils on outwash plains and stream terraces. These soils formed

in wind- or water-deposited loamy and sandy sediments. Permeability is moderately rapid in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 10 percent.

Dickinson soils are similar to Coyne soils and are commonly adjacent to Coyne, Gilford, Hoopeston, Sparta, and Waukegan soils. Coyne soils formed in loamy sediments and in the underlying reddish lacustrine material. Gilford soils are very poorly drained. Hoopeston soils are somewhat poorly drained. Sparta soils contain more sand in the solum than the Dickinson soils. They are excessively drained. Their position on the landscape is similar to that of the Dickinson soils. Waukegan soils formed in loess and in the underlying sandy outwash. Coyne, Gilford, Hoopeston, and Waukegan soils are in the lower landscape positions.

Typical pedon of Dickinson fine sandy loam, 2 to 5 percent slopes, 2,130 feet east and 2,550 feet north of the southwest corner of sec. 30, T. 18 N., R. 5 E., in a cornfield:

- Ap—0 to 6 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; medium acid; clear smooth boundary.
- A—6 to 15 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; medium acid; gradual smooth boundary.
- AB—15 to 19 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) fine sandy loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; medium acid; clear smooth boundary.
- Bw1—19 to 26 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable; medium acid; clear smooth boundary.
- Bw2—26 to 32 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine and medium subangular blocky structure; friable; medium acid; abrupt smooth boundary.
- Bw3—32 to 36 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; medium acid; clear smooth boundary.
- BC—36 to 44 inches; dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) fine sand; very weak medium subangular blocky structure; very friable; medium acid; gradual smooth boundary.
- C—44 to 60 inches; yellowish brown (10YR 5/6) sand; single grain; loose; medium acid.

The thickness of the solum ranges from 27 to 50 inches. The mollic epipedon is 10 to 23 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is fine sandy loam or sandy loam grading to loamy sand, fine sand, or sand in the lower part. The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is loamy sand, loamy fine sand, fine sand, or sand.

Downs Series

The Downs series consists of well drained and moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 10 percent.

Downs soils are similar to Fayette and Tama soils and are commonly adjacent to Clarksdale, Fayette, Ipava, and Tama soils. Clarksdale and Ipava soils are somewhat poorly drained. They are in broader landscape positions than the Downs soils. Also, their solum contains more clay. Ipava and Tama soils have a mollic epipedon. Fayette soils do not have a dark surface soil. Fayette and Tama soils are in positions on the landscape similar to those of the Downs soils.

Typical pedon of Downs silt loam, 5 to 10 percent slopes, eroded, 190 feet west and 1,680 feet south of the northeast corner of sec. 16, T. 15 N., R. 3 E., in a cornfield:

- Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.
- BA—7 to 11 inches; dark yellowish brown (10YR 4/4) silt loam mixed with some very dark grayish brown (10YR 3/2); weak medium subangular blocky structure; friable; medium acid; clear smooth boundary.
- Bt1—11 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; many moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; gradual wavy boundary.
- Bt2—22 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; many moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; gradual wavy boundary.
- Bt3—32 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; gradual wavy boundary.
- BC—43 to 52 inches; yellowish brown (10YR 5/4) silt loam; common fine faint yellowish brown (10YR 5/6) and few fine distinct very pale brown (10YR 7/3)

mottles; weak medium subangular blocky structure; friable; medium acid; gradual wavy boundary.

- C—52 to 60 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The A or Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon, if it occurs, has value of 3 through 5 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 through 5. It is commonly mottled in the lower part.

Drummer Series

The Drummer series consists of poorly drained, moderately permeable soils on outwash plains. These soils formed in loess or silty material and in the underlying stratified outwash. Slope ranges from 0 to 2 percent.

Drummer soils are similar to Pella and Sable soils and are commonly adjacent to Brenton, Elburn, Pella, and Selma soils. Brenton and Elburn soils are somewhat poorly drained and are in the higher landscape positions. Pella soils are shallower to carbonates and outwash than the Drummer soils. Sable soils formed entirely in loess on uplands. Selma soils contain more sand in the solum than the Drummer soils. Pella and Selma soils are in positions on the landscape similar to those of the Drummer soils.

Typical pedon of Drummer silty clay loam, 660 feet east and 600 feet north of the southwest corner of sec. 14, T. 16 N., R. 5 E., in a cornfield:

- Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure parting to weak fine granular; friable; neutral; abrupt smooth boundary.
- A—8 to 17 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure; friable; neutral; gradual wavy boundary.
- AB—17 to 22 inches; very dark gray (10YR 3/1) silty clay loam mixed with dark grayish brown (10YR 4/2) in the lower part; dark gray (10YR 4/1) dry; weak medium and coarse subangular blocky structure; friable; neutral; gradual wavy boundary.
- Btg1—22 to 30 inches; grayish brown (2.5Y 5/2) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.
- Btg2—30 to 43 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium and coarse prominent brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to

weak medium subangular blocky; friable; common thin grayish brown (2.5Y 5/2) clay films on faces of peds; neutral; gradual smooth boundary.

Btg3—43 to 54 inches; mottled light olive gray (5Y 6/2) and brownish yellow (10YR 6/8) silty clay loam; moderate medium prismatic structure parting to weak medium subangular blocky; friable; few thin dark gray (5Y 4/1) clay films on vertical faces of peds; black (N 2/0) root channel linings; neutral; abrupt smooth boundary.

2Bg—54 to 60 inches; mottled olive gray (5Y 5/2), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/6) stratified loam and sandy loam; weak medium subangular blocky structure; very friable; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 16 to 22 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 or 2 and has high chroma mottles. The 2Bg horizon is stratified loam, sandy loam, clay loam, silt loam, or silty clay loam.

Elburn Series

The Elburn series consists of somewhat poorly drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess or silty material and in the underlying loamy outwash. Slope ranges from 0 to 3 percent.

Elburn soils are similar to Brenton soils and are commonly adjacent to Drummer, Millbrook, Pella, and Plano soils. Brenton and Millbrook soils are in positions on the landscape similar to those of the Elburn soils. They are shallower to stratified outwash than the Elburn soils. Also, Millbrook soils have a thinner dark surface soil and have an albic horizon. Drummer and Pella soils are poorly drained and are on the lower parts of the landscape. Pella soils are shallower to outwash and carbonates than the Elburn soils. Plano soils are well drained and are on the higher parts of the landscape.

Typical pedon of Elburn silt loam, 0 to 3 percent slopes, 870 feet west and 1,335 feet north of the southeast corner of sec. 32, T. 17 N., R. 5 E., in a cultivated field:

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure parting to weak very fine granular; friable; neutral; abrupt smooth boundary.

A—8 to 12 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very

fine and fine granular structure; friable; neutral; abrupt smooth boundary.

AB—12 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure parting to moderate very fine granular; friable; continuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt—16 to 21 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common medium faint dark grayish brown (10YR 4/2) mottles; moderate fine and medium subangular blocky structure; friable; many moderately thick very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Btg1—21 to 31 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

Btg2—31 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; few dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Btg3—37 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few thin grayish brown (2.5Y 5/2) clay films on faces of peds; few dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

2BCg—52 to 60 inches; mottled grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) stratified loam and sandy loam; weak coarse subangular blocky structure; friable; few dark stains (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 10 to 17 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It typically has high chroma mottles throughout. The 2B horizon is sandy loam, clay loam, loam, or silt loam.

Elco Series

The Elco series consists of moderately well drained soils on uplands. These soils formed in loess and in the underlying paleosol, which formed in glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slope ranges from 10 to 18 percent.

Elco soils are similar to Assumption, Fayette, and Sylvan soils and are commonly adjacent to Atlas, Downs, Fayette, and Sylvan soils. Assumption soils have a mollic epipedon. Their position on the landscape is similar to that of the Elco soils. Atlas soils have a fine-textured subsoil. They are somewhat poorly drained and are in the lower landscape positions. Downs, Fayette, and Sylvan soils formed entirely in loess. They are higher on the landscape than the Elco soils. Fayette and Sylvan soils are well drained.

Typical pedon of Elco silt loam, 10 to 18 percent slopes, eroded, 2,340 feet south and 54 feet east of the northwest corner of sec. 2, T. 15 N., R. 3 E., in a pasture:

- Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam mixed with some dark yellowish brown (10YR 4/4) in the lower part; brown (10YR 5/3) dry; weak very fine subangular blocky structure; friable; neutral; abrupt smooth boundary.
- Bt1—6 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine subangular blocky structure parting to moderate very fine and fine granular; friable; common thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.
- Bt2—10 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine subangular blocky structure; friable; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.
- Bt3—19 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine subangular blocky structure; firm; many moderately thick brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.
- 2Btg1—28 to 39 inches; grayish brown (10YR 5/2) silty clay loam; weak medium subangular blocky structure; very firm; many moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; many bright stains (iron and manganese oxides); about 5 percent sand; neutral; clear smooth boundary.
- 2Btg2—39 to 53 inches; grayish brown (10YR 5/2) silty clay loam; weak medium subangular blocky structure; very firm; common thin dark grayish brown (2.5Y 4/2) and grayish brown (2.5Y 5/2) clay films on faces of peds; common bright stains (iron and manganese oxides); about 10 percent sand; neutral; abrupt smooth boundary.
- 2BCg—53 to 60 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) silty clay loam;

weak medium subangular blocky structure; very firm; few thin grayish brown (10YR 5/2) clay films on faces of peds; about 10 percent sand; neutral.

The thickness of the solum ranges from 48 to more than 60 inches. The thickness of the loess ranges from 20 to 40 inches. The surface soil is 3 to 10 inches thick.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is silt loam or silty clay loam. The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The 2B horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 through 6, and chroma of 1 through 4. It is silty clay loam, silty clay, or clay loam.

Elco silty clay loam, 10 to 18 percent slopes, severely eroded, and the Elco soil in the map unit Elco-Atlas silty clay loams, 10 to 18 percent slopes, severely eroded, have higher chroma in the surface layer than is defined as the range for the Elco series. This difference, however, does not affect the use or behavior of the soils.

Elkhart Series

The Elkhart series consists of well drained, moderately permeable soils on uplands. These soils formed in silty calcareous loess. Slope ranges from 8 to 15 percent.

Elkhart soils are similar to Sylvan and Tama soils and are commonly adjacent to Assumption and Tama soils. Assumption soils formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately well drained and are on the lower parts of the landscape. Sylvan soils do not have a mollic epipedon. Tama soils are higher on the landscape than the Elkhart soils. Also, their solum is thicker.

Typical pedon of Elkhart silt loam, 8 to 15 percent slopes, eroded, 60 feet south and 660 feet east of the northwest corner of sec. 8, T. 15 N., R. 3 E., in hayland:

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
- Bt1—10 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common moderately thick brown (10YR 4/3) clay films on faces of peds; neutral; gradual wavy boundary.
- Bt2—18 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear wavy boundary.
- BC—26 to 30 inches; pale brown (10YR 6/3) silt loam; many coarse distinct yellowish brown (10YR 5/8)

- relict mottles; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.
- C1—30 to 37 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) relict mottles; massive; friable; strong effervescence; moderately alkaline; clear smooth boundary.
- C2—37 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse distinct yellowish brown (10YR 5/8) relict mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 20 to 40 inches. The mollic epipedon is 10 to 15 inches thick. The subsoil is slightly acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 through 6.

Fayette Series

The Fayette series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 2 to 20 percent.

Fayette soils are similar to Downs, Rozetta, Seaton, and Sylvan soils and are commonly adjacent to Downs, Elco, Rozetta, and Sylvan soils. Downs soils have a dark surface layer. Their position on the landscape is similar to that of the Fayette soils. Elco soils formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately well drained. Rozetta soils are moderately well drained and are nearly level. They are in the broader areas. Seaton soils contain less clay in the solum than the Fayette soils. Sylvan soils are calcareous at a depth of 20 to 40 inches. Their solum is thinner than that of the Fayette soils. Elco and Sylvan soils are on the lower parts of the landscape.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes, 825 feet south and 676 feet west of the northeast corner of sec. 3, T. 14 N., R. 2 E., in a cultivated field:

- Ap—0 to 8 inches; mixed dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common very pale brown (10YR 7/3) dry silt coatings on faces of peds; neutral; abrupt smooth boundary.
- E—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium platy structure parting to weak fine granular; friable; common light gray (10YR 7/2) dry silt coatings on faces of peds; medium acid; clear smooth boundary.
- BE—12 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine and fine subangular blocky structure; firm; common light gray (10YR 7/2)

- dry silt coatings on faces of peds; medium acid; clear smooth boundary.
- Bt1—16 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine prismatic structure parting to strong very fine and fine subangular blocky; firm; many moderately thick dark brown (7.5YR 4/4) clay films and common very pale brown (10YR 7/3) silt coatings on faces of peds; strongly acid; clear smooth boundary.
- Bt2—24 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium prismatic structure parting to strong fine and medium angular and subangular blocky; firm; many moderately thick dark brown (7.5YR 4/4) clay films and very pale brown (10YR 7/3) silt coatings on faces of peds; few dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.
- Bt3—34 to 46 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick brown (7.5YR 5/4) clay films and very pale brown (10YR 7/3) silt coatings on faces of peds; common dark concretions and stains (iron and manganese oxides); strongly acid; gradual smooth boundary.
- Bt4—46 to 60 inches; yellowish brown (10YR 5/4) silt loam; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm; many thin brown (7.5YR 5/4) clay films and common very pale brown (10YR 7/3) silt coatings on faces of peds; common dark stains (iron and manganese oxides); strongly acid.

The thickness of the solum ranges from 45 to about 60 inches. The surface soil is 5 to 10 inches thick.

The A or Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 3; it is silt loam or silty clay loam. The E horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 1 through 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The lower part of the B horizon and the C horizon are mottled in some pedons.

Gilford Series

The Gilford series consists of very poorly drained soils on outwash plains. These soils formed in sandy outwash sediments. Permeability is moderately rapid in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Gilford soils are similar to Hoopeston and Selma soils and are commonly adjacent to Dickinson, Hoopeston, Selma, and Sparta soils. Dickinson soils are well drained. Hoopeston soils are somewhat poorly drained. Selma soils contain more clay throughout the solum than the Gilford soils. Their position on the landscape is similar to that of the Gilford soils. Sparta soils are excessively

drained. They contain more sand in the solum than the Gilford soils. Dickinson, Hoopston, and Sparta soils are in the higher landscape positions.

Typical pedon of Gilford fine sandy loam, 1,800 feet east and 1,800 feet north of the southwest corner of sec. 10, T. 17 N., R. 5 E., in a cornfield:

- Ap—0 to 8 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; moderate medium subangular blocky structure parting to weak fine granular; friable; neutral; clear smooth boundary.
- A—8 to 12 inches; black (10YR 2/1) and very dark gray (10YR 3/1) fine sandy loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.
- Bg1—12 to 20 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
- Bg2—20 to 28 inches; grayish brown (2.5Y 5/2) sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; very dark gray (10YR 3/1) krotovinas; neutral; abrupt wavy boundary.
- BCg—28 to 34 inches; mottled light brownish gray (2.5Y 6/2) and grayish brown (2.5Y 5/2) loamy sand; weak medium subangular blocky structure; friable; dark grayish brown (2.5Y 4/2) krotovinas; neutral; clear wavy boundary.
- Cg1—34 to 42 inches; light brownish gray (10YR 6/2) fine sand; single grain; loose; grayish brown (2.5Y 5/2) krotovinas; neutral; gradual wavy boundary.
- Cg2—42 to 51 inches; mottled light brownish gray (2.5Y 6/2) and grayish brown (2.5Y 5/2) sand; single grain; loose; neutral; clear wavy boundary.
- Cg3—51 to 60 inches; light brownish gray (10YR 6/2) sand; single grain; loose; neutral.

The thickness of the solum ranges from 20 to 42 inches. The mollic epipedon is 10 to 22 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is fine sandy loam or sandy loam. The Bg horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. It is fine sandy loam or sandy loam grading to loamy sand in the BCg horizon. The C horizon is fine sand or sand. It has free carbonates in some pedons.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on outwash plains. These soils formed in calcareous silty material derived from loess. Slope ranges from 0 to 2 percent.

Harpster soils are similar to Calco and Canisteo soils and are commonly adjacent to Canisteo, Drummer, Pella,

and Selma soils. The adjacent and similar soils do not have a calcic horizon. Calco soils have a mollic epipedon that is more than 24 inches thick. They are on flood plains. Canisteo and Selma soils contain more sand in the solum than the Harpster soils. Selma soils are not calcareous. Canisteo soils are in positions on the landscape similar to those of the Harpster soils. Drummer and Pella soils are not calcareous within a depth of 20 inches. Drummer, Pella, and Selma soils are in the lower landscape positions.

Typical pedon of Harpster silty clay loam, 1,585 feet south and 200 feet east of the northwest corner of sec. 19, T. 18 N., R. 5 E., in a cornfield:

- Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to weak medium granular; firm; few bright stains and concretions (iron and manganese oxides); few snail shell fragments; strong effervescence; moderately alkaline; clear smooth boundary.
- Ak1—7 to 11 inches; black (10YR 2/1) silty clay loam mixed with some very dark grayish brown (2.5Y 3/2) in the lower part; dark gray (10YR 4/1) dry; weak very fine and fine subangular blocky structure parting to weak very fine and fine granular; firm; few snail shell fragments; strong effervescence; moderately alkaline; abrupt smooth boundary.
- Ak2—11 to 16 inches; black (10YR 2/1) and very dark grayish brown (2.5Y 3/2) silty clay loam, dark gray (10YR 4/1) dry; few medium prominent light brownish gray (2.5Y 6/2) mottles; weak very fine and fine subangular blocky structure; firm; many bright stains and concretions (iron and manganese oxides); common snail shell fragments; violent effervescence; moderately alkaline; abrupt smooth boundary.
- Bkg—16 to 22 inches; mottled grayish brown (2.5Y 5/2) and olive brown (2.5Y 4/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; black (10YR 2/1) krotovinas; many snail shell fragments; violent effervescence; moderately alkaline; clear smooth boundary.
- Bg1—22 to 29 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many bright stains and concretions (iron and manganese oxides); black (10YR 2/1) krotovinas; few snail shell fragments; strong effervescence; moderately alkaline; clear smooth boundary.
- Bg2—29 to 36 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent olive brown (2.5Y 4/4) mottles; moderate medium prismatic structure; firm; very dark gray (10YR 3/1) root channel linings; few snail shell fragments; strong effervescence; moderately alkaline; abrupt smooth boundary.

Bg3—36 to 41 inches; mottled gray (5Y 5/1) and olive brown (2.5Y 4/4) silty clay loam; weak coarse prismatic structure; firm; very dark gray (10YR 3/1) root channel linings; few snail shell fragments; strong effervescence; moderately alkaline; abrupt smooth boundary.

Cg—41 to 60 inches; mottled olive brown (2.5Y 4/4) and grayish brown (2.5Y 5/2) silt loam; massive; firm; very dark gray (10YR 3/1) root channel linings; few snail shell fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 45 inches. The mollic epipedon is 11 to 19 inches thick. The calcic horizon is typically at the surface or within a depth of 16 inches. The subsoil is mildly alkaline or moderately alkaline.

The Ap horizon is neutral in hue or has hue of 10YR. It has value of 2 or 3 and chroma of 0 or 1. It is silty clay loam or silt loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 or 2. It is commonly mottled. The C horizon is stratified silt loam, sandy loam, or loam.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on uplands. These soils formed in a thin layer of loess and in the underlying Illinoian glacial till. Slope ranges from 10 to 35 percent.

Hickory soils are similar to Velma soils and are commonly adjacent to Atlas, Downs, Fayette, and Marseilles soils. Atlas soils are somewhat poorly drained. They formed in a thin layer of loess and in the underlying paleosol, which formed in Illinoian till. Downs and Fayette soils formed entirely in loess. Atlas, Downs, and Fayette soils are higher on the landscape than the Hickory soils. Marseilles soils formed in material weathered from Pennsylvanian shale. They are in the lower landscape positions. Velma soils have a mollic epipedon. Their position on the landscape is similar to that of the Hickory soils.

Typical pedon of Hickory silt loam, 10 to 18 percent slopes, eroded, 1,000 feet west and 300 feet north of the southeast corner of sec. 18, T. 14 N., R. 3 E., in a cultivated field:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

2Bt1—5 to 14 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky structure; firm; common moderately thick brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—14 to 29 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to

moderate fine and medium angular and subangular blocky; firm; common moderately thick brown (7.5YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt3—29 to 47 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

2BC—47 to 60 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct brownish yellow (10YR 6/8) mottles; weak medium and coarse subangular blocky structure; firm; few thin dark yellowish brown (10YR 4/4) clay films on faces of peds; common dark stains (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 42 to more than 60 inches. The loess is less than 20 inches thick. The surface soil is 4 to 10 inches thick.

The A horizon, if it occurs, has hue of 10YR, value of 3 or 4, and chroma of 2. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A or Ap horizon is loam, clay loam, or silt loam. The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. It is clay loam or silty clay loam. In some pedons it is mottled in the lower part.

Hoopeston Series

The Hoopeston series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils formed in loamy and sandy outwash sediments. Permeability is moderately rapid in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Hoopeston soils are similar to Gilford and Watseka soils and are commonly adjacent to Dickinson, Gilford, Oakville, and Sparta soils. Dickinson and Oakville soils are well drained. Gilford soils are very poorly drained. Sparta soils are excessively drained. Oakville, Sparta, and Watseka soils contain more sand in the solum than the Hoopeston soils. Oakville soils do not have a mollic epipedon. Dickinson, Oakville, and Sparta soils are in the higher landscape positions, and Gilford soils are in the lower landscape positions. Watseka soils are in positions on the landscape similar to those of the Hoopeston soils.

Typical pedon of Hoopeston sandy loam, 265 feet north and 1,450 feet west of the southeast corner of sec. 8, T. 18 N., R. 4 E., in a cultivated field:

Ap—0 to 7 inches; black (10YR 2/1) sandy loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak very fine

granular; very friable; slightly acid; clear smooth boundary.

- AB—7 to 17 inches; very dark gray (10YR 3/1) sandy loam mixed with some dark brown (10YR 4/3) in the lower part; dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; very friable; neutral; clear smooth boundary.
- Bw—17 to 31 inches; dark brown (10YR 4/3), dark grayish brown (10YR 4/2), and brown (10YR 5/3) sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium and fine subangular blocky structure; very friable; neutral; clear smooth boundary.
- C—31 to 42 inches; brown (10YR 5/3), dark grayish brown (10YR 4/2), and grayish brown (10YR 5/2) loamy sand; few medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 4/6) mottles; weak medium and coarse subangular blocky structure; very friable; neutral; clear smooth boundary.
- Cg1—42 to 48 inches; light brownish gray (2.5Y 6/2) sand; few medium distinct yellowish brown (10YR 5/6) mottles; single grain; loose; mildly alkaline; clear smooth boundary.
- Cg2—48 to 60 inches; grayish brown (2.5Y 5/2) loamy sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grain; very friable; neutral.

The thickness of the solum ranges from 20 to 44 inches. The mollic epipedon is 12 to 23 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is commonly sandy loam or fine sandy loam, but the range includes loam and loamy fine sand. The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is mottled. It typically is sandy loam or fine sandy loam, but in a few pedons it has thin layers of loam. The C horizon is commonly loamy sand or sand, but in some pedons it has thin strata of sandy loam.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

Ipava soils are similar to Muscatine soils and are commonly adjacent to Clarksdale, Denny, Sable, and Tama soils. Clarksdale and Denny soils have an albic horizon. Their dark surface layer is thinner than that of the Ipava soils. Denny soils are poorly drained and are in depressions. Clarksdale and Muscatine soils are in positions on the landscape similar to those of the Ipava soils. Muscatine soils contain less clay in the subsoil than the Ipava soils. Sable soils are poorly drained and are lower on the landscape than the Ipava soils. Also, they contain less clay in the subsoil. Tama soils are moderately well drained and well drained and are on the narrower ridgetops or the more sloping parts of the

landscape. They contain less clay in the subsoil than the Ipava soils.

Typical pedon of Ipava silt loam, 0 to 3 percent slopes, 204 feet south and 135 feet east of the northwest corner of sec. 10, T. 14 N., R. 1 E., in a cultivated field:

- Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; neutral; abrupt smooth boundary.
- A—7 to 14 inches; black (10YR 2/1) silty clay loam mixed with some dark grayish brown (10YR 4/2) in the lower part; dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; few dark concretions (iron and manganese oxides); neutral; clear smooth boundary.
- Bt1—14 to 17 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate very fine subangular blocky structure; friable; many very dark brown (10YR 2/2) organic coatings on faces of peds; few dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.
- Bt2—17 to 24 inches; brown (10YR 5/3) silty clay loam; common fine faint yellowish brown (10YR 5/6) and many fine distinct grayish brown (2.5Y 5/2) mottles; weak fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; common dark stains and concretions (iron and manganese oxides); medium acid; clear smooth boundary.
- Btg1—24 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium prismatic structure parting to moderate fine subangular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; common dark stains (iron and manganese oxides); medium acid; clear smooth boundary.
- Btg2—32 to 40 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium faint light olive brown (2.5Y 5/4) and many fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many moderately thick grayish brown (10YR 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); slightly acid; clear smooth boundary.
- Btg3—40 to 50 inches; light brownish gray (2.5Y 6/2) silt loam; many fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; many thin grayish brown (10YR 5/2) clay films on faces of peds; many dark stains (iron and manganese oxides); neutral; gradual smooth boundary.

Cg1—50 to 58 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/8) silt loam; massive; friable; common dark stains (iron and manganese oxides); weak effervescence; mildly alkaline; gradual smooth boundary.

Cg2—58 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many fine and medium distinct yellowish brown (10YR 5/8) mottles; massive; friable; common dark stains (iron and manganese oxides); common lime concretions; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to more than 60 inches. The mollic epipedon is 14 to 22 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is silty clay loam or silt loam. The Bt horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 or 3. It is commonly mottled throughout.

Jasper Series

The Jasper series consists of well drained soils on outwash plains, stream terraces, and side slopes on dissected uplands. These soils formed in loamy outwash material. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 15 percent.

Jasper soils are commonly adjacent to Dickinson, La Hogue, and Selma soils. Dickinson soils contain more sand in the solum than the Jasper soils and do not have an argillic horizon. Their position on the landscape is similar to that of the Jasper soils. The somewhat poorly drained La Hogue and poorly drained Selma soils are in the lower landscape positions.

Typical pedon of Jasper loam, sandy substratum, 0 to 2 percent slopes, 1,155 feet south and 2,405 feet east of the northwest corner of sec. 4, T. 17 N., R. 3 E., in a cornfield:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; neutral; abrupt smooth boundary.

A—5 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

BA—11 to 16 inches; dark brown (10YR 3/3) loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; slightly acid; gradual wavy boundary.

Bt1—16 to 22 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; common moderately thick reddish brown (5YR 4/3) clay films on faces of peds; medium acid; gradual wavy boundary.

Bt2—22 to 29 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; many moderately thick reddish brown (5YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt3—29 to 41 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; common moderately thick dark reddish brown (5YR 3/4) clay films on faces of peds; strongly acid; clear wavy boundary.

BC—41 to 46 inches; brown (7.5YR 4/4) and strong brown (7.5YR 5/6) sandy loam; weak coarse subangular blocky structure; very friable; few thin dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; gradual wavy boundary.

2C—46 to 60 inches; strong brown (7.5YR 5/6) sand; single grain; loose; slightly acid.

The thickness of the solum ranges from 30 to 48 inches. The mollic epipedon is 10 to 18 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is commonly loam or fine sandy loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 8. It is dominantly clay loam or sandy clay loam but has thin subhorizons of loam or fine sandy loam. The C horizon is loamy sand or sand.

Jasper loam, sandy substratum, 10 to 15 percent slopes, severely eroded, has a dark surface soil that is thinner than is defined as the range for the Jasper series. This difference, however, does not significantly affect the use or behavior of the soil.

Joy Series

The Joy series consists of somewhat poorly drained, moderately permeable soils on uplands and outwash plains. These soils formed in loess. Slope ranges from 0 to 2 percent.

Joy soils are similar to Muscatine soils and are commonly adjacent to Port Byron, Sable, and Thorp soils. Muscatine soils contain more clay in the subsoil than the Joy soils. Their position on the landscape is similar to that of the Joy soils. Port Byron soils are moderately well drained and well drained. They are in the higher positions on uplands. Sable soils are poorly drained. They contain more clay in the solum than the Joy soils. They are in the lower positions on uplands. Thorp soils are poorly drained. They contain more clay in the subsoil than the Joy soils and have an albic horizon. They are in the lower positions on outwash plains.

Typical pedon of Joy silt loam, 1,980 feet east and 2,600 feet north of the southwest corner of sec. 26, T. 18 N., R. 3 E., in a cornfield:

Ap—0 to 5 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium

- granular structure; friable; medium acid; abrupt smooth boundary.
- A1—5 to 13 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; slightly acid; clear smooth boundary.
- A2—13 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; neutral; clear smooth boundary.
- Bw1—17 to 21 inches; dark brown (10YR 4/3) silt loam; moderate fine and medium subangular blocky structure; friable; common dark grayish brown (10YR 4/2) coatings on faces of peds; neutral; clear smooth boundary.
- Bw2—21 to 27 inches; grayish brown (10YR 5/2) and brown (10YR 5/3) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common dark grayish brown (10YR 4/2) coatings on faces of peds; common dark stains (iron and manganese oxides); neutral; clear smooth boundary.
- Bw3—27 to 34 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common brown (10YR 5/3) coatings on faces of peds; common dark stains (iron and manganese oxides); neutral; clear smooth boundary.
- Bg—34 to 49 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silt loam; weak fine prismatic structure parting to weak fine and medium subangular blocky; friable; few grayish brown (10YR 5/2) coatings on faces of peds; common dark stains (iron and manganese oxides); neutral; gradual smooth boundary.
- Cg—49 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common dark stains (iron and manganese oxides); mildly alkaline.

The thickness of the solum ranges from 36 to 55 inches. The mollic epipedon is 10 to 24 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bw horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is mottled.

Keltner Series

The Keltner series consists of well drained soils on uplands and benches. These soils formed in loess and in the underlying shale residuum. Permeability is moderate

in the upper part of the profile and slow in the lower part. Slope ranges from 2 to 10 percent.

Keltner soils are similar to Plano, Proctor, and Tama soils and are commonly adjacent to Elburn, Loran, Plano, and Proctor soils. Elburn, Plano, and Proctor soils formed in loess and in the underlying loamy outwash. Loran, Plano, Proctor, and Tama soils are in positions on the landscape similar to those of the Keltner soils. Elburn and Loran soils are somewhat poorly drained. The nearly level Elburn soils are on the lower parts of the landscape. Tama soils formed entirely in loess.

Typical pedon of Keltner silt loam, 2 to 5 percent slopes, 1,350 feet south and 60 feet east of the center of sec. 27, T. 16 N., R. 5 E.

- Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; weak medium granular structure; friable; neutral; abrupt smooth boundary.
- A—7 to 12 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; neutral; clear wavy boundary.
- AB—12 to 17 inches; very dark brown (10YR 2/2) and dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; slightly acid; clear wavy boundary.
- Bt1—17 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to strong fine and medium subangular blocky; firm; many moderately thick dark brown (10YR 4/3) clay films on faces of peds; medium acid; gradual wavy boundary.
- Bt2—25 to 35 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to strong medium subangular blocky; firm; many moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; few dark stains (iron and manganese oxides) in the lower part; slightly acid; gradual wavy boundary.
- Bt3—35 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure; firm; common moderately thick yellowish brown (10YR 5/4) clay films on faces of peds; few dark stains (iron and manganese oxides); neutral; abrupt wavy boundary.
- 2BC—48 to 53 inches; mottled light olive brown (2.5Y 5/4) and brownish yellow (10YR 6/6) silty clay; weak coarse prismatic structure; firm; weak effervescence; moderately alkaline; clear wavy boundary.
- 2Cr—53 to 60 inches; mottled olive (5Y 5/3), grayish brown (2.5Y 5/2), light olive brown (2.5Y 5/4), and brownish yellow (10YR 6/8) clayey shale; massive; firm; violent effervescence; moderately alkaline.

The thickness of the solum and the depth to bedrock range from 40 to 60 inches. The thickness of the loess ranges from 30 to 50 inches. The mollic epipedon is 11 to 17 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. It is commonly mottled in the lower part. The 2BC horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 through 6. It is silty clay loam, silty clay, or clay.

Keomah Series

The Keomah series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

Keomah soils are similar to Clarksdale soils and are commonly adjacent to Clarksdale, Downs, Fayette, and Rozetta soils. Clarksdale soils have a dark surface soil. Downs soils are well drained and moderately well drained. They contain less clay in the solum than the Keomah soils. Also, they are on narrower ridgetops or more sloping parts of the landscape. The well drained Fayette and moderately well drained Rozetta soils contain less clay in the solum than the Keomah soils. Fayette soils are on the more sloping parts of the landscape. Rozetta soils are on the narrower ridgetops.

Typical pedon of Keomah silt loam, 0 to 3 percent slopes, 15 feet north and 2,400 feet west of the southeast corner of sec. 31, T. 14 N., R. 1 E., in a cornfield:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; very friable; neutral; clear smooth boundary.

E1—7 to 9 inches; dark grayish brown (10YR 4/2) silt loam mixed with some brown (10YR 5/3) in the lower part; weak fine and medium platy structure parting to weak very fine granular; very friable; slightly acid; clear smooth boundary.

E2—9 to 11 inches; brown (10YR 5/3) silt loam mixed with some dark grayish brown (10YR 4/2) in the upper part; moderate fine and medium platy structure parting to weak very fine granular; friable; few dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

BE—11 to 14 inches; brown (10YR 5/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common light gray (10YR 7/2) silt coatings on faces of peds; common dark stains (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt1—14 to 20 inches; brown (10YR 5/3) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; strong very fine and fine subangular and angular blocky structure; friable; many moderately

thick grayish brown (10YR 5/2) silt coatings on faces of peds; common dark stains (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt2—20 to 32 inches; brown (10YR 5/3) silty clay; few fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate very fine and fine subangular and angular blocky structure; firm; many moderately thick grayish brown (10YR 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt3—32 to 44 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); very strongly acid; clear smooth boundary.

BCg—44 to 50 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; friable; common dark stains and concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Cg—50 to 60 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silt loam; massive; friable; common dark stains and concretions (iron and manganese oxides); neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The surface soil is 10 to 15 inches thick.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The E horizon has hue of 10YR. It has value of 4 or 5 and chroma of 1 or 2 in the upper part and value of 5 and chroma of 2 or 3 in the lower part. The Bt horizon is silty clay loam or silty clay. It has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. Mottles with high chroma increase in number with increasing depth.

La Hogue Series

The La Hogue series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils formed in loamy and sandy outwash material. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 3 percent.

La Hogue soils are similar to Hoopston soils and are commonly adjacent to Dickinson, Orio, and Selma soils. Dickinson and Hoopston soils contain less clay in the solum than the La Hogue soils. Dickinson soils are well drained. They are on the higher parts of the landscape. Orio and Selma soils are poorly drained. Orio soils are in depressional areas. They have an albic horizon. Their dark surface soil is thinner than that of the La Hogue

soils. Selma soils are on the lower parts of the landscape.

Typical pedon of La Hogue loam, 0 to 3 percent slopes, 2,250 feet south and 1,190 feet east of the northwest corner of sec. 18, T. 17 N., R. 4 E., in a soybean stubble field:

- Ap—0 to 7 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; neutral; abrupt smooth boundary.
- A—7 to 15 inches; black (10YR 2/1) loam mixed with dark brown (10YR 4/3) in the lower part; very dark gray (10YR 3/1) dry; weak fine and medium granular structure; friable; neutral; clear smooth boundary.
- BA—15 to 19 inches; very dark grayish brown (10YR 3/2) and brown (10YR 4/3) clay loam, dark grayish brown (10YR 4/2) dry; weak fine and very fine subangular blocky structure; friable; many very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear wavy boundary.
- Bt1—19 to 23 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay loam; many fine and medium prominent light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable; common moderately thick dark grayish brown (10YR 4/2) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.
- Bt2—23 to 29 inches; brown (10YR 5/3) clay loam; common fine faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; many moderately thick brown (7.5YR 5/2) clay films on faces of peds; few dark concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.
- Bt3—29 to 36 inches; brown (10YR 5/3) and pale brown (10YR 6/3) clay loam; common fine faint grayish brown (10YR 5/2) and many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick brown (10YR 5/3) clay films on faces of peds; few dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.
- Btg—36 to 45 inches; light brownish gray (10YR 6/2) and pale brown (10YR 6/3) sandy clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; many thin grayish brown (2.5Y 5/2) clay films on faces of peds; neutral; clear smooth boundary.
- Bg—45 to 52 inches; mottled light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) sandy clay loam; weak medium prismatic structure parting to weak

medium subangular blocky; firm; neutral; clear smooth boundary.

- BC—52 to 60 inches; mottled brown (10YR 5/3) and yellowish brown (10YR 5/6) stratified sandy loam and loamy sand; weak medium and coarse subangular blocky structure; friable; dark grayish brown (2.5Y 4/2) krotovinas; neutral.

The thickness of the solum ranges from 42 to 60 inches. The mollic epipedon is 10 to 24 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is loam or sandy loam. The Bt horizon has hue of dominantly 10YR but in some pedons grades to 2.5Y in the lower part. It has value of 4 through 6 and chroma of 2 through 6. It is commonly mottled throughout and in the upper part has chroma of 2 in the matrix or in the mottles. It is sandy clay loam, loam, or clay loam. The BC horizon is sandy loam or loamy sand.

Lenzburg Series

The Lenzburg series consists of well drained, moderately slowly permeable soils in surface mine areas. These soils formed in loamy material that was excavated during coal mining activities. Slope ranges from 1 to 60 percent.

Lenzburg soils are adjacent to Drummer, Elburn, and Plano soils. The poorly drained Drummer soils, the somewhat poorly drained Elburn soils, and the Plano soils formed in undisturbed loess and in the underlying glacial drift.

Typical pedon of Lenzburg clay loam, 30 to 60 percent slopes, 420 feet south and 150 feet east of the center of sec. 35, T. 17 N., R. 4 E., in a coal-mined area:

- A—0 to 7 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure parting to weak very fine and fine granular; friable; about 15 percent black (N 2/0) shale fragments; strong effervescence; many roots; moderately alkaline; clear wavy boundary.
- C1—7 to 17 inches; mixed black (10YR 2/1) and dark brown (10YR 3/3) shaly clay loam, dark gray (2.5Y 4/0 and 10YR 4/1) dry; weak fine subangular blocky structure parting to moderate very fine and fine granular; friable; about 30 percent black (N 2/0) shale fragments; strong effervescence; common roots; moderately alkaline; gradual wavy boundary.
- C2—17 to 36 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) shaly loam; weak very fine granular structure; friable; about 30 percent black (N 2/0) shale fragments; violent effervescence; common roots; moderately alkaline; gradual wavy boundary.
- C3—36 to 60 inches; brown (10YR 4/3) shaly sandy loam; weak very fine granular structure parting to

single grain; very friable; about 30 percent black (N 2/0) shale fragments; strong effervescence; few roots; moderately alkaline.

Reaction is mildly alkaline to strongly alkaline throughout the profile. The surface layer is 3 to 15 inches thick. Shale and coal fragments range from 3 to 12 inches in diameter and are 1/8 to 1 inch thick. The content of these fragments ranges from 5 to 30 percent. The fragments range from soft to very hard and brittle.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is clay loam, silt loam, or silty clay loam. The C horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 4. It is clay loam, loam, sandy loam, loamy sand, or the shaly analogs of these textures.

Loran Series

The Loran series consists of somewhat poorly drained soils formed in loess and in the underlying calcareous shale residuum on uplands. Permeability is moderately slow in the upper part of the profile and slow in the lower part. Slope ranges from 0 to 10 percent.

Loran soils are similar to Muscatine soils and are commonly adjacent to Keltner, Plano, Radford, and Sawmill soils. Keltner soils are well drained. Their position on the landscape is similar to that of the Loran soils. Muscatine soils formed entirely in loess on uplands. Plano soils formed in loess and in the underlying stratified outwash. They are well drained and are in the higher landscape positions. Radford and Sawmill soils formed in alluvium on stream bottoms. Sawmill soils are poorly drained.

Typical pedon of Loran silt loam, 2 to 5 percent slopes, 540 feet east and 1,410 feet north of the southwest corner of sec. 24, T. 15 N., R. 3 E., in a cultivated field:

- Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure parting to moderate medium granular; friable; neutral; clear smooth boundary.
- A—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; friable; slightly acid; clear smooth boundary.
- BA—12 to 17 inches; brown (10YR 4/3) and dark brown (10YR 3/3) silty clay loam; weak fine and very fine subangular blocky structure; friable; slightly acid; gradual wavy boundary.
- Bt1—17 to 25 inches; brown (10YR 5/3) silty clay loam; few fine faint light gray (10YR 7/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak very fine and fine subangular blocky structure; friable; many moderately thick grayish brown (10YR 5/2) clay films on faces of peds; common dark

stains (iron and manganese oxides); slightly acid; gradual smooth boundary.

Bt2—25 to 32 inches; brown (10YR 5/3) silty clay loam; few fine and medium faint light brownish gray (10YR 6/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; many moderately thick grayish brown (10YR 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg—32 to 43 inches; light brownish gray (10YR 6/2) silty clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; many thin grayish brown (2.5Y 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); slightly acid; abrupt smooth boundary.

2Bg—43 to 51 inches; mottled grayish brown (2.5Y 5/2), light olive brown (2.5Y 5/4), yellowish brown (10YR 5/6), and light olive gray (5Y 6/2) clay; weak coarse prismatic structure; very firm; few lime concretions; many dark stains (iron and manganese oxides); weak effervescence; mildly alkaline; clear smooth boundary.

2Cg—51 to 60 inches; mottled light brownish gray (2.5Y 6/2), light olive gray (5Y 6/2), and yellowish brown (10YR 5/6) clay; massive; very firm; common lime concretions; common dark stains (iron and manganese oxides); strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 60 inches. The thickness of the loess ranges from 30 to 50 inches. The mollic epipedon is 10 to 16 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 or 3. It is mottled. The 2B horizon has hue of 2.5Y or 5Y, value of 5 or 6, chroma of 1 or 2 and has high chroma mottles. It is silty clay or clay. In some pedons a layer of glacial drift is between the loess and the residuum.

Loran silt loam, 5 to 10 percent slopes, eroded, has a dark surface soil that is thinner than is defined as the range for the Loran series. This difference, however, does not significantly affect the use or behavior of the soil.

Marseilles Series

The Marseilles series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from Pennsylvanian shale. Permeability is moderate in the upper part of the profile and slow in the lower part. Slope ranges from 12 to 35 percent.

Marseilles soils are commonly adjacent to Atlas, Fayette, and Hickory soils. They are lower on the landscape than the adjacent soils. Atlas soils formed in a thin layer of loess and in the underlying paleosol, which formed in Illinoian till. They are somewhat poorly drained. Fayette soils formed entirely in loess. Hickory soils formed in a thin layer of loess and in the underlying Illinoian glacial drift.

Typical pedon of Marseilles silt loam, 18 to 35 percent slopes, eroded, 250 feet east and 1,700 feet south of the northwest corner of sec. 33, T. 16 N., R. 3 E., in a grassy field:

- A—0 to 5 inches; mixed dark brown (10YR 3/3) and yellowish brown (10YR 5/4) silt loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.
- BA—5 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure parting to moderate fine and medium granular; friable; medium acid; clear smooth boundary.
- 2Bt1—12 to 19 inches; light olive brown (2.5Y 5/4) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
- 2Bt2—19 to 28 inches; light olive brown (2.5Y 5/4) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; firm; many moderately thick olive (5Y 5/3) clay films on faces of peds; strongly acid; clear smooth boundary.
- 2Bt3—28 to 37 inches; olive (5Y 5/3) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common moderately thick olive gray (5Y 5/2) clay films on faces of peds; strongly acid; gradual smooth boundary.
- 2Cr—37 to 60 inches; olive (5Y 5/3) silty shale; massive; firm; strongly acid.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The loess is less than 15 inches thick. The surface soil is 4 to 11 inches thick.

The A or Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 4. It is silt loam or silty clay loam. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The 2B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 2 through 4. It is commonly mottled.

The Marseilles soils in the Marseilles-Hickory complex, 10 to 18 percent slopes, severely eroded, and in the map unit Marseilles-Atlas silty clay loams, 12 to 18 percent slopes, severely eroded, have higher chroma in the surface soil than is defined as the range for the

Marseilles series. This difference, however, does not significantly affect the use or behavior of the soils.

Miami Series

The Miami series consists of well drained soils on uplands. These soils formed in glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slope ranges from 5 to 60 percent.

Miami soils are similar to Hickory soils and are commonly adjacent to Assumption, Fayette, Sylvan, and Timula soils. Assumption soils have a mollic epipedon. They formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately well drained and are higher on the landscape than the Miami soils. Hickory soils do not have free carbonates within a depth of 40 inches. Their position on the landscape is similar to that of the Miami soils. Fayette, Sylvan, and Timula soils formed entirely in loess. They are higher on the landscape than the Miami soils.

Typical pedon of Miami loam, 10 to 18 percent slopes, eroded, 130 feet east and 610 feet south of the northwest corner of sec. 7, T. 14 N., R. 3 E., in a pasture:

- Ap—0 to 8 inches; dark brown (10YR 4/3) loam, dark yellowish brown (10YR 4/4) dry; weak medium subangular blocky structure; firm; slightly acid; abrupt smooth boundary.
- Bt1—8 to 15 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate fine and medium subangular blocky structure; firm; many moderately thick brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.
- Bt2—15 to 20 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to weak fine and medium subangular blocky; firm; many moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; gradual smooth boundary.
- Bt3—20 to 25 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure; firm; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.
- C—25 to 60 inches; yellowish brown (10YR 5/4) sandy loam; massive; firm; strong effervescence; mildly alkaline.

The thickness of the solum and the depth to free carbonates range from 24 to 38 inches. The surface soil is 5 to 15 inches thick.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon, if it occurs, is brown (10YR 5/3) or light yellowish brown (10YR 6/4). The Bt horizon has hue of 10YR, value of 4 or 5, and

chroma of 3 or 4. It is clay loam or loam. The C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or loam.

Milford Series

The Milford series consists of poorly drained, moderately slowly permeable soils in glacial lakebeds on outwash plains. These soils formed in lacustrine material. Slope ranges from 0 to 2 percent.

Milford soils are similar to Drummer soils and are commonly adjacent to Booker, Drummer, Montgomery, and Selma soils. They are in positions on the landscape similar to those of the adjacent soils. Booker and Montgomery soils contain more clay in the solum than the Milford soils. Montgomery soils contain free carbonates in the lower part of the solum. They are very poorly drained. Drummer and Selma soils contain less clay in the solum than the Milford soils. Also, Selma soils contain more sand.

Typical pedon of Milford silty clay loam, 590 feet south and 45 feet west of the northeast corner of sec. 19, T. 17 N., R. 5 E., in a soybean field:

- Ap—0 to 9 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; firm; neutral; clear smooth boundary.
- A—9 to 17 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure parting to weak fine and medium granular; firm; neutral; clear smooth boundary.
- AB—17 to 23 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate fine and medium angular blocky structure; firm; neutral; abrupt smooth boundary.
- Btg1—23 to 28 inches; dark gray (5Y 4/1) silty clay loam; many fine and medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many thin very dark gray (5Y 3/1) clay films on faces of peds; neutral; clear smooth boundary.
- Btg2—28 to 35 inches; gray (5Y 5/1) silty clay loam; many fine and medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; many thin dark gray (5Y 4/1) clay films on faces of peds; neutral; abrupt smooth boundary.
- Btg3—35 to 45 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; common thin gray (5Y 5/1) clay films on faces of peds; neutral; abrupt smooth boundary.
- Btg4—45 to 55 inches; gray (5Y 5/1) silty clay; many medium prominent strong brown (7.5YR 5/6)

mottles in the upper part and common fine prominent yellowish brown (10YR 5/6) mottles in the lower part; moderate coarse prismatic structure; firm; many thin dark gray (5Y 4/1) clay films on faces of peds; neutral; abrupt smooth boundary.

BCg—55 to 60 inches; grayish brown (2.5Y 5/2) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; neutral.

The thickness of the solum ranges from 42 to 60 inches. The mollic epipedon is 12 to 24 inches thick.

The Ap horizon is black (10YR 2/1 or N 2/0) or very dark gray (10YR 3/1). The Bg horizon is neutral in hue or has hue of 2.5Y or 5Y. It has value of 4 through 6 and chroma of 0 through 2. It has high chroma mottles. It is dominantly silty clay loam or silty clay. In some pedons, however, it has strata of clay loam, loam, or sandy loam in the lower part.

Millbrook Series

The Millbrook series consists of somewhat poorly drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess and in the underlying glacial outwash. Slope ranges from 0 to 3 percent.

Millbrook soils are similar to Brenton and Elburn soils and are commonly adjacent to Brenton, Drummer, Elburn, and Proctor soils. The adjacent soils have a mollic epipedon and do not have an albic horizon. Brenton and Elburn soils are in positions on the landscape similar to those of the Millbrook soils. Drummer soils are poorly drained and are on the lower parts of the landscape. Proctor soils are well drained and are on the higher, more sloping parts of the landscape.

Typical pedon of Millbrook silt loam, 0 to 3 percent slopes, 1,100 feet east and 1,400 feet south of the northwest corner of sec. 6, T. 14 N., R. 3 E., in a soybean field:

- Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; neutral; abrupt smooth boundary.
- E1—9 to 12 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure; friable; medium acid; clear smooth boundary.
- E2—12 to 17 inches; light brownish gray (10YR 6/2) silt loam; weak medium platy structure; friable; medium acid; gradual smooth boundary.
- Bt1—17 to 21 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; many moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; medium acid; clear wavy boundary.

Bt2—21 to 28 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) silty clay loam; many medium and coarse prominent yellowish brown (10YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; many moderately thick brown (10YR 5/3) clay films on faces of peds; slightly acid; clear wavy boundary.

Bt3—28 to 38 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; many moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; common dark stains (iron and manganese oxides); slightly acid; gradual wavy boundary.

2Bt4—38 to 42 inches; grayish brown (2.5Y 5/2) silt loam; common medium prominent yellowish brown (10YR 5/8) and common fine distinct light gray (2.5Y 7/2) mottles; moderate medium subangular blocky structure; friable; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; few dark stains (iron and manganese oxides); slightly acid; clear wavy boundary.

2C—42 to 60 inches; light olive brown (2.5Y 5/4) and brown (10YR 4/3) stratified fine sandy loam and loamy sand; common medium prominent yellowish brown (10YR 5/8) and few medium distinct light gray (2.5Y 7/2) mottles; massive; friable; neutral.

The thickness of the solum ranges from 40 to 55 inches. The thickness of the loess ranges from 22 to 40 inches. The dark surface layer is 6 to 10 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 or 3. The 2B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 6. It is silt loam, loam, sandy loam, sandy clay loam, or clay loam. The 2C horizon is stratified fine sandy loam, silt loam, or loamy sand.

Montgomery Series

The Montgomery series consists of very poorly drained, slowly permeable soils on glacial lake plains. These soils formed in calcareous lacustrine material. Slope ranges from 0 to 2 percent.

The Montgomery soils in this county contain more montmorillonitic clay than is defined as the range for the Montgomery series. This difference, however, does not significantly affect the use or behavior of the soils.

Montgomery soils are similar to Booker and Pella soils and are commonly adjacent to Aholt, Booker, and Milford soils. They are in positions on the landscape similar to those of the adjacent soils. Aholt and Booker soils contain more clay in the subsoil than the Montgomery

soils. Also, Aholt soils are calcareous throughout. The poorly drained Milford and Pella soils contain less clay in the solum than the Montgomery soils. Also, Milford soils do not have free carbonates in the solum.

Typical pedon of Montgomery silty clay, 1,400 feet west and 250 feet north of the southeast corner of sec. 7, T. 18 N., R. 4 E., in a cultivated field:

Ap—0 to 8 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; firm; neutral; clear smooth boundary.

A1—8 to 13 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure parting to moderate medium granular; firm; neutral; clear smooth boundary.

A2—13 to 17 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; firm; neutral; abrupt wavy boundary.

Bg1—17 to 21 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; firm; common very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—21 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam; common coarse faint olive (5Y 5/3) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few dark stains (iron and manganese oxides); few lime concretions; mildly alkaline; clear smooth boundary.

Bg3—24 to 30 inches; light olive gray (5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few dark stains (iron and manganese oxides); many lime concretions; weak effervescence; mildly alkaline; clear smooth boundary.

Bg4—30 to 38 inches; olive gray (5Y 5/2) clay; few fine prominent yellowish brown (10YR 5/6) mottles; strong medium and coarse angular blocky structure; firm; dark gray (10YR 4/1) root channel linings and krotovinas; many lime concretions; weak effervescence; mildly alkaline; clear smooth boundary.

Bg5—38 to 55 inches; light olive gray (5Y 6/2) silty clay; common medium prominent yellowish brown (10YR 5/8) mottles; moderate coarse angular blocky structure; friable; few lime concretions; weak effervescence; mildly alkaline; abrupt smooth boundary.

Cg—55 to 60 inches; light olive gray (5Y 6/2) silty clay; common coarse prominent yellowish brown (10YR 5/8) mottles; massive; friable; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 30 to 55 inches. The mollic epipedon is 10 to 24 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1. It is silty clay loam or silty clay. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 or 2. It generally is mottled. It is silty clay loam, silty clay, or clay. The Cg horizon is silt loam, silty clay loam, or silty clay.

Muscatine Series

The Muscatine series consists of somewhat poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

The Muscatine soils in this county have an argillic horizon, which is not definitive of the Muscatine series. This difference, however, does not significantly affect the use or behavior of the soils.

Muscatine soils are similar to Ipava and Joy soils and are commonly adjacent to Denny, Sable, and Tama soils. The poorly drained Denny soils are in depressional areas. They have an albic horizon and contain more clay in the subsoil than the Muscatine soils. Also, their dark surface soil is thinner. Ipava soils contain more clay in the subsoil than the Muscatine soils. Joy soils contain less clay in the subsoil than the Muscatine soils. Sable soils are poorly drained and are in the lower landscape positions. Tama soils are moderately well drained and well drained and are on the narrower ridgetops and in the more sloping areas.

Typical pedon of Muscatine silt loam, 0 to 3 percent slopes, 180 feet west and 2,360 feet south of the northeast corner of sec. 9, T. 16 N., R. 2 E., in a cultivated field:

- Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; medium acid; abrupt smooth boundary.
- A1—8 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine angular blocky structure; firm; medium acid; clear smooth boundary.
- A2—10 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate medium and coarse granular structure; friable; medium acid; clear smooth boundary.
- Bt1—14 to 20 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium subangular blocky structure; firm; many very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Bt2—20 to 30 inches; grayish brown (10YR 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak fine and medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many moderately thick dark brown (10YR 4/3) clay films on faces of

peds; few dark concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

- Btg1—30 to 37 inches; grayish brown (10YR 5/2) silty clay loam; few fine faint light brownish gray (10YR 6/2) and few medium and coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; many moderately thick dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.
- Btg2—37 to 44 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine and medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium and coarse prismatic structure parting to weak medium and coarse angular blocky; firm; many thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; common dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
- Cg1—44 to 50 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; common dark concretions (iron and manganese oxides); neutral; clear smooth boundary.
- Cg2—50 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; common dark concretions (iron and manganese oxides); neutral.

The thickness of the solum ranges from 40 to 60 inches. The mollic epipedon is 14 to 20 inches thick.

The Ap horizon has hue of 10YR, value of 2, and chroma of 1 or 2. It is silt loam or silty clay loam. The Bt horizon has hue of 10YR or 2.5Y. It has value of 4 and chroma of 2 in the upper part and value of 5 or 6 and chroma of 2 through 4 in the lower part. It generally has mottles with higher chroma in the lower part. The C horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2. It is silt loam or silty clay loam.

Niota Series

The Niota series consists of poorly drained, very slowly permeable soils on terraces. These soils formed in silty material over lacustrine clayey material and loamy outwash. Slope ranges from 0 to 2 percent.

The Niota soils in this county do not have the red colors in the control section that are definitive for the Niota series. This difference, however, does not significantly affect the use or behavior of the soils.

Niota soils are commonly adjacent to Booker, Coyne, Denrock, and Milford soils. The adjacent soils have a mollic epipedon and do not have an albic horizon. Booker and Milford soils are in the lower landscape

positions. Coyne soils are well drained. They contain more sand and less clay in the upper part of the solum than the Niota soils. Denrock soils are somewhat poorly drained. Coyne and Denrock soils are in the higher landscape positions.

Typical pedon of Niota silt loam, 1,470 feet north and 1,077 feet east of the southwest corner of sec. 1, T. 18 N., R. 4 E., in a cornfield:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some dark grayish brown (10YR 4/2) in the lower part; grayish brown (10YR 5/2) dry; weak very fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

E—10 to 14 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium platy structure parting to weak fine subangular blocky; friable; medium acid; abrupt smooth boundary.

2Btg1—14 to 17 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish red (5YR 5/6) mottles; moderate fine and very fine subangular blocky structure; firm; common moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; very dark grayish brown (10YR 3/2) root channel linings; strongly acid; abrupt smooth boundary.

2Btg2—17 to 22 inches; dark grayish brown (2.5Y 4/2) silty clay; many fine prominent yellowish red (5YR 5/6) mottles; strong very fine and fine subangular blocky structure; firm; many moderately thick very dark grayish brown (2.5Y 3/2) clay films on faces of peds; very dark grayish brown (10YR 3/2) root channel linings; strongly acid; abrupt smooth boundary.

2Btg3—22 to 25 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; firm; many moderately thick dark grayish brown (2.5Y 4/2) clay films on faces of peds; very dark grayish brown (10YR 3/2) root channel linings; strongly acid; clear smooth boundary.

2Btg4—25 to 31 inches; light brownish gray (2.5Y 6/2) silty clay; weak fine prismatic structure parting to weak fine subangular blocky; firm; common moderately thick grayish brown (2.5Y 5/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

2Btg5—31 to 36 inches; grayish brown (2.5Y 5/2) silty clay; few fine prominent reddish brown (5YR 5/4) mottles; weak medium subangular blocky structure; firm; common moderately thick olive gray (5Y 5/2) clay films on faces of peds; few dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2Btg6—36 to 41 inches; light olive gray (5Y 6/2) silty clay; common medium prominent reddish brown

(5YR 4/4) mottles; weak medium subangular blocky structure; firm; few thin olive gray (5Y 5/2) clay films on faces of peds; few bright stains (iron and manganese oxides); medium acid; abrupt wavy boundary.

2BCg—41 to 54 inches; reddish brown (5YR 5/3) silty clay; common medium prominent light olive gray (5Y 6/2) mottles; weak medium subangular blocky structure; firm; few bright stains (iron and manganese oxides); very dark gray (10YR 3/1) root channel linings; medium acid; abrupt smooth boundary.

3Cg—54 to 60 inches; light olive gray (5Y 6/2) silt loam; common coarse prominent yellowish red (5YR 4/6) and common fine prominent strong brown (7.5YR 5/8) mottles; massive; very friable; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess or silty material is less than 20 inches. The mollic epipedon is 6 to 10 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The 2B horizon has hue of 5Y through 5YR, value of 4 through 6, and chroma of 1 through 3. It ranges from silty clay loam to clay. The 3C horizon is commonly silt loam, but the range includes strata of silty clay loam, loam, sandy loam, and loamy fine sand.

Oakville Series

The Oakville series consists of well drained, rapidly permeable soils on outwash plains and sand dunes. These soils formed in wind- and water-deposited sandy material. Slope ranges from 1 to 30 percent.

Oakville soils are similar to Sparta soils and are commonly adjacent to Orio, Selma, Sparta, and Tell soils. Orio and Selma soils are poorly drained and are lower on the landscape than the Oakville soils. Also, their solum contains more clay. Selma soils have a mollic epipedon. Sparta soils also have a mollic epipedon. They are excessively drained and are in positions on the landscape similar to those of the Oakville soils. Tell soils formed in silty material and in the underlying sandy outwash. They are in the lower landscape positions.

Typical pedon of Oakville loamy fine sand, in an area of Oakville-Tell complex, 7 to 15 percent slopes, 80 feet south and 2,400 feet west of the northeast corner of sec. 5, T. 18 N., R. 4 E., in a stand of timber:

A—0 to 3 inches; very dark brown (10YR 2/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; very friable; neutral; abrupt smooth boundary.

- BA—3 to 8 inches; brown (10YR 4/3) and dark brown (10YR 3/3) fine sand; weak medium subangular blocky structure; very friable; medium acid; clear wavy boundary.
- Bw1—8 to 15 inches; dark yellowish brown (10YR 4/4) fine sand; weak coarse subangular blocky structure; very friable; medium acid; gradual wavy boundary.
- Bw2—15 to 18 inches; yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) fine sand; weak medium subangular blocky structure; very friable; medium acid; clear wavy boundary.
- BC—18 to 23 inches; yellowish brown (10YR 5/6) fine sand; weak medium subangular blocky structure; very friable; medium acid; gradual wavy boundary.
- C—23 to 60 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; medium acid.

The thickness of the solum ranges from 20 to about 40 inches. The surface layer is 5 to 10 inches thick.

The Ap horizon, if it occurs, has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A horizon has hue of 10YR, value of 2, and chroma of 1 or 2. The Ap or A horizon is loamy fine sand or fine sand. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. It is loamy fine sand, fine sand, or sand.

Orio Series

The Orio series consists of poorly drained soils on stream terraces and outwash plains. These soils formed in loamy and sandy material. Permeability is moderately slow in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Orio soils are similar to Selma soils and are commonly adjacent to Gilford, La Hogue, Oakville, Selma, and Sparta soils. Gilford, La Hogue, Selma, and Sparta soils have a mollic epipedon and do not have an albic horizon. They are higher on the landscape than the Orio soils. Gilford soils contain less clay in the solum than the Orio soils. They are very poorly drained. La Hogue soils are somewhat poorly drained. Oakville and Sparta soils contain more sand in the solum than the Orio soils. Oakville soils are well drained and are in the higher landscape positions. Sparta soils are excessively drained.

Typical pedon of Orio loam, 1,190 feet west and 925 feet north of the southeast corner of sec. 8, T. 18 N., R. 4 E., in a cultivated field:

- Ap—0 to 9 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; strongly acid; abrupt smooth boundary.
- E1—9 to 13 inches; grayish brown (10YR 5/2) fine sandy loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; medium acid; clear smooth boundary.

- E2—13 to 18 inches; mottled dark gray (10YR 4/1) and light brownish gray (10YR 6/2) fine sandy loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; slightly acid; clear smooth boundary.
- Btg1—18 to 30 inches; dark grayish brown (2.5Y 4/2) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few moderately thick olive gray (5Y 4/2) clay films on faces of peds; neutral; clear wavy boundary.
- Btg2—30 to 35 inches; olive gray (5Y 5/2) clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few moderately thick olive gray (5Y 4/2) clay films on faces of peds; neutral; clear wavy boundary.
- BCg—35 to 41 inches; grayish brown (2.5Y 5/2) sandy loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.
- Cg—41 to 60 inches; grayish brown (2.5Y 5/2) sand; single grain; loose; mildly alkaline.

The thickness of the solum ranges from 35 to 50 inches. The mollic epipedon is 6 to 10 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is loam or sandy loam. The E horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. It is loam, fine sandy loam, sandy loam, loamy fine sand, or loamy sand. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 or 2. It has high chroma mottles. It is commonly clay loam, but the range includes loam, sandy clay loam, and silty clay loam. The Cg horizon is sand, loamy sand, loamy fine sand, or fine sandy loam.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in recently deposited alluvium over an older, dark alluvium. Slope ranges from 0 to 2 percent.

Orion soils are similar to Radford soils and are commonly adjacent to Radford and Sawmill soils. The adjacent soils have a mollic epipedon. Their position on the landscape is similar to that of the Orion soils. Sawmill soils are poorly drained.

Typical pedon of Orion silt loam, 265 feet east and 1,585 feet north of the center of sec. 24, T. 14 N., R. 4 E., in a pasture-hayfield:

- Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium angular and subangular blocky structure parting to weak very fine and fine granular; friable; mildly alkaline; clear smooth boundary.

C1—8 to 28 inches; brown (10YR 5/3) silt loam; few fine faint dark grayish brown (10YR 4/2) and common fine faint yellowish brown (10YR 5/4) mottles; moderate medium and thick strata parting to weak very fine granular structure; friable; few bright stains (iron and manganese oxides); neutral; abrupt smooth boundary.

C2—28 to 36 inches; stratified very dark grayish brown (10YR 3/2), very dark gray (10YR 3/1), and yellowish brown (10YR 5/4) silt loam; weak thin strata parting to weak very fine subangular blocky structure; friable; few bright stains (iron and manganese oxides); neutral; abrupt smooth boundary.

Ab1—36 to 48 inches; black (10YR 2/1) silty clay loam; moderate very fine and fine subangular blocky structure; firm; neutral; gradual smooth boundary.

Ab2—48 to 55 inches; very dark gray (10YR 3/1) silty clay loam; weak fine subangular blocky structure; firm; neutral; gradual smooth boundary.

Ab3—55 to 60 inches; very dark gray (10YR 3/1) silty clay loam; weak fine subangular blocky structure; firm; common bright stains (iron and manganese oxides); neutral.

The depth to the buried horizon ranges from 20 to 40 inches. The surface layer is 5 to 10 inches thick.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4 and has strata of darker material. The Ab horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is silt loam or silty clay loam.

Palms Series

The Palms series consists of very poorly drained soils in lake basins on outwash plains. These soils formed in deposits of organic material underlain by loamy mineral deposits. Permeability is moderately rapid in the organic material and moderate in the loamy material. Slope ranges from 0 to 2 percent.

Palms soils are similar to Adrian soils and are commonly adjacent to Adrian, Gilford, Harpster, and Watseka soils. Adrian soils are underlain by sandy material. Their position on the landscape is similar to that of the Palms soils. Gilford, Harpster, and Watseka soils do not have organic layers. They are in the higher landscape positions. Harpster soils are poorly drained and are calcareous throughout. Watseka soils are somewhat poorly drained.

Typical pedon of Palms muck, 2,000 feet south and 2,440 feet east of the northwest corner of sec. 17, T. 18 N., R. 5 E., in a cornfield:

Oap—0 to 8 inches; black (10YR 2/1) broken face and rubbed sapric material, black (10YR 2/1) dry; less than 5 percent fiber unrubbed and rubbed; weak fine

and medium subangular blocky structure parting to weak fine granular; friable; slightly acid; abrupt smooth boundary.

Oa—8 to 24 inches; black (10YR 2/1) broken face and rubbed sapric material, black (10YR 2/1) dry; less than 5 percent fiber unrubbed and rubbed; weak very fine and fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

2Cg1—24 to 30 inches; very dark gray (10YR 3/1) silt loam; massive; friable; neutral; abrupt smooth boundary.

2Cg2—30 to 42 inches; grayish brown (2.5Y 5/2) silt loam; massive; friable; neutral; gradual smooth boundary.

2Cg3—42 to 60 inches; dark gray (5Y 4/1) silt loam; massive; friable; few sand lenses; neutral.

The thickness of the solum, or the thickness of the organic layer, ranges from 16 to 50 inches. The surface tier is 5 to 10 inches thick. The organic material is derived primarily from herbaceous plants.

The surface tier primarily has hue of 10YR, value of 2, and chroma of 1 or 2. The subsurface tier has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 0 through 3. The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 through 7, and chroma of 1 or 2. It is fine sandy loam, loam, or silt loam.

Pella Series

The Pella series consists of poorly drained, moderately permeable soils on outwash plains. These soils formed in silty material underlain by stratified loamy outwash. Slope ranges from 0 to 2 percent.

Pella soils are similar to Drummer soils and are commonly adjacent to Drummer, Elburn, Harpster, and Selma soils. Drummer and Elburn soils are deeper to outwash and free carbonates than the Pella soils. Elburn soils are somewhat poorly drained. Harpster soils contain free carbonates throughout the solum. Elburn and Harpster soils are in the higher landscape positions. Selma soils contain more sand in the solum than the Pella soils. Drummer and Selma soils are in positions on the landscape similar to those of the Pella soils.

Typical pedon of Pella silty clay loam, 120 feet east and 2,520 feet north of the southwest corner of sec. 19, T. 17 N., R. 5 E., in a soybean field:

Ap—0 to 8 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure; firm; neutral; abrupt smooth boundary.

A—8 to 15 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak very fine and fine subangular blocky structure; firm; neutral; clear smooth boundary.

- Bg1—15 to 19 inches; very dark gray (5Y 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine and medium distinct olive gray (5Y 5/2) mottles; moderate very fine and fine subangular blocky structure; firm; mildly alkaline; abrupt wavy boundary.
- Bg2—19 to 27 inches; mottled gray (5Y 5/1) and olive gray (5Y 5/2) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few dark gray (5Y 4/1) coatings on faces of peds; very dark gray (5Y 3/1) krotovinas; mildly alkaline; clear smooth boundary.
- Bg3—27 to 32 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; very dark gray (5Y 3/1) krotovinas; mildly alkaline; abrupt smooth boundary.
- 2Bg4—32 to 38 inches; gray (5Y 5/1) stratified loam and sandy loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; dark gray (5Y 4/1) root channel linings; strong effervescence; moderately alkaline; clear smooth boundary.
- 2Cg1—38 to 46 inches; dark gray (5Y 4/1) stratified loam and silty clay loam; massive; firm; very dark gray (5Y 3/1) krotovinas; strong effervescence; moderately alkaline; clear smooth boundary.
- 2Cg2—46 to 53 inches; dark gray (5Y 4/1) silt loam; common coarse prominent brown (7.5YR 4/4) mottles; massive; friable; strong effervescence; moderately alkaline; clear smooth boundary.
- 2Cg3—53 to 60 inches; mottled dark gray (5Y 4/1 and N 4/0) and brown (7.5YR 4/4) stratified silt loam and sandy loam; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 32 to 48 inches. The silty material is less than 40 inches thick. The depth to free carbonates ranges from 23 to 40 inches. The mollic epipedon is 12 to 24 inches thick.

The Ap horizon is neutral in hue or has hue of 10YR or 2.5Y. It has value of 2 or 3 and chroma of 0 through 2. It is silty clay loam or silt loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 through 5, and chroma of 1 or 2. It is mottled. The 2Bg horizon is stratified silt loam, silty clay loam, loam, or sandy loam.

Plano Series

The Plano series consists of well drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Slope ranges from 0 to 10 percent.

Plano soils are similar to Catlin, Proctor, and Tama soils and are commonly adjacent to Catlin, Drummer, Elburn, and Proctor soils. Catlin soils formed in loess and in the underlying glacial till. The poorly drained Drummer and somewhat poorly drained Elburn soils are in the

lower landscape positions. Proctor soils are shallower to loamy outwash than the Plano soils. Catlin, Proctor, and Tama soils are in positions on the landscape similar to those of the Plano soils. Tama soils formed entirely in loess.

Typical pedon of Plano silt loam, 0 to 2 percent slopes, 50 feet north and 3,180 feet east of the southwest corner of sec. 27, T. 17 N., R. 5 E., in a cultivated field:

- 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 parting to weak fine granular; friable; slightly acid; gradual smooth boundary.
- A—9 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; slightly acid; clear smooth boundary.
- AB—13 to 19 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.
- Bt1—19 to 29 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; common moderately thick dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.
- Bt2—29 to 40 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; many moderately thick dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.
- Bt3—40 to 51 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure; friable; many thin brown (10YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.
- 2Bt4—51 to 57 inches; mottled dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; friable; many thin brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.
- 2BC—57 to 60 inches; yellowish brown (10YR 5/4) loam; weak medium angular and subangular blocky structure; friable; few thin brown (10YR 4/3) clay films on faces of peds; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam

or silt loam. The 2B horizon is stratified sandy loam, loam, or silt loam.

Plano silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface soil than is defined as the range for the Plano series. This difference, however, does not significantly affect the use or behavior of the soil.

Port Byron Series

The Port Byron series consists of well drained and moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 10 percent.

Port Byron soils are similar to Tama soils and are commonly adjacent to Dickinson, Joy, and Seaton soils. Dickinson, Seaton, and Tama soils are in positions on the landscape similar to those of the Port Byron soils. Dickinson soils formed in loamy sediments. Joy soils are somewhat poorly drained and are in the lower landscape positions. Seaton soils do not have a mollic epipedon. Tama soils contain more clay in the subsoil than the Port Byron soils.

Typical pedon of Port Byron silt loam, 2 to 5 percent slopes, 2,375 feet east and 180 feet south of the northwest corner of sec. 28, T. 18 N., R. 3 E., in a cornfield:

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure parting to moderate medium granular; friable; neutral; clear smooth boundary.
- A—10 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.
- AB—16 to 22 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; friable; many very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.
- Bw1—22 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; neutral; gradual wavy boundary.
- Bw2—29 to 42 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few dark stains (iron and manganese oxides); neutral; gradual smooth boundary.
- BC—42 to 57 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/6) and few fine and medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; friable; common dark stains (iron and manganese oxides); neutral; gradual smooth boundary.
- C—57 to 60 inches; brown (10YR 5/3) silt loam; many medium distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (2.5Y

6/2) mottles; massive; friable; common dark stains (iron and manganese oxides); neutral.

The thickness of the solum ranges from 36 to more than 60 inches. The mollic epipedon is 10 to 23 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 5. The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 6.

Port Byron silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface soil than is defined as the range for the Port Byron series. This difference, however, does not significantly affect the use or behavior of the soil.

Proctor Series

The Proctor series consists of well drained soils on outwash plains and stream terraces. These soils formed in loess or silty material and in the underlying stratified glacial outwash. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 2 to 10 percent.

Proctor soils are similar to Plano soils and are commonly adjacent to Brenton, Drummer, and Millbrook soils. They are higher on the landscape than the adjacent soils. Brenton and Millbrook soils are somewhat poorly drained. Millbrook soils have an albic horizon. Their dark surface layer is thinner than that of the Proctor soils. Drummer soils are poorly drained. Plano soils are deeper to stratified outwash than the Proctor soils.

Typical pedon of Proctor silt loam, 2 to 5 percent slopes, 90 feet west and 1,380 feet north of the southeast corner of sec. 1, T. 14 N., R. 2 E., in a grassed area:

- Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to weak very fine and fine granular; friable; medium acid; clear smooth boundary.
- A—8 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine and fine granular structure; friable; strongly acid; clear smooth boundary.
- AB—11 to 15 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Bt1—15 to 19 inches; brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common moderately thick dark

- brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.
- Bt2—19 to 24 inches; dark yellowish brown (10YR 4/4) and brown (10YR 4/3) silty clay loam; weak fine and medium subangular blocky structure; friable; many moderately thick dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.
- Bt3—24 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine and medium subangular blocky structure; friable; many moderately thick brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.
- 2Bt4—32 to 42 inches; yellowish brown (10YR 5/4) loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; friable; common moderately thick dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; abrupt smooth boundary.
- 2BC—42 to 47 inches; yellowish brown (10YR 5/4) stratified loam and loamy sand; weak coarse prismatic structure; friable; few thin dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; gradual smooth boundary.
- 2C—47 to 60 inches; yellowish brown (10YR 5/4) stratified sandy loam, loamy sand, and loam; few fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; common dark stains (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess or silty material ranges from 20 to 40 inches. The mollic epipedon is 10 to 16 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 6. The 2Bt horizon is clay loam or loam. The 2C horizon is stratified loam, sandy loam, loamy sand, or silt loam.

Proctor silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface soil than is defined as the range for the Proctor series. This difference, however, does not significantly affect the use or behavior of the soil.

Radford Series

The Radford series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium over an older buried soil. Slope ranges from 0 to 2 percent.

Radford soils are similar to Orion soils and are commonly adjacent to Orion and Sawmill soils. They are in positions on the landscape similar to those of the adjacent soils. Orion soils have light colored silty alluvium above the buried soil. Sawmill soils are poorly drained. They are not underlain by a buried soil.

Typical pedon of Radford silt loam, 660 feet south and 990 feet east of the northwest corner of sec. 13, T. 16 N., R. 2 E.

- Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.
- A—8 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; common fine faint dark brown (10YR 4/3) mottles; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; thin zone of stratification at a depth of 12 inches; neutral; clear smooth boundary.
- C—16 to 28 inches; very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) silt loam; weak fine and medium subangular blocky structure; friable; few thin dark brown (10YR 4/3) zones of stratification; neutral; abrupt wavy boundary.
- Ab1—28 to 46 inches; black (10YR 2/1) silty clay loam; moderate very fine and fine subangular blocky structure; friable; neutral; gradual smooth boundary.
- Ab2—46 to 60 inches; black (10YR 2/1) silty clay loam; few coarse distinct dark brown (10YR 3/3) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; neutral.

The thickness of the silt loam alluvium ranges from 20 to 40 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The C horizon has hue of 10YR, value of 2 through 6, and chroma of 1 or 2. It is commonly stratified with zones of higher chroma. The Ab horizon has hue of 10YR, value of 2 or 3, and chroma of 1.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

Rozetta soils are similar to Fayette soils and are commonly adjacent to Clarksdale, Downs, Fayette, and Keomah soils. Clarksdale and Keomah soils contain more clay in the solum than the Rozetta soils. They are somewhat poorly drained and are in the broader areas. Clarksdale and Downs soils have a dark surface soil. Downs soils are in positions on the landscape similar to those of the Rozetta soils. Fayette soils are well drained and are typically more sloping than the Rozetta soils.

Typical pedon of Rozetta silt loam, 0 to 3 percent slopes, 228 feet south and 100 feet east of the northwest corner of sec. 10, T. 15 N., R. 3 E., in a hayfield:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam mixed with some dark yellowish brown (10YR 4/4) in the lower part; pale brown (10YR 6/3) dry; weak very fine subangular blocky structure parting to weak very fine and fine granular; friable; neutral; abrupt smooth boundary.

BE—8 to 10 inches; dark yellowish brown (10YR 4/4) silt loam mixed with some dark grayish brown (10YR 4/2) in the upper part; weak very fine subangular blocky structure; friable; light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt1—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine and fine subangular blocky structure; firm; common moderately thick dark brown (10YR 4/3) clay films and light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt2—14 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; strong very fine and fine subangular and angular blocky structure; firm; many moderately thick dark yellowish brown (10YR 4/4) clay films and light gray (10YR 7/2) silt coatings on faces of peds; medium acid; gradual smooth boundary.

Bt3—19 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular and angular blocky; firm; many moderately thick dark yellowish brown (10YR 4/4) clay films and light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt4—25 to 34 inches; mottled pale brown (10YR 6/3) and yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many moderately thick brown (10YR 5/3) clay films and white (10YR 8/2) silt coatings on faces of peds; few dark stains (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt5—34 to 46 inches; pale brown (10YR 6/3) silty clay loam; many fine and medium distinct yellowish brown (10YR 5/6) and common fine and medium faint light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; many moderately thick brown (10YR 5/3) clay films and white (10YR 8/2) silt coatings on faces of peds; few dark stains (iron and manganese oxides); strongly acid; gradual smooth boundary.

BC—46 to 54 inches; mottled pale brown (10YR 6/3), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) silty clay loam; weak coarse prismatic structure; firm; few dark stains (iron and manganese oxides); medium acid; gradual smooth boundary.

C—54 to 60 inches; mottled pale brown (10YR 6/3), yellowish brown (10YR 5/6), and light brownish gray

(10YR 6/2) silt loam; massive; firm; common dark stains (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 50 to 60 inches. The surface soil is 8 to 12 inches thick.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3. The E horizon, if it occurs, has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has hue of 10YR, value of 4 through 6, and chroma of 3 through 6. In the upper 10 inches it does not have mottles with chroma of 2.

Sable Series

The Sable series consists of poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Sable soils are similar to Drummer soils and are commonly adjacent to Denny, Ipava, Muscatine, and Tama soils. Denny soils are in depressional areas. They have an albic horizon and contain more clay in the solum than the Sable soils. Also, their dark surface layer is thinner. Drummer soils have stratified loamy outwash in the lower part of the solum. Ipava and Muscatine soils are somewhat poorly drained. Ipava soils contain more clay in the solum than the Sable soils. Tama soils are moderately well drained and well drained. Ipava, Muscatine, and Tama soils are higher on the landscape than the Sable soils.

Typical pedon of Sable silty clay loam, 630 feet east and 30 feet south of the center of sec. 29, T. 16 N., R. 2 E., in a cultivated field:

Ap—0 to 7 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine and fine subangular blocky structure; firm; neutral; abrupt smooth boundary.

A—7 to 12 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure; firm; neutral; clear smooth boundary.

AB—12 to 15 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate very fine subangular blocky structure; very firm; neutral; clear smooth boundary.

Bg1—15 to 21 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct light brownish gray (2.5Y 6/2) mottles; weak very fine and fine prismatic structure parting to moderate fine subangular blocky; very firm; dark gray (10YR 4/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bg2—21 to 31 inches; light olive gray (5Y 6/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) and common fine faint dark gray (5Y 4/1) mottles; moderate medium prismatic structure parting to weak medium angular blocky; firm; dark gray (5Y

- 4/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.
- Bg3—31 to 40 inches; light olive gray (5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium and coarse prismatic structure; firm; black (N 2/0) root channel linings; mildly alkaline; gradual smooth boundary.
- BCg—40 to 53 inches; light olive gray (5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; black (N 2/0) root channel linings; common gray (5Y 5/1) coatings on faces of peds; mildly alkaline; gradual smooth boundary.
- Cg—53 to 60 inches; light gray (5Y 6/1) silt loam; many fine and medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; black (N 2/0) root channel linings; weak effervescence; mildly alkaline.

The thickness of the solum ranges from 36 to 55 inches. The mollic epipedon is 12 to 23 inches thick.

The Ap horizon is black (N 2/0 or 10YR 2/1). The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value 4 through 6, and chroma of 2 or less. It is mottled throughout.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slope ranges from 0 to 2 percent.

Sawmill soils are similar to Calco and Radford soils and are commonly adjacent to Calco, Elburn, Orion, and Radford soils. Calco soils are calcareous throughout the solum. Their mollic epipedon is more than 36 inches thick. Elburn soils are somewhat poorly drained. They formed in loess or silty material and in the underlying loamy outwash. Their mollic epipedon is less than 24 inches thick. Calco and Elburn soils are higher on the landscape than the Sawmill soils. Orion and Radford soils are somewhat poorly drained. They formed in silty alluvium over a buried soil. They are in positions on the landscape similar to those of the Sawmill soils.

Typical pedon of Sawmill silty clay loam, 2,600 feet south and 1,780 feet west of the northeast corner of sec. 23, T. 15 N., R. 3 E., in a cultivated field:

- Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.
- A1—7 to 15 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; slightly acid; gradual smooth boundary.
- A2—15 to 26 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium subangular blocky structure; firm; neutral; gradual wavy boundary.

- A3—26 to 32 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure; firm; neutral; clear wavy boundary.
- Bg1—32 to 41 inches; dark gray (5Y 4/1) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; neutral; gradual wavy boundary.
- Bg2—41 to 46 inches; olive gray (5Y 5/2) silty clay loam; common medium distinct olive yellow (2.5Y 6/6) mottles; moderate medium prismatic structure; firm; neutral; gradual wavy boundary.
- Btg—46 to 56 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent brownish yellow (10YR 6/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common moderately thick dark gray (10YR 4/1) clay films on faces of peds; very dark gray (10YR 3/1) root channel linings; mildly alkaline; gradual wavy boundary.
- BCg—56 to 60 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium and coarse subangular blocky structure; firm; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The mollic epipedon is 24 to 36 inches thick.

The Ap horizon is neutral in hue or has hue of 10YR or 2.5Y. It has value of 2 or 3 and chroma of 0 through 2. The Bg horizon is neutral in hue or has hue of 10YR, 2.5Y, or 5Y. It has value of 4 through 6 and chroma of 0 through 2. The Cg horizon, if it occurs, is dominantly silty clay loam but in some pedons has strata of loam, silt loam, or sandy loam.

Seaton Series

The Seaton series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 2 to 60 percent.

Seaton soils are similar to Fayette and Sylvan soils and are commonly adjacent to Port Byron, Sylvan, and Timula soils. They are in positions on the landscape similar to those of the adjacent soils. Fayette and Sylvan soils contain more clay in the solum than the Seaton soils. Sylvan soils have free carbonates within a depth of 40 inches. Port Byron soils have a mollic epipedon. Timula soils contain less clay in the solum than the Seaton soils and do not have an argillic horizon. They have free carbonates within a depth of 40 inches.

Typical pedon of Seaton silt loam, 2 to 5 percent slopes, 780 feet east and 240 feet south of the northwest corner of sec. 25, T. 18 N., R. 2 E., in a cultivated field:

- Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium

- subangular blocky structure parting to moderate fine granular; friable; slightly acid; abrupt smooth boundary.
- E1—7 to 10 inches; dark brown (10YR 4/3) silt loam; moderate fine platy structure; friable; slightly acid; abrupt smooth boundary.
- E2—10 to 13 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silt loam; moderate fine platy structure; friable; slightly acid; abrupt smooth boundary.
- Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; common moderately thick dark brown (10YR 4/3) clay films and very pale brown (10YR 7/3) silt coatings on faces of peds; medium acid; clear smooth boundary.
- Bt2—18 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; many moderately thick dark brown (10YR 4/3) clay films and few very pale brown (10YR 7/3) silt coatings on faces of peds; medium acid; clear smooth boundary.
- Bt3—23 to 36 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium and coarse subangular blocky structure; friable; many moderately thick dark brown (10YR 4/3) clay films and few very pale brown (10YR 7/3) silt coatings on faces of peds; medium acid; gradual smooth boundary.
- BC—36 to 55 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; friable; few moderately thick dark brown (10YR 4/3) clay films and very pale brown (10YR 7/3) silt coatings on faces of peds; medium acid; gradual smooth boundary.
- C—55 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; few dark stains (iron and manganese oxides); medium acid.

The thickness of the solum ranges from 42 to more than 60 inches. The surface soil is 6 to 15 inches thick.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The BC horizon is mottled in some pedons.

Selma Series

The Selma series consists of poorly drained soils formed in loamy outwash on outwash plains. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Selma soils are similar to Canisteo and Gilford soils and are commonly adjacent to Canisteo, Drummer, Gilford, La Hogue, and Orio soils. Canisteo soils are calcareous. Drummer soils contain less sand in the

upper part of the solum than the Selma soils. Gilford soils contain more sand and less clay in the solum than the Selma soils. They are very poorly drained. Drummer and Gilford soils are in positions on the landscape similar to those of the Selma soils. La Hogue soils are somewhat poorly drained. Canisteo and La Hogue soils are higher on the landscape than the Selma soils. Orio soils are in depressional areas. They have an albic horizon. Their dark surface layer is thinner than that of the Selma soils.

Typical pedon of Selma clay loam, 1,380 feet east and 2,550 feet south of the northwest corner of sec. 18, T. 17 N., R. 4 E., in a cultivated field:

- Ap—0 to 8 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; very dark grayish brown (10YR 3/2) krotovinas; neutral; abrupt smooth boundary.
- A—8 to 15 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; weak fine and medium granular structure; friable; very dark grayish brown (10YR 3/2) krotovinas; neutral; gradual smooth boundary.
- BA—15 to 19 inches; mottled very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2) clay loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; neutral; clear wavy boundary.
- Bg—19 to 26 inches; dark grayish brown (2.5Y 4/2) clay loam; few fine faint olive brown (2.5Y 4/4) mottles; moderate fine subangular blocky structure; friable; few very dark gray (10YR 3/1) organic coatings on faces of peds; few dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.
- Btg—26 to 38 inches; grayish brown (2.5Y 5/2) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate very fine and fine subangular blocky; firm; few thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; very dark gray (10YR 3/1) krotovinas; common dark stains (iron and manganese oxides); neutral; abrupt wavy boundary.
- B'g1—38 to 42 inches; mottled grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and gray (5Y 5/1) silty clay loam; strong medium prismatic structure; firm; neutral; abrupt smooth boundary.
- B'g2—42 to 48 inches; light brownish gray (2.5Y 6/2) clay loam; many medium and coarse prominent yellowish brown (10YR 5/6) and few medium distinct gray (5Y 5/1) mottles; moderate coarse prismatic structure; firm; few dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Cg1—48 to 55 inches; mottled light brownish gray (2.5Y 6/2), grayish brown (2.5Y 5/2), yellowish brown (10YR 5/6), and gray (5Y 5/1) loam; weak coarse prismatic structure; friable; few dark stains (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Cg2—55 to 60 inches; mottled grayish brown (2.5Y 5/2), light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), and dark grayish brown (2.5Y 4/2) stratified sandy loam, sand, and loam; massive; very friable; mildly alkaline.

The thickness of the solum ranges from 35 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 23 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is typically clay loam, but the range includes silty clay loam and loam. The Bg horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 or 2. It is dominantly clay loam, but the range includes silty clay loam, sandy clay loam, and loam. The Cg horizon is stratified sand, loamy sand, or loam and commonly has thin strata of other textures.

Sparta Series

The Sparta series consists of excessively drained, rapidly permeable soils on stream terraces and outwash plains. These soils formed in sandy material. Slope ranges from 1 to 15 percent.

Sparta soils are similar to Oakville soils and are commonly adjacent to Dickinson, Gilford, Oakville, Watseka, and Waukegan soils. Dickinson and Oakville soils are well drained and are in positions on the landscape similar to those of the Sparta soils. Dickinson and Gilford soils contain less sand in the solum than the Sparta soils. Gilford soils are very poorly drained. Oakville soils do not have a mollic epipedon. Watseka soils are somewhat poorly drained. Waukegan soils formed in loess and in the underlying sandy outwash. They are well drained. Gilford, Watseka, and Waukegan soils are in the lower landscape positions.

Typical pedon of Sparta loamy fine sand, 1 to 7 percent slopes, 180 feet east and 2,580 feet north of the southwest corner of sec. 16, T. 18 N., R. 4 E., in a cultivated field:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; very friable; neutral; clear smooth boundary.

AB—9 to 15 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) loamy fine sand, dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) dry; weak fine and medium subangular blocky structure; very friable; neutral; clear smooth boundary.

Bw—15 to 29 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak medium subangular blocky structure; very friable; medium acid; gradual smooth boundary.

C1—29 to 39 inches; brown (7.5YR 4/4) fine sand and sand; single grain; loose; strongly acid; gradual smooth boundary.

C2—39 to 60 inches; strong brown (7.5YR 5/6) sand and fine sand; many medium distinct brown (10YR 5/3) and few coarse faint strong brown (7.5YR 5/8) mottles; single grain; loose; strongly acid.

The thickness of the solum ranges from 24 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is loamy fine sand or loamy sand. The Bw horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. It is loamy fine sand, loamy sand, fine sand, or sand. The C horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6.

Sylvan Series

The Sylvan series consists of well drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slope ranges from 10 to 30 percent.

Sylvan soils are similar to Fayette and Seaton soils and are commonly adjacent to Bold, Downs, Elco, Fayette, and Seaton soils. Bold soils contain less clay than the Sylvan soils and do not have an argillic horizon. They are calcareous throughout. Their position on the landscape is similar to that of the Sylvan soils. Downs, Fayette, and Seaton soils are in the higher areas. They are deeper to carbonates than the Sylvan soils. Also, their solum is thicker. Elco soils are moderately well drained and are lower on the landscape than the Sylvan soils. They formed in loess and in the underlying paleosol.

Typical pedon of Sylvan silt loam, 10 to 18 percent slopes, eroded, 1,400 feet west and 1,140 feet north of the southeast corner of sec. 25, T. 17 N., R. 1 E., in a pasture:

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary.

BE—4 to 8 inches; brown (10YR 4/3) silty clay loam; weak medium platy structure parting to moderate very fine subangular blocky; friable; medium acid; clear wavy boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; many

- moderately thick brown (10YR 4/3) clay films on faces of peds; medium acid; clear wavy boundary.
- Bt2**—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many moderately thick brown (10YR 4/3) clay films on faces of peds; slightly acid; gradual wavy boundary.
- Bt3**—18 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many moderately thick brown (10YR 4/3) clay films on faces of peds; neutral; clear wavy boundary.
- BC**—24 to 32 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few thin dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; gradual wavy boundary.
- C1**—32 to 52 inches; light olive brown (2.5Y 5/4) silt loam; massive; friable; few lime concretions; strong effervescence; moderately alkaline; clear wavy boundary.
- C2**—52 to 60 inches; light olive brown (2.5Y 5/4) silt loam; massive; friable; few lime concretions; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 22 to 35 inches. The surface soil is 3 to 6 inches thick. The depth to carbonates ranges from 20 to 40 inches.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or silty clay loam. The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is silty clay loam grading to silt loam.

Tama Series

The Tama series consists of moderately well drained and well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 10 percent.

Tama soils are similar to Downs soils and are commonly adjacent to Downs, Elkhart, Ipava, Muscatine, and Sylvan soils. Downs soils are in positions on the landscape similar to those of the Tama soils. Their dark surface soil is thinner than that of the Tama soils. Elkhart and Sylvan soils are lower on the landscape than the Tama soils and are more sloping. Also, they have a thinner solum and are calcareous at a depth of 20 to 40 inches. Sylvan soils do not have a mollic epipedon. Ipava and Muscatine soils are somewhat poorly drained. They are in the broader areas. Ipava soils contain more clay in the subsoil than the Tama soils.

Typical pedon of Tama silt loam, 2 to 5 percent slopes, 270 feet south and 1,800 feet east of the northwest corner of sec. 8, T. 14 N., R. 2 E., in a hayfield:

- Ap**—0 to 8 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; slightly acid; abrupt smooth boundary.
- A**—8 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.
- BA**—15 to 18 inches; dark brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; many very dark brown (10YR 2/2) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Bt1**—18 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; firm; common moderately thick dark brown (10YR 3/3) clay films on faces of peds; few dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
- Bt2**—24 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; many moderately thick dark brown (10YR 4/3) clay films on faces of peds; few pale brown (10YR 6/3) deoxidized zones along root channels; few dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
- Bt3**—31 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many moderately thick dark brown (10YR 4/3 and 7.5YR 4/4) clay films and common very pale brown (10YR 7/3) silt coatings on faces of peds; few pale brown (10YR 6/3) deoxidized zones along root channels; common dark stains (iron and manganese oxides); medium acid; clear smooth boundary.
- Bt4**—38 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many moderately thick dark brown (10YR 4/3 and 7.5YR 4/4) clay films and common very pale brown (10YR 7/3) silt coatings on faces of peds; common dark stains and concretions (iron and manganese oxides); medium acid; gradual smooth boundary.
- C**—50 to 60 inches; mottled yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) silt loam; massive; friable; common dark stains (iron and manganese oxides); neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. In some pedons it is mottled in the lower part.

Tell Series

The Tell series consists of well drained soils on outwash plains and stream terraces. These soils formed in silty material and in the underlying sandy outwash. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 15 percent.

Tell soils are similar to Waukegan soils and are commonly adjacent to Joy, Oakville, and Waukegan soils. Joy soils are somewhat poorly drained and are on the lower parts of the landscape. They are deeper to sandy outwash than the Tell soils. Oakville soils formed in sandy deposits. They are higher on the landscape than the Tell soils. Waukegan soils have a mollic epipedon. Their position on the landscape is similar to that of the Tell soils.

Typical pedon of Tell silt loam, in an area of Oakville-Tell complex, 1 to 7 percent slopes, 1,380 feet south and 1,380 feet east of the northwest corner of sec. 1, T. 17 N., R. 5 E., in a cornfield:

- Ap—0 to 7 inches; mixed dark brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam; some dark brown (7.5YR 4/4) in the lower part; pale brown (10YR 6/3) dry; moderate fine granular structure; friable; medium acid; clear smooth boundary.
- BA—7 to 11 inches; brown (10YR 4/3 and 7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; slightly acid; abrupt smooth boundary.
- Bw—11 to 15 inches; brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.
- Bt—15 to 26 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable; many moderately thick dark brown (7.5YR 4/4) clay films and very pale brown (10YR 8/3) silt coatings on faces of peds; medium acid; clear smooth boundary.
- 2BC—26 to 31 inches; strong brown (7.5YR 5/6) sandy loam; weak medium and coarse subangular blocky structure; friable; many moderately thick dark brown (7.5YR 4/4) clay films on faces of peds; common dark stains (iron and manganese oxides); medium acid; clear smooth boundary.
- 2C—31 to 60 inches; yellowish brown (10YR 5/6) sand; single grain; loose; thin discontinuous dark brown (7.5YR 4/4) bands of loamy sand; slightly acid.

The thickness of the solum and the thickness of the loess range from 20 to about 40 inches. The surface layer is 5 to 10 inches thick.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The 2B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. It is sandy loam or loam. The 2C horizon is sand or loamy sand.

Thorp Series

The Thorp series consists of poorly drained soils on outwash plains and stream terraces. These soils formed in silty material and in the underlying loamy outwash. Permeability is slow in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Thorp soils are similar to Drummer soils and are commonly adjacent to Drummer, Elburn, Joy, and Waukegan soils. The adjacent soils do not have an albic horizon. They are higher on the landscape than the Thorp soils. Elburn and Joy soils are somewhat poorly drained. Waukegan soils are well drained. They contain less clay in the subsoil than the Thorp soils.

Typical pedon of Thorp silt loam, 12 feet north and 1,848 feet east of the southwest corner of sec. 27, T. 17 N., R. 5 E., in a cornfield:

- Ap—0 to 6 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure parting to weak very fine and fine granular; friable; slightly acid; abrupt smooth boundary.
- A—6 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure; friable; slightly acid; clear wavy boundary.
- E—10 to 14 inches; dark grayish brown (2.5Y 4/2) silt loam; moderate fine platy structure; friable; slightly acid; abrupt smooth boundary.
- Btg1—14 to 19 inches; dark gray (5Y 4/1) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate very fine and fine subangular blocky structure; firm; common moderately thick dark gray (5Y 4/1) clay films and light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.
- Btg2—19 to 25 inches; gray (5Y 5/1) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; many moderately thick dark gray (5Y 4/1) clay films on faces of peds; few dark stains (iron and manganese oxides); medium acid; gradual smooth boundary.
- Btg3—25 to 32 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; many moderately thick gray (5Y 5/1) clay films on faces of peds; common dark stains (iron and

manganese oxides); medium acid; gradual smooth boundary.

Btg4—32 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular and angular blocky; firm; many moderately thick olive gray (5Y 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg5—40 to 48 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; firm; common moderately thick dark gray (5Y 4/1) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2BCg—48 to 58 inches; mottled dark gray (5Y 4/1), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6) stratified silt loam, sandy loam, and sandy clay loam; weak coarse subangular blocky structure; friable; slightly acid; gradual smooth boundary.

2Cg—58 to 60 inches; mottled dark gray (5Y 4/1), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6) stratified loam, sandy clay loam, and sand; massive; friable; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The mollic epipedon is 10 to 14 inches thick. The thickness of the loess ranges from 30 to 50 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. It is mottled throughout. The 2BC horizon is stratified silt loam, clay loam, loam, sandy clay loam, sandy loam, or sand.

Timula Series

The Timula series consists of well drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slope ranges from 10 to 60 percent.

Timula soils are similar to Bold, Seaton, and Sylvan soils and are commonly adjacent to Bold, Miami, and Seaton soils. Bold soils have free carbonates within 10 inches of the surface. Their positions on the landscape are similar to those of the Timula soils. Miami soils formed in glacial till. They are lower on the landscape than the Timula soils. Seaton and Sylvan soils have an argillic horizon and contain more clay in the solum than the Timula soils. Their positions on the landscape are similar to those of the Timula soils. Seaton soils are deeper to carbonates than the Timula soils. Also, their solum is thicker.

Typical pedon of Timula silt loam, in an area of Seaton-Timula silt loams, 20 to 60 percent slopes, 1,840

feet south and 1,400 feet east of the northwest corner of sec. 34, T. 18 N., R. 2 E., in woodland:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; friable; neutral; abrupt smooth boundary.

E—4 to 8 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam; weak fine and very fine platy structure; friable; few very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bw1—8 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw2—16 to 24 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; slightly acid; gradual smooth boundary.

BC—24 to 28 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

C—28 to 60 inches; light olive brown (2.5Y 5/4) silt loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 20 to 36 inches. The surface soil is 8 to 15 inches thick.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The Bw horizon has hue of 10YR and value and chroma of 4 through 6. The C horizon is calcareous silt loam or silt.

Velma Series

The Velma series consists of well drained, moderately permeable soils on uplands. These soils formed in loess and in the underlying glacial till. Slope ranges from 5 to 20 percent.

Velma soils are similar to Hickory soils and are commonly adjacent to Assumption and Tama soils. Hickory soils do not have a mollic epipedon. Assumption and Tama soils are higher on the landscape than the Velma soils. Also, Assumption soils formed in a thicker layer of loess and in the underlying paleosol, which formed in glacial till. Tama soils formed entirely in loess.

Typical pedon of Velma silt loam, 10 to 15 percent slopes, eroded, 260 feet east and 1,880 feet north of the southwest corner of sec. 25, T. 14 N., R. 3 E., in a permanent pasture:

- Ap—0 to 10 inches; mixed very dark gray (10YR 3/1) and dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; weak medium and fine granular structure; friable; strongly acid; abrupt smooth boundary.
- AB—10 to 13 inches; mixed dark brown (10YR 3/3) and very dark gray (10YR 3/1) silt loam, mixed brown (10YR 5/3) and grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium and fine granular; friable; strongly acid; clear smooth boundary.
- 2Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common thin very dark grayish brown (10YR 3/2) organic coatings and dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; abrupt smooth boundary.
- 2Bt2—18 to 22 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common moderately thick brown (10YR 4/3) clay films on faces of peds; few pebbles; strongly acid; clear smooth boundary.
- 2Bt3—22 to 27 inches; yellowish brown (10YR 5/4) clay loam; few fine faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; common moderately thick brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.
- 2Bt4—27 to 34 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium and coarse subangular and angular blocky structure; firm; common moderately thick brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.
- 2Bt5—34 to 44 inches; mottled pale brown (10YR 6/3) and yellowish brown (10YR 5/6) clay loam; moderate medium and coarse angular blocky structure; firm; few thin brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.
- 2C—44 to 60 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct light gray (5Y 7/1) mottles; massive; firm; few pebbles; mildly alkaline.

The thickness of the solum ranges from 42 to more than 60 inches. The loess is less than 20 inches thick. The mollic epipedon is 10 to 16 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is loam or silt loam. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. It commonly has low chroma mottles in the lower part.

Velma loam, 15 to 20 percent slopes, eroded, has a thinner dark surface soil than is defined as the range for

the Velma series. This difference, however, does not significantly affect the use or behavior of the soil.

Watseka Series

The Watseka series consists of somewhat poorly drained, rapidly permeable soils on outwash plains. These soils formed in sandy sediments. Slope ranges from 0 to 2 percent.

Watseka soils are similar to Hoopeston soils and are commonly adjacent to Gilford, Oakville, and Sparta soils. Gilford and Hoopeston soils contain more clay in the solum than the Watseka soils. Gilford soils are very poorly drained and are in the lower landscape positions. Hoopeston soils are in positions on the landscape similar to those of the Watseka soils. Oakville soils do not have a mollic epipedon. They are well drained. Sparta soils are excessively drained. Oakville and Sparta soils are higher on the landscape than the Watseka soils.

Typical pedon of Watseka loamy fine sand, 1,200 feet east and 180 feet south of the northwest corner of sec. 4, T. 18 N., R. 4 E., in a pasture:

- Ap—0 to 6 inches; black (10YR 2/1) loamy fine sand, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; very friable; slightly acid; abrupt smooth boundary.
- A—6 to 13 inches; black (10YR 2/1) loamy fine sand, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak very fine granular; very friable; slightly acid; abrupt wavy boundary.
- Bw1—13 to 18 inches; dark grayish brown (10YR 4/2) fine sand; weak medium subangular blocky structure parting to weak fine granular; very friable; common very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.
- Bw2—18 to 25 inches; dark grayish brown (10YR 4/2) fine sand; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.
- BC—25 to 33 inches; dark grayish brown (10YR 4/2) fine sand; weak fine and medium subangular blocky structure; very friable; very dark gray (10YR 3/1) krotovinas; slightly acid; abrupt smooth boundary.
- C1—33 to 54 inches; mottled grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) fine sand; single grain; loose; very dark gray (10YR 3/1) krotovinas neutral; abrupt smooth boundary.
- C2—54 to 60 inches; brown (10YR 5/3) sand; single grain; loose; very dark gray (10YR 3/1) krotovinas neutral.

The thickness of the solum ranges from 24 to 36 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap or A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of

10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is loamy fine sand, fine sand, or sand.

Waukegan Series

The Waukegan series consists of well drained soils on outwash plains and stream terraces. These soils formed in loess and in the underlying sandy outwash.

Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 5 percent.

Waukegan soils are similar to Tell soils and are commonly adjacent to Dickinson, Oakville, Sparta, and Tell soils. Dickinson, Oakville, and Sparta soils contain more sand in the solum than the Waukegan soils. Dickinson and Tell soils are in positions on the landscape similar to those of the Waukegan soils. Oakville and Tell soils do not have a mollic epipedon. Sparta soils are excessively drained. Oakville and Sparta soils are in the higher landscape positions.

Typical pedon of Waukegan silt loam, 2 to 5 percent slopes, 700 feet south and 160 feet east of the northwest corner of sec. 16, T. 18 N., R. 5 E., in a cornfield:

- Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.
- A—7 to 14 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; medium acid; gradual smooth boundary.
- AB—14 to 19 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium and coarse subangular blocky structure; friable; medium acid; gradual wavy boundary.
- Bw1—19 to 24 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; gradual wavy boundary.
- Bw2—24 to 30 inches; brown (10YR 4/3) silt loam; moderate medium and coarse subangular blocky structure; friable; medium acid; clear wavy boundary.
- 2Bw3—30 to 33 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; slightly acid; abrupt wavy boundary.
- 2BC—33 to 41 inches; dark yellowish brown (10YR 4/4) sand; weak medium subangular blocky structure; very friable; slightly acid; gradual wavy boundary.
- 2C—41 to 60 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess ranges from 25 to 40 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of 10YR, value of 3 through 5, and chroma of 3 or 4. The 2Bw and 2BC horizons have hue of 10YR, value of 4 or 5, and chroma of 3 through 6. They are sand, loamy sand, or sandy loam. The 2C horizon has hue of 10YR, value of 4 through 6, and chroma of 3 through 6.

Westville Series

The Westville series consists of well drained, moderately permeable soils on uplands. These soils formed in a paleosol, which formed in glacial till. Slope ranges from 10 to 18 percent.

Westville soils are similar to Hickory soils and are commonly adjacent to Downs, Fayette, Hickory, and Sylvan soils. Downs, Fayette, and Sylvan soils formed entirely in loess. They are higher on the landscape than the Westville soils. Hickory soils formed in Illinoian glacial till that does not have reddish brown colors. They are lower on the landscape than the Westville soils.

Typical pedon of Westville loam, 10 to 18 percent slopes, eroded, 180 feet west and 1,920 feet north of the southeast corner of sec. 3, T. 14 N., R. 1 E., in a grassed area:

- Ap—0 to 5 inches; mixed dark brown (10YR 3/3) and dark grayish brown (10YR 4/2) loam, mixed grayish brown (10YR 5/2) and brown (10YR 5/3) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.
- BA—5 to 9 inches; mixed brown (10YR 4/3) and dark brown (10YR 3/3) clay loam; moderate fine subangular blocky structure parting to moderate fine and medium granular; friable; medium acid; clear smooth boundary.
- Bt1—9 to 15 inches; dark brown (7.5YR 4/4) clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common moderately thick dark brown (7.5YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.
- Bt2—15 to 23 inches; dark brown (7.5YR 4/4) clay loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; many moderately thick reddish brown (5YR 4/4) clay films on faces of peds; few dark stains (iron and manganese oxides); strongly acid; gradual smooth boundary.
- Bt3—23 to 35 inches; reddish brown (5YR 4/4) clay loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; common moderately thick reddish brown (5YR 4/3) clay films on faces of peds; few dark stains (iron and manganese oxides); medium acid; gradual smooth boundary.

Bt4—35 to 45 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; common moderately thick reddish brown (5YR 4/4) clay films on faces of peds; medium acid; gradual smooth boundary.

Bw—45 to 58 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular and angular blocky structure; firm; strongly acid; gradual smooth boundary.

BC—58 to 60 inches; strong brown (7.5YR 5/6) sandy-clay loam; weak fine and medium subangular blocky structure; firm; medium acid.

The thickness of the solum ranges from 48 to more than 60 inches. The surface soil is 5 to 10 inches thick.

The Ap or A horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or 3. It is loam or clay loam. The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. It is clay loam or sandy clay loam.

Formation of the Soils

In this section the major factors of soil formation are described. These factors have affected the formation of the soils in Henry County.

Factors of Soil Formation

Soil-forming processes act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the parent material, the plant and animal life on and in the soil, the climate, the relief, and the length of time that the forces of soil formation have acted on the soil material.

Climate and plant and animal life are active factors of soil formation. As they act on the parent material that has accumulated through the weathering of rocks and that may have been relocated by water, glaciers, or wind, they slowly change the material into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms. Finally, time is needed for changing the parent material into a soil. Usually, a long time is needed for the formation of distinct horizons. The importance of each factor differs from place to place, and each modifies the effect of the other four. In some areas one factor dominates the formation of a soil. Human activities, such as clearing forests, cultivating, and applying fertilizer, also affect soil formation.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It determines the chemical and mineralogical composition of the soil. Some of the parent material in Henry County was deposited by wind, glaciers, or melt water from the glaciers (5). In some areas it was reworked and redeposited by subsequent actions of water and wind. Although all of the parent material in the county is of common glacial origin, its properties vary greatly, sometimes within small areas, depending on how the material was deposited. The soils in the county formed dominantly in loess, glacial till, outwash deposits, lacustrine deposits, alluvium, organic material, and bedrock residuum.

Peoria loess is the major parent material in the county. The Mississippi River Valley was the main source of the loess. Wind picked up silt from the valley floor and redeposited it in the uplands. The loess is about 30 feet

thick in nearly level areas on uplands. Tama soils are an example of soils that formed in loess. These soils typically are moderately fine textured and have a strongly expressed structure.

Glacial till is material laid down directly by glaciers with a minimum of water action. It consists of particles of different sizes that are mixed together. The small pebbles in glacial till have sharp corners, indicating that they have not been worn by washing water. All of the till in the county is of Illinoian age. In some areas it retains a Sangamon paleosol. Atlas and other modern soils formed in this material. In many areas the paleosol has been removed by erosion. Hickory and other soils formed in this material. In a few areas the till contains carbonates within a depth of 40 inches. Miami and other soils formed in this material.

Outwash material is deposited by running water from melting glaciers. The size of particles varies, depending on the speed of the stream that carried the material. When the water slowed down, the coarser particles were deposited. The finer particles, such as very fine sand, silt, and clay, were carried by the more slowly moving water. Outwash deposits generally consist of layers of particles that are similar in size, such as silt loam, sandy loam, and sand. La Hogue and other soils formed in loamy deposits of outwash material. In many areas the outwash deposits are covered by a thin layer of loess. Plano, Proctor, and other soils formed in this material. In some of these areas, the outwash is a thin deposit overlying glacial till.

Lacustrine material was deposited from still or ponded glacial melt water. After the coarser fragments were deposited as outwash by moving water, the finer particles, such as very fine sand, silt, and clay, settled in the still water. As a result, the soils that formed in lacustrine deposits are typically fine textured. Niota and other soils formed in lacustrine material.

The alluvium in the county was recently deposited by floodwater from streams. It varies in texture, depending on the speed of the water from which it was deposited. Examples of alluvial soils are Sawmill and Radford soils.

Organic material is made up of deposits of plant remains. After the glaciers withdrew from the area, water was left standing in depressions on outwash and lake plains. As the grasses and sedges growing around the edges of these lakes died, their remains fell to the bottom. Later, water-tolerant trees grew in the areas. As

these trees died, their residue became part of the organic accumulation. When the lakes eventually were filled with organic material, areas of muck and peat formed. Palms and other soils formed in organic material.

Shale bedrock is predominantly buried by loess, glacial till, outwash, and alluvium in Henry County. Along side slopes on dissected uplands, however, the material weathered from shale bedrock is the parent material of some soils. An example is Marseilles soils.

Plant and Animal Life

Plants are the principal living organisms affecting the soils in Henry County. Bacteria, fungi, and earthworms, however, also have affected soil formation. The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material on and in the soil depends on the kind of plants that grew on the soil. The remains of these plants accumulate in the surface layer, decay, and eventually become organic matter. The roots of the plants provide channels for the downward movement of water through the soil and add organic matter as they decay. Bacteria in the soil help to break down the organic matter and thus help to provide plant nutrients.

The native vegetation in the county was trees and prairie grasses. The sloping soils formed mainly under forests of oak, hickory, and similar trees. The nearly level soils formed under prairie grasses. They have a darker surface layer than the soils that formed under forest vegetation. Also, they have a higher content of organic matter. Fayette soils are an example of soils that formed under forest vegetation. Muscatine soils are an example of soils that formed under prairie vegetation.

Climate

Climate is an important factor in the formation of soils. It influences the kind of plant and animal life on and in the soil. Precipitation affects the weathering of minerals and the transporting of soil material. Temperature determines the rate of chemical reaction that occurs in the soil. The general climate has had an important overall influence on the characteristics of the soils, but it does not cause major differences among soils in a relatively small area, such as a county.

The climate in Henry County is temperate and humid. It is probably similar to the climate under which the soils formed. More detailed information about the climate of the county is provided in the section "General Nature of the County."

Relief

Relief or topography has a marked influence on the soils through its effect on natural drainage, erosion, plant cover, and soil temperature. In Henry County, the slopes range from 0 to 60 percent. Natural soil drainage ranges from excessively drained on sandy ridgetops to very poorly drained in depressions.

Relief influences the formation of soils by affecting runoff and drainage. Drainage in turn, through its effect on aeration of the soil, determines the color of the soil. Runoff is most rapid on the steeper slopes, but in low areas, water is temporarily ponded. Water and air move freely through well drained soils but slowly through poorly drained soils. In well aerated soils, the iron and aluminum compounds that give most soils their color are brightly colored. In poorly aerated soils, the colors are dull gray and mottled. Fayette soils are an example of well drained, well aerated soils. Sable soils are an example of poorly aerated, poorly drained soils.

Time

The length of time needed for the formation of a soil depends on the other factors of soil formation. Differences in the length of time that the parent materials have been in place are commonly reflected in the degree of profile development. Soils form more rapidly and are more acid if the parent material is low in content of lime. The more rapidly permeable soils form more readily than slowly permeable soils because lime and other soluble minerals are leached more quickly. Soils form more quickly under forest vegetation than under prairie vegetation because grasses are more efficient in recycling calcium and other bases from the subsoil to the surface layer. Soils generally form more quickly in a humid climate than a dry climate.

The soils in Henry County range from young to mature. Most of the soils on uplands are moderately developed. The soils in the northern part of the county and on terraces are weakly developed.

References

- (1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vols., illus.
- (2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.
- (3) Fehrenbacher, J. B., R. A. Pope, I. J. Jansen, J. D. Alexander, and B. W. Ray. 1978. Soil productivity in Illinois. *Coop. Ext. Serv. Circ.* 1156, 21 pp., illus.
- (4) Illinois Cooperative Crop Reporting Service. 1981. Illinois agricultural statistics annual summary. III. *Coop. Crop Rep. Serv. Bull.* 81-1, 103 pp., illus.
- (5) Leighton, M. M., and J. A. Brophy. 1961. Illinoian glaciation in Illinois. *J. Geol.* 69: 1-31, illus.
- (6) Smith, R. S., E. E. De Turk, F. C. Bank, and L. H. Smith. 1928. Henry County soils. *Univ. Ill. Agric. Exp. Stn. Soil Rep.* 41, 65 pp., illus.
- (7) United States Department of Agriculture. 1951. Soil survey manual. *U.S. Dep. Agric. Handb.* 18, 503 pp., illus.
- (8) United States Department of Agriculture. 1961. Land capability classification. *U.S. Dep. Agric. Handb.* 210, 21 pp.
- (9) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. *Soil Conserv. Serv., U.S. Dep. Agric. Handb.* 436, 754 pp., illus.
- (10) United States Department of Commerce, Bureau of the Census. 1981. 1978 census of agriculture. Vol. I, Part 13, 717 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon.

Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	<i>Inches</i>
Very low.....	0 to 3
Low.....	3 to 6
Moderate.....	6 to 9
High.....	9 to 12
Very high.....	more than 12

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil 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 are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a “wire” when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

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 to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material

- through eluviation are eluvial; those that have received material are illuvial.
- Eolian soil material.** Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.
- Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
- Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
- Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.
- Excess fines** (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.
- Fast intake** (in tables). The rapid movement of water into the soil.
- Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
- Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry 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, and clay.
- First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.
- Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.
- Foot slope.** The inclined surface at the base of a hill.
- Forb.** Any herbaceous plant not a grass or a sedge.
- Frost action** (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
- Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
- Glacial drift** (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.
- Glacial outwash** (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.
- Glacial till** (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
- Glaciolacustrine deposits.** Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.
- Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.
- Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
- Gravel.** Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.
- Green manure crop** (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
- Ground water** (geology). Water filling all the unblocked pores of underlying material below the water table.
- Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
- Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:
- O horizon.*—An organic layer of fresh and decaying plant residue.
- A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.
- E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
- B horizon.*—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or

browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration 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

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

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.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

- Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.
- Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
- Moderately coarse textured soil.** Coarse sandy loam, sandy loam, and fine sandy loam.
- Moderately fine textured soil.** Clay loam, sandy clay loam, and silty clay loam.
- Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.
- Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common, and many*; size—*fine, medium, and coarse*; and contrast—*faint, distinct, and prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).
- Muck.** Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)
- Munsell notation.** A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.
- Neutral soil.** A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)
- Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.
- Organic matter.** Plant and animal residue in the soil in various stages of decomposition.
- Outwash, glacial.** Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.
- Outwash plain.** A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.
- Parent material.** The unconsolidated organic and mineral material in which soil forms.
- Peat.** Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)
- Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.
- Pedon.** The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.
- Percolation.** The downward movement of water through the soil.
- Percs slowly** (in tables). The slow movement of water through the soil adversely affecting the specified use.
- Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:
- | | |
|-----------------------|------------------------|
| Very slow..... | less than 0.06 inch |
| Slow..... | 0.06 to 0.2 inch |
| Moderately slow..... | 0.2 to 0.6 inch |
| Moderate..... | 0.6 inch to 2.0 inches |
| Moderately rapid..... | 2.0 to 6.0 inches |
| Rapid..... | 6.0 to 20 inches |
| Very rapid..... | more than 20 inches |
- Phase, soil.** A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.
- pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)
- Piping** (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.
- Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.
- Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.
- Plowpan.** A compacted layer formed in the soil directly below the plowed layer.
- Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.
- Poor filter** (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.
- Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.
- Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.
- Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—
- | | pH |
|-------------------------|------------|
| Extremely acid..... | below 4.5 |
| Very strongly acid..... | 4.5 to 5.0 |
| Strongly acid..... | 5.1 to 5.5 |

Medium acid.....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral.....	6.6 to 7.3
Mildly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline.....	8.5 to 9.0
Very strongly alkaline.....	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

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.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002

millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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 insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	<i>Millimeters</i>
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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded and 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

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. Includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and

are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION
 [Recorded in the period 1957-77 at Geneseo, Illinois]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>	<u>In</u>	<u>In</u>	
January----	28.3	11.2	19.8	57	-19	0	1.63	0.64	2.43	4	8.1
February---	34.3	16.9	25.6	62	-11	0	1.06	.36	1.62	3	5.2
March-----	45.8	27.0	36.5	78	4	32	2.65	1.26	3.78	6	5.2
April-----	61.8	39.8	50.8	87	21	106	4.08	2.51	5.49	8	1.6
May-----	73.3	50.6	62.0	92	31	391	4.17	2.02	5.92	7	.0
June-----	82.2	60.1	71.2	96	43	636	4.23	2.64	5.65	7	.0
July-----	85.5	63.9	74.7	98	49	766	4.79	2.63	6.55	7	.0
August-----	83.5	61.8	72.7	96	47	704	3.17	1.34	4.64	5	.0
September--	75.9	53.7	64.8	93	33	444	3.62	1.74	5.15	7	.0
October----	64.9	43.0	54.0	87	23	201	2.87	.87	4.45	5	.1
November---	48.2	30.6	39.4	73	5	17	2.04	1.04	2.85	5	2.3
December---	34.0	18.2	26.1	62	-16	0	1.70	.62	2.56	4	7.2
Yearly:											
Average--	59.8	39.7	49.8	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	-19	---	---	---	---	---	---
Total----	---	---	---	---	---	3,297	36.01	29.98	41.24	68	29.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL
 [Recorded in the period 1957-77 at Geneseo, Illinois]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 15	April 29	May 8
2 years in 10 later than--	April 11	April 24	May 3
5 years in 10 later than--	April 3	April 16	April 24
First freezing temperature in fall:			
1 year in 10 earlier than--	October 24	October 13	September 29
2 years in 10 earlier than--	October 29	October 18	October 5
5 years in 10 earlier than--	November 7	October 27	October 15

TABLE 3.--GROWING SEASON
 [Recorded in the period 1957-77 at Geneseo, Illinois]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	195	173	151
8 years in 10	203	180	158
5 years in 10	218	194	173
2 years in 10	232	207	187
1 year in 10	240	214	194

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
8D2	Hickory silt loam, 10 to 18 percent slopes, eroded-----	3,580	0.7
8D3	Hickory clay loam, 10 to 20 percent slopes, severely eroded-----	6,390	1.2
8F2	Hickory loam, 18 to 35 percent slopes, eroded-----	5,490	1.0
17A	Keomah silt loam, 0 to 3 percent slopes-----	430	0.1
19D2	Sylvan silt loam, 10 to 18 percent slopes, eroded-----	6,490	1.2
19D3	Sylvan silty clay loam, 10 to 18 percent slopes, severely eroded-----	17,080	3.2
19F	Sylvan silt loam, 18 to 30 percent slopes-----	3,510	0.7
22D2	Westville loam, 10 to 18 percent slopes, eroded-----	230	*
22D3	Westville clay loam, 10 to 18 percent slopes, severely eroded-----	290	0.1
27C2	Miami loam, 5 to 10 percent slopes, eroded-----	740	0.1
27D2	Miami loam, 10 to 18 percent slopes, eroded-----	450	0.1
36A	Tama silt loam, 0 to 2 percent slopes-----	6,470	1.2
36B	Tama silt loam, 2 to 5 percent slopes-----	41,750	7.9
36C2	Tama silt loam, 5 to 10 percent slopes, eroded-----	25,690	4.8
41A	Muscatine silt loam, 0 to 3 percent slopes-----	20,160	3.8
43A	Ipava silt loam, 0 to 3 percent slopes-----	29,230	5.5
45	Denny silt loam-----	530	0.1
49	Watseka loamy fine sand-----	1,220	0.2
67	Harpster silty clay loam-----	9,030	1.7
68	Sable silty clay loam-----	5,670	1.1
69	Milford silty clay loam-----	4,210	0.8
74	Radford silt loam-----	18,700	3.5
87A	Dickinson fine sandy loam, 0 to 2 percent slopes-----	1,290	0.2
87B	Dickinson fine sandy loam, 2 to 5 percent slopes-----	2,780	0.5
87C2	Dickinson fine sandy loam, 5 to 10 percent slopes, eroded-----	660	0.1
88B	Sparta loamy fine sand, 1 to 7 percent slopes-----	2,960	0.6
88D	Sparta loamy fine sand, 7 to 15 percent slopes-----	970	0.2
100	Palms muck-----	2,030	0.4
102A	La Hogue loam, 0 to 3 percent slopes-----	2,420	0.4
107	Sawmill silty clay loam-----	8,100	1.5
107+	Sawmill silt loam, overwash-----	13,470	2.5
119D2	Elco silt loam, 10 to 18 percent slopes, eroded-----	2,770	0.5
119D3	Elco silty clay loam, 10 to 18 percent slopes, severely eroded-----	1,540	0.3
125	Selma clay loam-----	13,000	2.5
148B	Proctor silt loam, 2 to 5 percent slopes-----	4,770	0.9
148C2	Proctor silt loam, 5 to 10 percent slopes, eroded-----	2,780	0.5
149A	Brenton silt loam, 0 to 3 percent slopes-----	1,840	0.3
152	Drummer silty clay loam-----	15,160	2.9
153	Pella silty clay loam-----	3,230	0.6
171A	Catlin silt loam, 0 to 2 percent slopes-----	930	0.2
171B	Catlin silt loam, 2 to 5 percent slopes-----	2,450	0.5
172	Hoopeston sandy loam-----	1,010	0.2
198A	Elburn silt loam, 0 to 3 percent slopes-----	16,880	3.2
199A	Plano silt loam, 0 to 2 percent slopes-----	2,440	0.4
199B	Plano silt loam, 2 to 5 percent slopes-----	8,240	1.6
199C2	Plano silt loam, 5 to 10 percent slopes, eroded-----	1,340	0.3
200	Orio loam-----	2,190	0.4
201	Gilford fine sandy loam-----	2,610	0.5
206	Thorp silt loam-----	3,270	0.6
219A	Millbrook silt loam, 0 to 3 percent slopes-----	3,690	0.7
250C2	Velma silt loam, 5 to 10 percent slopes, eroded-----	270	0.1
250D2	Velma silt loam, 10 to 15 percent slopes, eroded-----	1,110	0.2
250E2	Velma loam, 15 to 20 percent slopes, eroded-----	400	0.1
257A	Clarksdale silt loam, 0 to 3 percent slopes-----	2,040	0.4
259B	Assumption silt loam, 2 to 5 percent slopes-----	2,810	0.5
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded-----	2,380	0.4
259D2	Assumption silt loam, 10 to 15 percent slopes, eroded-----	1,380	0.3
261	Niota silt loam-----	3,260	0.6
262	Denrock silt loam-----	1,450	0.3
274B	Seaton silt loam, 2 to 5 percent slopes-----	3,340	0.6
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded-----	5,110	1.0
274D2	Seaton silt loam, 10 to 18 percent slopes, eroded-----	2,150	0.4
275	Joy silt loam-----	2,600	0.5
277A	Port Byron silt loam, 0 to 2 percent slopes-----	1,990	0.4
277B	Port Byron silt loam, 2 to 5 percent slopes-----	5,810	1.1
277C2	Port Byron silt loam, 5 to 10 percent slopes, eroded-----	970	0.2
279A	Rozetta silt loam, 0 to 3 percent slopes-----	890	0.2
280B	Fayette silt loam, 2 to 5 percent slopes-----	4,170	0.8
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded-----	11,980	2.3
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded-----	3,650	0.7

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
280D3	Fayette silty clay loam, 10 to 18 percent slopes, severely eroded-----	2,330	0.4
280E2	Fayette silt loam, 15 to 20 percent slopes, eroded-----	510	0.1
386A	Downs silt loam, 0 to 2 percent slopes-----	2,020	0.4
386B	Downs silt loam, 2 to 5 percent slopes-----	15,820	3.0
386C2	Downs silt loam, 5 to 10 percent slopes, eroded-----	23,050	4.3
400	Calco silty clay loam-----	1,110	0.2
415	Orion silt loam-----	6,680	1.3
439A	Jasper loam, sandy substratum, 0 to 2 percent slopes-----	260	*
439B	Jasper loam, sandy substratum, 2 to 5 percent slopes-----	720	0.1
439D3	Jasper loam, sandy substratum, 10 to 15 percent slopes, severely eroded-----	1,850	0.3
447	Canisteo loam, sandy substratum-----	1,910	0.4
457	Booker silty clay-----	5,250	1.0
465	Montgomery silty clay-----	2,380	0.4
546B	Keltner silt loam, 2 to 5 percent slopes-----	600	0.1
546C2	Keltner silt loam, 5 to 10 percent slopes, eroded-----	820	0.2
549D2	Marseilles silt loam, 12 to 18 percent slopes, eroded-----	850	0.2
549F2	Marseilles silt loam, 18 to 35 percent slopes, eroded-----	670	0.1
562A	Port Byron silt loam, sandy substratum, 0 to 2 percent slopes-----	1,750	0.3
562B	Port Byron silt loam, sandy substratum, 2 to 5 percent slopes-----	1,550	0.3
564A	Waukegan silt loam, 0 to 2 percent slopes-----	2,780	0.5
564B	Waukegan silt loam, 2 to 5 percent slopes-----	1,800	0.3
565A	Tell silt loam, 0 to 2 percent slopes-----	570	0.1
565B	Tell silt loam, 2 to 5 percent slopes-----	2,080	0.4
565C2	Tell silt loam, 5 to 10 percent slopes, eroded-----	1,470	0.3
567D2	Elkhart silt loam, 8 to 15 percent slopes, eroded-----	6,380	1.2
572A	Loran silt loam, 0 to 2 percent slopes-----	320	0.1
572B	Loran silt loam, 2 to 5 percent slopes-----	920	0.2
572C2	Loran silt loam, 5 to 10 percent slopes, eroded-----	350	0.1
575	Joy silt loam, sandy substratum-----	3,210	0.6
670	Aholt silty clay-----	2,410	0.4
741B	Oakville loamy fine sand, 1 to 7 percent slopes-----	3,520	0.7
741D	Oakville loamy fine sand, 7 to 15 percent slopes-----	4,770	0.9
741E	Oakville loamy fine sand, 15 to 30 percent slopes-----	1,220	0.2
764A	Coyne fine sandy loam, 0 to 2 percent slopes-----	1,000	0.2
764B	Coyne loam, 2 to 5 percent slopes-----	1,090	0.2
777	Adrian muck-----	1,470	0.3
800C	Psammments, sloping-----	430	0.1
802B	Orthents, loamy, gently sloping-----	1,110	0.2
871B	Lenzburg silt loam, 1 to 7 percent slopes-----	900	0.2
871G	Lenzburg clay loam, 30 to 60 percent slopes-----	1,720	0.3
910G	Timula-Miami complex, 30 to 60 percent slopes-----	660	0.1
913D	Marseilles-Hickory silt loams, 10 to 18 percent slopes-----	560	0.1
913D3	Marseilles-Hickory complex, 10 to 18 percent slopes, severely eroded-----	800	0.2
913F2	Marseilles-Hickory complex, 18 to 35 percent slopes, eroded-----	1,340	0.3
917B	Oakville-Tell complex, 1 to 7 percent slopes-----	2,000	0.4
917D	Oakville-Tell complex, 7 to 15 percent slopes-----	4,570	0.9
918D3	Marseilles-Atlas silty clay loams, 12 to 18 percent slopes, severely eroded-----	530	0.1
943D3	Seaton-Timula silt loams, 10 to 20 percent slopes, severely eroded-----	3,990	0.8
943G	Seaton-Timula silt loams, 20 to 60 percent slopes-----	3,010	0.6
946D2	Hickory-Atlas silt loams, 12 to 20 percent slopes, eroded-----	1,200	0.2
946D3	Hickory-Atlas complex, 12 to 20 percent slopes, severely eroded-----	2,890	0.5
957D3	Elco-Atlas silty clay loams, 10 to 18 percent slopes, severely eroded-----	2,760	0.5
962D3	Sylvan-Bold complex, 10 to 18 percent slopes, severely eroded-----	3,170	0.6
	Water-----	2,870	0.5
	Total-----	529,920	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
17A	Keomah silt loam, 0 to 3 percent slopes (where drained)
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
41A	Muscatine silt loam, 0 to 3 percent slopes
43A	Ipava silt loam, 0 to 3 percent slopes
45	Denny silt loam (where drained)
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
69	Milford silty clay loam (where drained)
74	Radford silt loam
87A	Dickinson fine sandy loam, 0 to 2 percent slopes
87B	Dickinson fine sandy loam, 2 to 5 percent slopes
87C2	Dickinson fine sandy loam, 5 to 10 percent slopes, eroded
102A	La Hogue loam, 0 to 3 percent slopes
107	Sawmill silty clay loam (where drained and protected from flooding)
107+	Sawmill silt loam, overwash (where drained and protected from flooding)
125	Selma clay loam (where drained)
148B	Proctor silt loam, 2 to 5 percent slopes
149A	Brenton silt loam, 0 to 3 percent slopes
152	Drummer silty clay loam (where drained)
153	Pella silty clay loam (where drained)
171A	Catlin silt loam, 0 to 2 percent slopes
171B	Catlin silt loam, 2 to 5 percent slopes
172	Hoopeston sandy loam
198A	Elburn silt loam, 0 to 3 percent slopes
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
200	Orio loam (where drained)
201	Gilford fine sandy loam (where drained)
206	Thorp silt loam (where drained)
219A	Millbrook silt loam, 0 to 3 percent slopes (where drained)
257A	Clarksdale silt loam, 0 to 3 percent slopes (where drained)
259B	Assumption silt loam, 2 to 5 percent slopes
261	Niota silt loam (where drained)
262	Denrock silt loam (where drained)
274B	Seaton silt loam, 2 to 5 percent slopes
275	Joy silt loam
277A	Port Byron silt loam, 0 to 2 percent slopes
277B	Port Byron silt loam, 2 to 5 percent slopes
279A	Rozetta silt loam, 0 to 3 percent slopes
280B	Fayette silt loam, 2 to 5 percent slopes
386A	Downs silt loam, 0 to 2 percent slopes
386B	Downs silt loam, 2 to 5 percent slopes
400	Calco silty clay loam (where drained)
415	Orion silt loam (where not frequently flooded during the growing season)
439A	Jasper loam, sandy substratum, 0 to 2 percent slopes
439B	Jasper loam, sandy substratum, 2 to 5 percent slopes
447	Canisteo loam, sandy substratum (where drained)
457	Booker silty clay (where drained)
465	Montgomery silty clay (where drained)
546B	Keltner silt loam, 2 to 5 percent slopes
562A	Port Byron silt loam, sandy substratum, 0 to 2 percent slopes
562B	Port Byron silt loam, sandy substratum, 2 to 5 percent slopes
564A	Waukegan silt loam, 0 to 2 percent slopes
564B	Waukegan silt loam, 2 to 5 percent slopes
565A	Tell silt loam, 0 to 2 percent slopes
565B	Tell silt loam, 2 to 5 percent slopes
572A	Loran silt loam, 0 to 2 percent slopes
572B	Loran silt loam, 2 to 5 percent slopes
575	Joy silt loam, sandy substratum
670	Aholt silty clay (where drained)
764A	Coyne fine sandy loam, 0 to 2 percent slopes
764B	Coyne loam, 2 to 5 percent slopes
871B	Lenzburg silt loam, 1 to 7 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Brome-grass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
8D2----- Hickory	IVe	67	---	26	46	2.5	4.2
8D3----- Hickory	VIe	---	---	---	---	2.5	4.1
8F2----- Hickory	VIe	---	---	---	---	2.1	3.6
17A----- Keomah	IIw	125	43	---	71	4.8	8.0
19D2----- Sylvan	IVe	90	---	42	53	4.0	6.6
19D3----- Sylvan	VIe	---	---	---	---	3.3	5.4
19F----- Sylvan	VIe	---	---	---	---	3.7	6.0
22D2----- Westville	IVe	99	---	41	55	3.7	6.1
22D3----- Westville	VIe	---	---	---	---	3.2	5.4
27C2----- Miami	IIIe	95	33	43	---	3.1	---
27D2----- Miami	IVe	80	28	36	---	2.6	---
36A----- Tama	I	145	46	62	89	5.9	9.8
36B----- Tama	IIe	143	46	61	88	5.8	9.7
36C2----- Tama	IIIe	125	44	---	88	4.9	8.1
41A----- Muscatine	I	151	50	---	98	5.5	9.1
43A----- Ipava	I	150	52	66	91	6.1	---
45----- Denny	IIw	115	37	47	62	4.0	---
49----- Watseka	IIIs	92	31	43	62	3.7	6.2
67----- Harpster	IIw	136	44	52	74	5.0	8.3
68----- Sable	IIw	150	51	61	85	5.6	---
69----- Milford	IIw	131	48	56	81	5.2	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capabil- ity	Corn	Soybeans	Winter wheat	Oats	Grass- legume hay	Bromegrass- alfalfa
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Ton</u>	<u>AUM*</u>
74----- Radford	I	143	46	61	84	5.6	9.3
87A----- Dickinson	IIIs	99	37	---	62	3.9	6.5
87B----- Dickinson	IIe	95	37	---	60	3.9	6.5
87C2----- Dickinson	IIIe	90	35	---	55	3.7	6.0
88B----- Sparta	IVs	50	---	---	40	2.5	---
88D----- Sparta	VIIs	---	---	---	---	---	---
100----- Palms	IIIW	105	42	---	65	---	---
102A----- La Hogue	I	129	43	56	80	5.2	8.6
107, 107+----- Sawmill	IIW	147	47	54	76	5.5	---
119D2----- Elco	IVe	97	---	41	56	3.8	6.4
119D3----- Elco	VIe	---	---	---	---	3.4	5.6
125----- Selma	IIW	136	44	53	76	5.0	8.3
148B----- Proctor	IIe	143	44	58	87	5.4	9.1
148C2----- Proctor	IIIe	135	41	55	83	5.2	8.6
149A----- Brenton	I	160	47	62	91	5.9	9.8
152----- Drummer	IIW	154	51	61	83	5.5	9.2
153----- Pella	IIW	125	45	50	75	4.8	8.0
171A----- Catlin	I	145	46	61	87	5.8	9.7
171B----- Catlin	IIe	145	46	60	86	5.7	9.6
172----- Hoopeston	IIIs	105	33	47	70	4.1	6.8
198A----- Elburn	I	161	50	63	94	6.1	10.2
199A----- Plano	I	151	45	60	90	5.8	9.7
199B----- Plano	IIe	150	45	59	89	5.7	9.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capabil- ity	Corn	Soybeans	Winter wheat	Oats	Grass- legume hay	Bromegrass- alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
199C2----- Plano	IIIe	142	42	56	85	5.5	9.1
200----- Orion	IIw	112	37	47	64	4.1	6.8
201----- Gilford	IIw	120	42	54	100	4.0	---
206----- Thorp	IIw	110	38	44	63	4.2	7.0
219A----- Millbrook	I	144	43	59	81	5.4	9.0
250C2----- Velma	IIIe	100	37	48	68	4.3	---
250D2----- Velma	IIIe	95	35	46	65	4.1	---
250E2----- Velma	IVe	89	---	43	60	3.9	---
257A----- Clarksdale	I	140	43	57	79	5.3	---
259B----- Assumption	IIe	127	39	55	76	4.9	8.2
259C2----- Assumption	IIIe	120	37	52	72	4.7	7.8
259D2----- Assumption	IIIe	116	35	51	70	4.6	7.6
261----- Niota	IIw	113	37	46	62	4.0	6.7
262----- Denrock	IIw	108	37	46	63	4.1	6.8
274B----- Seaton	IIe	117	35	49	68	4.8	7.9
274C2----- Seaton	IIIe	115	34	48	67	4.7	7.8
274D2----- Seaton	IVe	100	30	43	60	4.2	7.0
275----- Joy	I	161	48	63	92	6.1	---
277A----- Port Byron	I	140	42	52	88	4.8	---
277B----- Port Byron	IIe	139	42	51	87	4.8	---
277C2----- Port Byron	IIIe	131	39	57	83	5.3	8.7
279A----- Rozetta	I	131	40	54	73	5.2	8.7
280B----- Fayette	IIe	125	39	---	90	5.1	7.8

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Brome-grass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
280C2----- Fayette	IIIe	121	37	---	84	4.8	7.5
280D2----- Fayette	IIIe	116	38	---	80	4.7	7.0
280D3----- Fayette	VIe	---	---	---	62	3.2	5.3
280E2----- Fayette	VIe	---	---	---	---	4.3	5.8
386A----- Downs	I	140	43	59	83	5.6	9.3
386B----- Downs	IIe	140	45	---	95	5.6	8.3
386C2----- Downs	IIIe	131	42	---	89	5.3	7.8
400----- Calco	IIw	99	38	---	84	4.2	7.0
415----- Orion	IIw	110	35	---	75	4.0	---
439A----- Jasper	I	125	44	50	73	4.1	7.8
439B----- Jasper	IIe	120	42	48	70	4.0	7.5
439D3----- Jasper	IVe	104	37	41	61	3.4	6.5
447----- Canisteo	IIw	132	44	53	77	5.3	---
457----- Booker	IIIw	99	35	34	62	3.5	---
465----- Montgomery	IIIw	115	40	52	---	3.8	---
546B----- Keltner	IIe	109	36	---	73	4.5	---
546C2----- Keltner	IIIe	103	34	---	70	4.2	---
549D2----- Marseilles	VIe	---	---	---	---	3.5	5.8
549F2----- Marseilles	VIIe	---	---	---	---	---	5.0
562A----- Port Byron	I	150	45	61	88	5.6	9.3
562B----- Port Byron	IIe	148	45	60	87	5.5	9.2
564A----- Waukegan	IIs	110	40	---	75	4.5	5.6
564B----- Waukegan	IIe	105	30	---	75	4.0	5.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capabil- ity	Corn	Soybeans	Winter wheat	Oats	Grass- legume hay	Bromegrass- alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
565A----- Tell	IIs	100	30	---	65	4.8	---
565B----- Tell	IIe	100	30	---	65	4.5	---
565C2----- Tell	IIIe	90	28	---	60	3.5	---
567D2----- Elkhart	IIIe	114	36	49	68	4.4	7.9
572A----- Loran	I	105	39	49	68	4.7	7.8
572B----- Loran	IIe	105	39	49	67	4.7	7.7
572C2----- Loran	IIIe	96	33	46	64	4.4	7.3
575----- Joy	I	155	46	---	89	5.8	---
670----- Aholt	IIIw	112	36	32	66	4.0	5.3
741B----- Oakville	IVs	50	---	24	48	2.0	---
741D----- Oakville	VI s	---	---	---	35	1.8	---
741E----- Oakville	VII s	---	---	---	---	---	---
764A----- Coyne	IIs	101	36	40	65	3.8	6.3
764B----- Coyne	IIe	101	36	38	65	3.8	6.3
777----- Adrian	IVw	75	23	---	---	---	---
800C. Psamments							
802B**. Orthents							
871B----- Lenzburg	IIe	75	23	26	---	3.0	---
871G----- Lenzburg	VIIe	---	---	---	---	---	---
910G----- Timula-Miami	VIIe	---	---	---	---	---	---
913D----- Marseilles- Hickory	VIe	85	29	35	56	3.4	5.7
913D3----- Marseilles- Hickory	VIIe	---	---	---	---	2.9	4.7

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Brome-grass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
913F2----- Marseilles- Hickory	VIIe	---	---	---	---	---	4.3
917B----- Oakville-Tell	IVs	64	---	---	57	2.8	---
917D----- Oakville-Tell	VI s	---	---	---	46	2.4	---
918D3----- Marseilles- Atlas	VIIe	---	---	---	---	2.6	---
943D3----- Seaton-Timula	VIe	---	---	---	---	3.3	5.5
943G----- Seaton-Timula	VIIe	---	---	---	---	---	3.9
946D2----- Hickory-Atlas	VIe	---	---	22	44	2.3	---
946D3----- Hickory-Atlas	VIIe	---	---	---	---	2.1	---
957D3VIe----- Elco-Atlas	VIe	---	---	28	44	2.8	---
962D3----- Sylvan-Bold	VIe	---	---	---	---	3.3	5.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Common trees	Site index	
8D2, 8D3----- Hickory	1o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black oak----- Green ash----- Bitternut hickory--- Yellow-poplar-----	85 85 --- --- --- 95	Eastern white pine, red pine, yellow- poplar, sugar maple, white oak, black walnut.
8F2----- Hickory	1r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Black oak----- Green ash----- Bitternut hickory--- Yellow-poplar-----	85 85 --- --- --- 95	Eastern white pine, red pine, yellow- poplar, sugar maple, white oak, black walnut.
17A----- Keomah	3o	Slight	Slight	Slight	Slight	White oak----- Northern red oak----	65 70	Eastern white pine, white oak, red pine, northern red oak, black walnut, sugar maple.
19D2, 19D3----- Sylvan	2o	Slight	Slight	Slight	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 80 80 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
19F----- Sylvan	2r	Moderate	Moderate	Moderate	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 80 80 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
22D2, 22D3----- Westville	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black walnut-----	80 80 ---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine, red pine.
27D2----- Miami	1o	Slight	Slight	Slight	Slight	White oak----- Yellow-poplar----- Sweetgum-----	90 98 76	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
88B, 88D----- Sparta	3s	Slight	Slight	Severe	Slight	Northern red oak---- Red pine----- Eastern white pine-- Jack pine-----	70 --- --- ---	Eastern white pine, red pine, jack pine.
119D2, 119D3----- Elco	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black walnut-----	80 --- ---	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
274B, 274C2, 274D2- Seaton	2o	Slight	Slight	Slight	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 90 80 ---	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Common trees	Site index	
279A----- Rozetta	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	Eastern white pine, northern red oak, green ash, yellow- poplar.
280B, 280C2, 280D2, 280D3----- Fayette	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	Eastern white pine, northern red oak, green ash, yellow- poplar.
280E2----- Fayette	2r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	Eastern white pine, northern red oak, green ash, yellow- poplar.
386A, 386B, 386C2o- Downs	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	Eastern white pine, northern red oak, green ash, yellow- poplar.
549D2, 549F2----- Marseilles	3r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Black oak----- White ash-----	66 66 --- ---	White oak, northern red oak, black oak, white ash, eastern white pine, black walnut.
565C2----- Tell	2o	Slight	Slight	Slight	Slight	Northern red oak---- White oak-----	75 75	Red pine, eastern white pine.
741B, 741D----- Oakville	3s	Slight	Slight	Severe	Slight	White oak----- Red pine----- Eastern white pine-- Jack pine-----	70 78 85 68	Eastern white pine, red pine, jack pine.
741E----- Oakville	3s	Moderate	Severe	Severe	Slight	White oak----- Red pine----- Eastern white pine-- Jack pine-----	70 78 85 68	Eastern white pine, red pine, jack pine.
910G*: Timula-----	3r	Severe	Severe	Severe	Slight	White oak----- Northern red oak---- Green ash----- Bur oak-----	70 --- --- ---	Eastern white pine, red pine.
Miami-----	1r	Severe	Severe	Slight	Slight	White oak----- Yellow-poplar----- Sweetgum-----	90 98 76	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
913D*, 913D3*: Marseilles-----	3o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black oak----- White ash-----	66 66 --- ---	White oak, northern red oak, black oak, white ash, eastern white pine, black walnut.
Hickory-----	1o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black oak----- Green ash----- Bitternut hickory--- Yellow-poplar-----	85 85 --- --- --- 95	Eastern white pine, red pine, yellow- poplar, sugar maple, white oak, black walnut.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Common trees	Site index	
913F2*: Marseilles-----	3r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Black oak----- White ash-----	66 66 --- ---	White oak, northern red oak, black oak, white ash, eastern white pine, black walnut.
Hickory-----	1r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Black oak----- Green ash----- Bitternut hickory--- Yellow-poplar-----	85 85 --- --- --- 95	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
917B*, 917D*: Oakville-----	3s	Slight	Slight	Severe	Slight	White oak----- Red pine----- Eastern white pine-- Jack pine-----	70 78 85 68	Eastern white pine, red pine, jack pine.
Tell-----	2o	Slight	Slight	Slight	Slight	Northern red oak---- White oak-----	75 75	Red pine, eastern white pine.
918D3*: Marseilles-----	3o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black oak----- White ash-----	66 66 --- ---	White oak, northern red oak, black oak, white ash, eastern white pine, Scotch pine, black walnut.
Atlas-----	3c	Slight	Slight	Moderate	Moderate	White oak----- Northern red oak---- Bur oak----- Green ash-----	70 70 70 ---	Red pine, eastern white pine.
943D3*: Seaton-----	2r	Moderate	Moderate	Moderate	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 90 80 ---	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
Timula-----	3r	Moderate	Moderate	Moderate	Slight	White oak----- Northern red oak---- Green ash----- Bur oak-----	70 --- --- ---	Eastern white pine, red pine.
943G*: Seaton-----	2r	Severe	Severe	Severe	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 90 80 ---	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
Timula-----	3r	Severe	Severe	Severe	Slight	White oak----- Northern red oak---- Green ash----- Bur oak-----	70 --- --- ---	Eastern white pine, red pine.
946D2*, 946D3*: Hickory-----	1r	Moderate	Moderate	Slight	Slight	White oak----- Northern red oak---- Black oak----- Green ash----- Bitternut hickory--- Yellow-poplar-----	85 85 --- --- --- 95	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Common trees	Site index	
946D2*, 946D3*: Atlas-----	3c	Moderate	Moderate	Moderate	Moderate	White oak----- Northern red oak---- Bur oak----- Green ash-----	70 70 70 ---	Red pine, eastern white pine.
957D3*: Elco-----	2o	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black walnut-----	80 --- ---	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
Atlas-----	3c	Slight	Slight	Moderate	Moderate	White oak----- Northern red oak---- Bur oak----- Green ash-----	70 70 70 ---	Red pine, eastern white pine.
962D3*: Sylvan-----	2o	Slight	Slight	Slight	Slight	Yellow-poplar----- White oak----- Northern red oak---- Black walnut-----	90 80 80 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
Bold.								

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
8D2, 8D3, 8F2----- Hickory	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
17A----- Keomah	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
19D2, 19D3, 19F---- Sylvan	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
22D2, 22D3----- Westville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
27C2, 27D2----- Miami	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36A, 36B----- Tama	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white- cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36C2----- Tama	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
41A----- Muscatine	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
43A----- Ipava	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
45----- Denny	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern white- cedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
49----- Watseka	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
67----- Harpster	---	Tatarian honeysuckle, nannyberry viburnum, Washington hawthorn.	White spruce, northern white-cedar, eastern redcedar, green ash, osageorange.	Black willow-----	---
68----- Sable	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
69----- Milford	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
74----- Radford	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
87A, 87B, 87C2---- Dickinson	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
88B, 88D----- Sparta	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Austrian pine, jack pine, red pine.	Eastern white pine	---
100----- Palms	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum, Tatarian honeysuckle.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
102A----- La Hogue	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
107, 107+----- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
119D2, 119D3----- Elco	---	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
125----- Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
148B, 148C2----- Proctor	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
149A----- Brenton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
152----- Drummer	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine.	Eastern white pine	Pin oak.
153----- Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
171A, 171B----- Catlin	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
172----- Hoopeston	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
198A----- Elburn	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern white-cedar, Washington hawthorn, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
199A, 199B, 199C2- Plano	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white- cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
200----- Orio	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern white- cedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
201----- Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern white- cedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.
206----- Thorp	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white- cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
219A----- Millbrook	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
250C2, 250D2, 250E2----- Velma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white- cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
257A----- Clarksdale	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Washington hawthorn, northern white- cedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Eastern white pine, pin oak.
259B, 259C2, 259D2----- Assumption	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
261----- Niota	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white- cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
262----- Denrock	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
274B, 274C2, 274D2----- Seaton	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
275----- Joy	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
277A, 277B----- Port Byron	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Blue spruce, northern white- cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
277C2----- Port Byron	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
279A----- Rozetta	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280D2, 280D3, 280E2----- Payette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
386A----- Downs	---	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern white- cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
386B, 386C2----- Downs	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
400----- Calco	---	Lilac, Tatarian honeysuckle, Siberian peashrub, northern white- cedar.	Hackberry, eastern redcedar, bur oak, white spruce.	Honeylocust, golden willow, green ash.	Eastern cottonwood.
415----- Orion	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
439A, 439B, 439D3-Jasper	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
447----- Canisteo	---	Nannyberry viburnum, Tatarian honeysuckle, Washington hawthorn.	Eastern redcedar, white spruce, northern white-cedar, green ash.	Black willow-----	---
457----- Booker	---	Amur honeysuckle, silky dogwood, American cranberrybush, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
465----- Montgomery	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
546B, 546C2----- Keltner	---	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
549D2, 549F2----- Marseilles	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, eastern redcedar, radiant crabapple.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
562A, 562B----- Port Byron	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
564A, 564B----- Waukegan	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
565A, 565B, 565C2----- Tell	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
567D2----- Elkhart	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
572A, 572B, 572C2- Loran	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
575----- Joy	---	Silky dogwood, autumn-olive, Amur honeysuckle, American cranberrybush.	Blue spruce, white fir, northern white-cedar, Austrian pine, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
670----- Aholt	---	Tatarian honeysuckle, nannyberry viburnum, Washington hawthorn.	White spruce, northern white-cedar, eastern redcedar, green ash, osageorange.	Black willow-----	---
741B, 741D, 741E-- Oakville	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Washington hawthorn, Amur honeysuckle, Tatarian honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
764A, 764B----- Coyne	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, eastern redcedar, northern white-cedar, osageorange.	Eastern white pine, Norway spruce, red pine.	---
777----- Adrian	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum, Tatarian honeysuckle.	Tall purple willow	Black willow, golden willow.	Imperial Carolina poplar.
800C*. Psamments					
802B*. Orthents					
871B, 871G----- Lenzburg	Siberian peashrub, Tatarian honeysuckle.	Eastern redcedar, jack pine, Washington hawthorn, osageorange, Russian-olive.	Honeylocust, northern catalpa.	---	---

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
910G*: Timula-----	Tatarian honeysuckle.	Osageorange, Russian-olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, green ash.	---	---
Miami-----	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
913D*, 913D3*, 913F2*: Marseilles-----	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, eastern redcedar, radiant crabapple.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
Hickory-----	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
917B*, 917D*: Oakville-----	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Washington hawthorn, Amur honeysuckle, Tatarian honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
Tell-----	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
918D3*: Marseilles-----	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, eastern redcedar, radiant crabapple.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
918D3*: Atlas-----	---	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
943D3*, 943G*: Seaton-----	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Timula-----	Tatarian honeysuckle.	Osageorange, Russian-olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, green ash.	---	---
946D2*, 946D3*: Hickory-----	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Atlas-----	---	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
957D3*: Elco-----	---	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Atlas-----	---	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
962D3*: Sylvan-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
962D3*: Bold-----	Tatarian honeysuckle, Siberian peashrub.	Osageorange, jack pine, eastern redcedar, Washington hawthorn, Russian-olive.	Northern catalpa, honeylocust.	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8D2, 8D3----- Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8F2----- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
17A----- Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight-----	Slight.
19D2, 19D3----- Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
19F----- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
22D2, 22D3----- Westville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27C2----- Miami	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight-----	Slight.
27D2----- Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight-----	Moderate: slope.
36A----- Tama	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
36B----- Tama	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
36C2----- Tama	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
41A----- Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight-----	Slight.
43A----- Ipava	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45----- Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
49----- Watseka	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
67----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68----- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69----- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
74----- Radford	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
87A----- Dickinson	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
87B----- Dickinson	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
87C2----- Dickinson	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
88B----- Sparta	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Moderate: droughty.
88D----- Sparta	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope.
100----- Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
102A----- La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
107, 107+----- Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
119D2, 119D3----- Elco	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
125----- Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
148B----- Proctor	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
148C2----- Proctor	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
149A----- Brenton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
152----- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
153----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
171A, 171B----- Catlin	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.	Slight.
172----- Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
198A----- Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199A----- Plano	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
199B----- Plano	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
199C2----- Plano	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
200----- Orio	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
201----- Gilford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
206----- Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
219A----- Millbrook	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
250C2----- Velma	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
250D2----- Velma	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
250E2----- Velma	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
257A----- Clarksdale	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
259B----- Assumption	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
259C2----- Assumption	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight-----	Slight.
259D2----- Assumption	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight-----	Moderate: slope.
261----- Niota	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
262----- Der,rock	Severe: flooding, wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
274B----- Seaton	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
274C2----- Seaton	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
274D2----- Seaton	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
275----- Joy	Moderate: wetness.	Moderate: wetness.	Moderate: slope.	Slight-----	Slight.
277A----- Port Byron	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
277B----- Port Byron	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
277C2----- Port Byron	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
279A----- Rozetta	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
280B----- Fayette	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
280C2----- Fayette	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
280D2, 280D3----- Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe erodes easily.	Moderate: slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
280E2----- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
386A----- Downs	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
386B----- Downs	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
386C2----- Downs	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
400----- Calco	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: flooding, wetness.
415----- Orion	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
439A----- Jasper	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
439B----- Jasper	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
439D3----- Jasper	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
447----- Canisteo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
457----- Booker	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
465----- Montgomery	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
546B----- Keltner	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
546C2----- Keltner	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
549D2----- Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
549F2----- Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
562A----- Port Byron	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
562B----- Port Byron	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
564A----- Waukegan	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
564B----- Waukegan	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
565A----- Tell	Slight-----	Slight-----	Slight-----	Slight-----	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
565B----- Tell	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
565C2----- Tell	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
567D2----- Elkhart	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
572A, 572B----- Loran	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
572C2----- Loran	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
575----- Joy	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight-----	Slight.
670----- Aholt	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
741B----- Oakville	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
741D----- Oakville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope, droughty.
741E----- Oakville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
764A----- Coyne	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
764B----- Coyne	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
777----- Adrian	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
800C*. Psammets					
802B*. Orthents					
871B----- Lenzburg	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones.
871G----- Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
910G*: Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Miami-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
913D*, 913D3*: Marseilles-----	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Hickory-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
913F2*: Marseilles-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
917B*: Oakville-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
Tell-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
917D*: Oakville-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope, droughty.
Tell-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
918D3*: Marseilles-----	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Atlas-----	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness.	Severe: wetness.
943D3*: Seaton-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
943G*: Seaton-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
946D2*: Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Atlas-----	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness, slope.
946D3*: Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
946D3*: Atlas-----	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness.	Severe: wetness, slope.
957D3*: Elco-----	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Atlas-----	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness.	Severe: wetness.
962D3*: Sylvan-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Bold-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements						Potential as habitat for-		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
8D2, 8D3----- Hickory	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
8F2----- Hickory	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
17A----- Keomah	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
19D2, 19D3----- Sylvan	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
19F----- Sylvan	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
22D2, 22D3----- Westville	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
27C2----- Miami	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
27D2----- Miami	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
36A, 36B----- Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36C2----- Tama	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
41A----- Muscatine	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43A----- Ipava	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45----- Denny	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
49----- Watseka	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Poor.
67----- Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
68----- Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
69----- Milford	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
74----- Radford	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
87A, 87B----- Dickinson	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
87C2----- Dickinson	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
88B----- Sparta	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
88D----- Sparta	Poor	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
100----- Palms	Good	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
102A----- La Hogue	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
107, 107+----- Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
119D2, 119D3----- Elco	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
125----- Selma	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
148B, 148C2----- Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149A----- Brenton	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
152----- Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
153----- Pella	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
171A, 171B----- Catlin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
172----- Hoopeston	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
198A----- Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B----- Plano	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
199C2----- Plano	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
200----- Orio	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
201----- Gilford	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
206----- Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good.
219A----- Millbrook	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
250C2, 250D2----- Velma	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
250E2----- Velma	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
257A----- Clarksdale	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
259B----- Assumption	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
259C2, 259D2----- Assumption	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
261----- Niota	Poor	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
262----- Denrock	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
274B----- Seaton	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
274C2, 274D2----- Seaton	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
275----- Joy	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
277A, 277B----- Port Byron	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
277C2----- Port Byron	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
279A----- Rozetta	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
280B----- Fayette	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
280C2, 280D2, 280D3----- Fayette	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
280E2----- Fayette	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
386A----- Downs	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
386B----- Downs	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
386C2----- Downs	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
400----- Calco	Good	Fair	Good	Poor	Good	Good	Fair	Poor	Fair.
415----- Orion	Fair	Fair	Good	Good	Good	Fair	Good	Good	Good.
439A, 439B----- Jasper	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
439D3----- Jasper	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
447----- Canisteo	Good	Good	Fair	Fair	Good	Good	Fair	Fair	Fair.
457----- Booker	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
465----- Montgomery	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
546B----- Keltner	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
546C2----- Keltner	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
549D2, 549F2----- Marseilles	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
562A, 562B----- Port Byron	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
564A, 564B----- Waukegan	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
565A, 565B----- Tell	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
565C2----- Tell	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
567D2----- Elkhart	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
572A----- Loran	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
572B, 572C2----- Loran	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
575----- Joy	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
670----- Aholt	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
741B----- Oakville	Poor	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.
741D, 741E----- Oakville	Poor	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
764A, 764B----- Coyne	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
777----- Adrian	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
800C*. Psamments									
802B*. Orthents									
871B----- Lenzburg	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
871G----- Lenzburg	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
910G*: Timula-----	Very poor	Poor	Good	Good	Very poor	Very poor	Very poor	Good	Very poor.
Miami-----	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
913D*, 913D3*: Marseilles-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Hickory-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
913F2*: Marseilles-----	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Hickory-----	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
917B*: Oakville-----	Poor	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor.
Tell-----	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
917D*: Oakville-----	Poor	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Tell-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
918D3*: Marseilles-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Atlas-----	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
943D3*: Seaton-----	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Timula-----	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
943G*: Seaton-----	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
Timula-----	Very poor	Poor	Good	Good	Very poor	Very poor	Very poor	Good	Very poor.
946D2*, 946D3*: Hickory-----	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Atlas-----	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
957D3*: Elco-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Atlas-----	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
962D3*: Sylvan-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
962D3*: Bold-----	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8D2, 8D3----- Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8F2----- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17A----- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
19D2, 19D3----- Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
19F----- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
22D2, 22D3----- Westville	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27C2----- Miami	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: frost action, low strength.	Slight.
27D2----- Miami	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope.
36A, 36B----- Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
36C2----- Tama	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
41A----- Muscatine	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
43A----- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
45----- Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
49----- Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
67----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
68----- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding,	Severe: ponding.
69----- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
74----- Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness.
87A, 87B----- Dickinson	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
87C2----- Dickinson	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
88B----- Sparta	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
88D----- Sparta	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
100----- Palms	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
102A----- La Hogue	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
107, 107+----- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
119D2, 119D3----- Elco	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
125----- Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
148B----- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
148C2----- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
149A----- Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
152----- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
153----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
171A----- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
171B----- Catlin	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
172----- Hoopeston	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
198A----- Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B----- Plano	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
199C2----- Plano	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
200----- Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
201----- Gilford	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
206----- Thorp	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
219A----- Millbrook	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
250C2----- Velma	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
250D2----- Velma	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
250E2----- Velma	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
257A----- Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, frost action, low strength.	Moderate: wetness.
259B----- Assumption	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
259C2----- Assumption	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
259D2----- Assumption	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
261----- Niota	Severe: cutbanks cave, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
262----- Denrock	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
274B----- Seaton	Slight-----	Slight-----	Slight-----	Slight-----	Severe: low strength, frost action.	Slight.
274C2----- Seaton	Slight-----	Slight-----	Slight-----	Moderate: slope.	Severe: low strength, frost action.	Slight.
274D2----- Seaton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
275----- Joy	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength, frost action.	Slight.
277A, 277B----- Port Byron	Moderate: wetness.	Slight-----	Moderate: wetness.	Slight-----	Severe: low strength, frost action.	Slight.
277C2----- Port Byron	Slight-----	Slight-----	Slight-----	Moderate: slope.	Severe: low strength, frost action.	Slight.
279A----- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
280B----- Fayette	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2----- Fayette	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D2, 280D3----- Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
280E2----- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
386A----- Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
386B----- Downs	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
386C2----- Downs	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
400----- Calco	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: flooding, wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
415----- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
439A, 439B----- Jasper	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
439D3----- Jasper	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
447----- Canisteo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
457----- Booker	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
465----- Montgomery	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
546B----- Keltner	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
546C2----- Keltner	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
549D2, 549F2----- Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
562A, 562B----- Port Byron	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Severe: low strength, frost action.	Slight.
564A, 564B----- Waukegan	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Severe: low strength.	Slight.
565A, 565B----- Tell	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
565C2----- Tell	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
567D2----- Elkhart	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
572A, 572B, 572C2----- Loran	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
575----- Joy	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength, frost action.	Slight.
670----- Aholt	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
741B----- Oakville	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
741D----- Oakville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
741E----- Oakville	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
764A, 764B----- Coyne	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
777----- Adrian	Severe: ponding, cutbanks cave, excess humus.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: excess humus, ponding.
800C*. Psammments						
802B*. Orthents						
871B----- Lenzburg	Moderate: too clayey, dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
871G----- Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
910G*: Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Miami-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
913D*, 913D3*: Marseilles-----	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer.
Hickory-----	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
913F2*: Marseilles-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
917B*: Oakville-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
Tell-----	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
917D*: Oakville-----	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
917D*: Tell-----	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
918D3*: Marseilles-----	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer.
Atlas-----	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
943D3*, 943G*: Seaton-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
946D2*, 946D3*: Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Atlas-----	Severe: wetness, slope.	Severe: wetness, shrink-swell, slope.	Severe: wetness, slope, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness, slope.	Severe: wetness, slope.
957D3*: Elco-----	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
Atlas-----	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
962D3*: Sylvan-----	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Bold-----	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8D2, 8D3----- Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
8F2----- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17A----- Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
19D2, 19D3----- Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
19F----- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
22D2, 22D3----- Westville	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
27C2----- Miami	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
27D2----- Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
36A----- Tama	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36B----- Tama	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36C2----- Tama	Slight-----	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
41A----- Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
43A----- Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
45----- Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
49----- Watseka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
67----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
68----- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
69----- Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
74----- Radford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
87A, 87B----- Dickinson	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
87C2----- Dickinson	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
88B----- Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
88D----- Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
100----- Palms	Severe: subsides, ponding.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.
102A----- La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
107, 107+----- Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
119D2, 119D3----- Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
125----- Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
148B----- Proctor	Slight-----	Severe: seepage.	Severe: seepage.	Slight-----	Fair: too clayey, thin layer.
148C2----- Proctor	Slight-----	Severe: seepage, slope.	Severe: seepage.	Slight-----	Fair: too clayey, thin layer.
149A----- Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
152----- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
153----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
171A----- Catlin	Moderate: wetness, percs slowly.	Moderate: seepage.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey.
171B----- Catlin	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
172----- Hoopeston	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
198A----- Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A----- Plano	Slight-----	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
199B----- Plano	Slight-----	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
199C2----- Plano	Slight-----	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
200----- Orlo	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: ponding.	Poor: seepage, too sandy, ponding.
201----- Gilford	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
206----- Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
219A----- Millbrook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
250C2----- Velma	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
250D2----- Velma	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
250E2----- Velma	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
257A----- Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
259B----- Assumption	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight-----	Poor: thin layer.
259C2----- Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, too clayey.	Slight-----	Poor: thin layer.
259D2----- Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: slope.	Poor: thin layer.
261----- Niota	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
262----- Denrock	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness, thin layer.
274B----- Seaton	Slight-----	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
274C2----- Seaton	Slight-----	Severe: slope.	Slight-----	Slight-----	Good.
274D2----- Seaton	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
275----- Joy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
277A----- Port Byron	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Good.
277B----- Port Byron	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Good.
277C2----- Port Byron	Slight-----	Severe: slope.	Slight-----	Slight-----	Good.
279A----- Rozetta	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
280B----- Fayette	Slight-----	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
280C2----- Fayette	Slight-----	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
280D2, 280D3----- Fayette	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
280E2----- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
386A----- Downs	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
386B----- Downs	Slight-----	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
386C2----- Downs	Slight-----	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
400----- Calco	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Poor: wetness.
415----- Orion	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
439A, 439B----- Jasper	Slight-----	Severe: seepage.	Severe: seepage.	Slight-----	Fair: too clayey, thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
439D3----- Jasper	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, slope, thin layer.
447----- Canisteo	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
457----- Booker	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
465----- Montgomery	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
546B----- Keltner	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
546C2----- Keltner	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
549D2, 549F2----- Marseilles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
562A, 562B----- Port Byron	Slight-----	Severe: seepage.	Severe: seepage.	Slight-----	Good.
564A, 564B----- Waukegan	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
565A, 565B----- Tell	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
565C2----- Tell	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
567D2----- Elkhart	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
572A, 572B----- Loran	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, thin layer.
572C2----- Loran	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, thin layer.
575----- Joy	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness, thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
670----- Aholt	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
741B----- Oakville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
741D----- Oakville	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
741E----- Oakville	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy, slope.	Severe: seepage, slope.	Poor: too sandy, slope, seepage.
764A, 764B----- Coyne	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer.
777----- Adrian	Severe: ponding, poor filter.	Severe: seepage, ponding, excess humus.	Severe: ponding, seepage.	Severe: ponding, seepage.	Poor: ponding, excess humus.
800C*. Psammments					
802B*. Orthents					
871B----- Lenzburg	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, small stones.
871G----- Lenzburg	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
910G*: Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Miami-----	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
913D*, 913D3*: Marseilles-----	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Hickory-----	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
913F2*: Marseilles-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
917B*: Oakville-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
Tell-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
917D*: Oakville-----	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
Tell-----	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
918D3*: Marseilles-----	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Atlas-----	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
943D3*, 943G*: Seaton-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Timula-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
946D2*, 946D3*: Hickory-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Atlas-----	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness, slope, too clayey.	Severe: wetness, slope.	Poor: too clayey, hard to pack, slope.
957D3*: Elco-----	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Atlas-----	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
962D3*: Sylvan-----	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Bold-----	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
8D2----- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
8D3----- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
8F2----- Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
17A----- Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
19D2----- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
19D3----- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
19F----- Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
22D2, 22D3----- Westville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
27C2----- Miami	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
27D2----- Miami	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope.
36A, 36B, 36C2----- Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
41A----- Muscatine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43A----- Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
45----- Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
49----- Watseka	Fair: wetness.	Probable-----	Improbable: too sandy.	Fair: too sandy.
67----- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68----- Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69----- Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
74----- Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
87A, 87B, 87C2----- Dickinson	Good-----	Probable-----	Improbable: too sandy.	Good.
88B----- Sparta	Good-----	Probable-----	Improbable: too sandy.	Fair: too sandy.
88D----- Sparta	Good-----	Probable-----	Improbable: too sandy.	Fair: slope, too sandy.
100----- Palms	Poor: wetness.	Improbable: excess humus, excess fines.	Improbable: excess humus, excess fines.	Poor: wetness, excess humus.
102A----- La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
107, 107+----- Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
119D2----- Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
119D3----- Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
125----- Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
148B, 148C2----- Proctor	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
149A----- Brenton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
152----- Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
153----- Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
171A, 171B----- Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
172----- Hoopeston	Fair: wetness.	Probable-----	Improbable: too sandy.	Fair: small stones, thin layer.
198A----- Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B, 199C2----- Plano	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
200----- Orio	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: wetness.
201----- Gilford	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: wetness.
206----- Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
219A----- Millbrook	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
250C2----- Velma	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: large stones.
250D2----- Velma	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: large stones, slope.
250E2----- Velma	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
257A----- Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
259B, 259C2----- Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
259D2----- Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
261----- Niota	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
262----- Denrock	Fair: wetness.	Probable-----	Improbable: too sandy.	Poor: thin layer.
274B, 274C2----- Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274D2----- Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
275----- Joy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
277A, 277B, 277C2----- Port Byron	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
279A----- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280B, 280C2----- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
280D2----- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer.
280D3----- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
280E2----- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
386A, 386B, 386C2----- Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
400----- Calco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
415----- Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
439A, 439B----- Jasper	Good-----	Probable-----	Improbable: too sandy.	Good.
439D3----- Jasper	Good-----	Probable-----	Improbable: too sandy.	Fair: slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
447----- Canisteo	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: wetness.
457----- Booker	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
465----- Montgomery	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
546B, 546C2----- Keltner	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
549D2----- Marseilles	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
549F2----- Marseilles	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
562A, 562B----- Port Byron	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
564A, 564B----- Waukegan	Good-----	Probable-----	Improbable: too sandy.	Fair: area reclaim, thin layer.
565A, 565B, 565C2----- Tell	Good-----	Probable-----	Improbable: too sandy.	Fair: thin layer.
567D2----- Elkhart	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
572A, 572B, 572C2----- Loran	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
575----- Joy	Fair: wetness.	Probable-----	Improbable: too sandy.	Good.
670----- Aholst	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
741B, 741D----- Oakville	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
741E----- Oakville	Fair: slope.	Probable-----	Improbable: too sandy.	Poor: too sandy, slope.
764A----- Coyne	Good-----	Probable-----	Probable-----	Good.
764B----- Coyne	Good-----	Probable-----	Probable-----	Good.
777----- Adrian	Poor: wetness, low strength.	Probable-----	Improbable: too sandy.	Poor: wetness, excess humus.
800C*. Psamments				
802B*. Orthents				

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
871B----- Lenzburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
871G----- Lenzburg	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
910G*: Timula-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Miami-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
913D*: Marseilles-----	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Hickory-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
913D3*: Marseilles-----	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Hickory-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
913F2*: Marseilles-----	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Hickory-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
917B*: Oakville-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
Tell-----	Good-----	Probable-----	Improbable: too sandy.	Fair: thin layer.
917D*: Oakville-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
Tell-----	Good-----	Probable-----	Improbable: too sandy.	Fair: thin layer, slope.
918D3*: Marseilles-----	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Atlas-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
943D3*: Seaton-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Timula-----	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
943G*: Seaton-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Timula-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
946D2*, 946D3*: Hickory-----	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Atlas-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness, slope.
957D3*: Elco-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Atlas-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
962D3*: Sylvan-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Bold-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated].

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
8D2, 8D3, 8F2----- Hickory	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
17A----- Keomah	Slight-----	Moderate: wetness.	Frost action---	Wetness, erodes easily.	Wetness, erodes easily.	Erodes easily.
19D2, 19D3, 19F--- Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
22D2, 22D3----- Westville	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
27C2----- Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
27D2----- Miami	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope, erodes easily.	Slope, erodes easily.
36A----- Tama	Moderate: seepage.	Slight-----	Deep to water	Favorable-----	Erodes easily	Erodes easily.
36B----- Tama	Moderate: seepage, slope.	Slight-----	Deep to water	Slope-----	Erodes easily	Erodes easily.
36C2----- Tama	Moderate: slope, seepage.	Slight-----	Deep to water	Slope-----	Erodes easily	Erodes easily.
41A----- Muscatine	Moderate: seepage.	Moderate: wetness.	Frost action---	Wetness-----	Wetness, erodes easily.	Erodes easily.
43A----- Ipava	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness-----	Erodes easily, wetness.	Wetness, erodes easily.
45----- Denny	Slight-----	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
49----- Watseka	Severe: seepage.	Severe: piping, seepage, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
67----- Harpster	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
68----- Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
69----- Milford	Slight-----	Severe: ponding.	Ponding, frost action.	Ponding-----	Erodes easily, ponding.	Wetness, erodes easily.
74----- Radford	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness-----	Wetness-----	Wetness.
87A----- Dickinson	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing---	Soil blowing, too sandy.	Favorable.
87B, 87C2----- Dickinson	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing, slope.	Soil blowing, too sandy.	Favorable.
88B----- Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
88D----- Sparta	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
100----- Palms	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
102A----- La Hogue	Severe: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness-----	Wetness, too sandy.	Wetness.
107, 107+----- Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness-----	Wetness.
119D2, 119D3----- Elco	Severe: slope.	Moderate: piping, wetness.	Frost action, slope.	Wetness, slope, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.
125----- Selma	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
148B, 148C2----- Proctor	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
149A----- Brenton	Moderate: seepage.	Severe: wetness.	Frost action--	Wetness-----	Wetness-----	Wetness.
152----- Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
153----- Pella	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding-----	Ponding-----	Wetness.
171A----- Catlin	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Favorable-----	Erodes easily	Erodes easily.
171B----- Catlin	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope-----	Erodes easily	Erodes easily.
172----- Hoopston	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
198A----- Elburn	Moderate: seepage.	Severe: wetness.	Frost action--	Wetness-----	Erodes easily, wetness.	Wetness, erodes easily.
199A----- Plano	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable-----	Erodes easily	Erodes easily.
199B, 199C2----- Plano	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
200----- Orio	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding-----	Ponding, too sandy.	Wetness.
201----- Gilford	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
206----- Thorp	Moderate: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
219A----- Millbrook	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness-----	Erodes easily, wetness.	Wetness, erodes easily.
250C2----- Velma	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Slope-----	Favorable-----	Favorable.
250D2, 250E2----- Velma	Severe: slope.	Moderate: thin layer.	Deep to water	Slope-----	Slope-----	Slope.
257A----- Clarksdale	Slight-----	Severe: wetness.	Frost action---	Wetness, erodes easily.	Wetness, erodes easily.	Wetness, erodes easily.
259B, 259C2----- Assumption	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
259D2----- Assumption	Severe: slope.	Moderate: piping.	Deep to water	Slope-----	Slope, erodes easily.	Slope, erodes easily.
261----- Niota	Moderate: seepage.	Severe: thin layer, wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
262----- Denrock	Moderate: seepage.	Severe: thin layer.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
274B, 274C2----- Seaton	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
274D2----- Seaton	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
275----- Joy	Moderate: seepage.	Severe: thin layer.	Frost action---	Wetness-----	Erodes easily, wetness.	Erodes easily.
277A----- Port Byron	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable-----	Erodes easily	Erodes easily.
277B, 277C2----- Port Byron	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
279A----- Rozetta	Moderate: seepage.	Slight-----	Deep to water	Erodes easily	Erodes easily	Erodes easily.
280B, 280C2----- Fayette	Moderate: slope, seepage.	Slight-----	Deep to water	Slope, erodes easily.	Favorable-----	Erodes easily.
280D2, 280D3, 280E2----- Fayette	Severe: slope.	Slight-----	Deep to water	Slope, erodes easily.	Slope-----	Slope, erodes easily.
386A----- Downs	Moderate: seepage.	Slight-----	Deep to water	Favorable-----	Erodes easily	Erodes easily.
386B, 386C2----- Downs	Moderate: slope, seepage.	Slight-----	Deep to water	Slope-----	Erodes easily	Erodes easily.
400----- Calco	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Flooding, wetness.	Wetness-----	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
415----- Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
439A----- Jasper	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
439B----- Jasper	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Favorable-----	Favorable.
439D3----- Jasper	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope-----	Slope.
447----- Canisteo	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness-----	Wetness-----	Wetness.
457----- Booker	Slight-----	Severe: hard to pack, ponding.	Percs slowly, ponding.	Ponding, droughty, slow intake.	Ponding, percs slowly.	Wetness, droughty, percs slowly.
465----- Montgomery	Slight-----	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
546B, 546C2----- Keltner	Moderate: seepage, depth to rock, slope.	Slight-----	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily.
549D2, 549F2----- Marseilles	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
562A----- Port Byron	Severe: seepage.	Moderate: piping.	Deep to water	Favorable-----	Erodes easily	Erodes easily.
562B----- Port Byron	Severe: seepage.	Moderate: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
564A----- Waukegan	Severe: seepage.	Severe: seepage.	Deep to water	Favorable-----	Erodes easily, too sandy.	Erodes easily.
564B----- Waukegan	Severe: seepage.	Severe: seepage.	Deep to water	Slope-----	Erodes easily, too sandy.	Erodes easily.
565A----- Tell	Severe: seepage.	Severe: seepage, piping.	Deep to water	Erodes easily	Erodes easily, too sandy.	Erodes easily.
565B, 565C2----- Tell	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, erodes easily.	Erodes easily, too sandy.	Erodes easily.
567D2----- Elkhart	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope, erodes easily.	Slope, erodes easily.
572A----- Loran	Slight-----	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Wetness, erodes easily.
572B, 572C2----- Loran	Moderate: slope.	Moderate: wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Wetness, erodes easily.
575----- Joy	Moderate: seepage.	Severe: thin layer.	Frost action---	Wetness-----	Erodes easily, wetness.	Erodes easily.
670----- Aholt	Slight-----	Severe: hard to pack, ponding.	Percs slowly, ponding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
741B----- Oakville	Severe: seepage.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
741D, 741E----- Oakville	Severe: seepage, slope.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
764A----- Coyne	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
764B----- Coyne	Severe: seepage.	Severe: piping.	Deep to water	Slope-----	Soil blowing---	Favorable.
777----- Adrian	Severe: seepage.	Severe: seepage, ponding, excess humus.	Ponding, frost action, subsides.	Ponding, soil blowing.	Ponding, soil blowing, too sandy.	Wetness.
800C*. Psammets						
802B*. Orthents						
871B----- Lenzburg	Moderate: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
871G----- Lenzburg	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
910G*: Timula-----	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Miami-----	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope, erodes easily.	Slope, erodes easily.
913D*, 913D3*, 913F2*: Marseilles-----	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Hickory-----	Severe: slope.	Severe: thin layer.	Deep to water	Slope, eroded easily.	Slope, erodes easily.	Slope, erodes easily.
917B*: Oakville-----	Severe: seepage.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
Tell-----	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, erodes easily.	Erodes easily, too sandy.	Erodes easily.
917D*: Oakville-----	Severe: seepage, slope.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
Tell-----	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily, too sandy.	Slope, erodes easily.
918D3*: Marseilles-----	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
918D3*: Atlas-----	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness.	Wetness, slope.
943D3*, 943G*: Seaton-----	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Timula-----	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
946D2*: Hickory-----	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Atlas-----	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
946D3*: Hickory-----	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Atlas-----	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness.	Wetness, slope.
957D3*: Elco-----	Severe: slope.	Moderate: piping, wetness.	Frost action, slope.	Wetness, slope, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.
Atlas-----	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness.	Wetness, slope.
962D3*: Sylvan-----	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Bold-----	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
8D2----- Hickory	0-5	Silt loam-----	CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	8-15
	5-47	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
8D3----- Hickory	0-5	Clay loam-----	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	5-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	40-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
8F2----- Hickory	0-14	Loam-----	CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	8-15
	14-47	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
17A----- Keomah	0-11	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	11-50	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	50-60	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
19D2----- Sylvan	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	4-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	24-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19D3----- Sylvan	0-4	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	4-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	24-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19F----- Sylvan	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	4-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	24-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
22D2----- Westville	0-5	Loam-----	CL-ML, CL	A-6, A-4	0	100	100	90-100	70-90	25-40	4-15
	5-60	Clay loam, sandy clay loam.	CL	A-6, A-7-6	0-5	90-100	90-100	80-90	60-90	30-45	11-19
22D3----- Westville	0-5	Clay loam-----	CL	A-6, A-7-6	0-5	90-100	90-100	80-90	60-90	30-45	11-19
	5-60	Clay loam, sandy clay loam.	CL	A-6, A-7-6	0-5	90-100	90-100	80-90	60-90	30-45	11-19
27C2, 27D2----- Miami	0-8	Loam-----	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	8-25	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	25-60	Loam, clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
36A, 36B----- Tama	0-15	Silt loam-----	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	15-50	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	50-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
36C2----- Tama	0-15	Silt loam-----	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	15-50	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	50-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth in	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
41A----- Muscatine	0-10	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-15
	10-44	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	20-30
	44-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
43A----- Ipava	0-7	Silt loam-----	ML, CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	7-40	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	40-60	Silt loam-----	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
45----- Denny	0-7	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	7-14	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	14-47	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
	47-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	25-40	11-20
49----- Watseka	0-13	Loamy fine sand	SM, SM-SC	A-2	0	100	95-100	80-100	17-35	<25	NP-5
	13-60	Fine sand, sand, loamy fine sand.	SP, SM, SP-SM	A-3, A-2	0	90-100	90-100	60-80	3-25	<20	NP-4
67----- Harpster	0-16	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	16-41	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	41-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35
68----- Sable	0-15	Silty clay loam	CL, OH, CH, OL	A-7	0	100	100	95-100	95-100	41-65	15-35
	15-40	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	40-60	Silt loam-----	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
69----- Milford	0-17	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	75-95	40-60	20-35
	17-55	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	55-60	Stratified clay to sandy loam.	CL, ML, SM, SC	A-6, A-7, A-4	0	95-100	95-100	90-100	45-100	20-50	5-30
74----- Radford	0-28	Silt loam-----	ML, CL	A-4, A-6	0	100	100	95-100	80-100	30-40	5-15
	28-60	Silty clay loam, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	95-100	80-95	35-55	15-30
87A, 87B, 87C2--- Dickinson	0-19	Fine sandy loam	SM, SC, SM-SC	A-4, A-2	0	100	100	85-95	30-50	15-30	NP-10
	19-32	Fine sandy loam, sandy loam.	SM, SC, SM-SC	A-4	0	100	100	85-95	35-50	15-30	NP-10
	32-36	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM, SM-SC	A-2, A-3	0	100	100	80-95	5-20	10-20	NP-5
	36-60	Sand, loamy fine sand, loamy sand.	SM, SP-SM	A-3, A-2	0	100	100	70-90	5-20	---	NP
88B, 88D----- Sparta	0-15	Loamy fine sand	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	15-29	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	29-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
100----- Palms	0-24 24-60	Sapric material Clay loam, silt loam, fine sandy loam.	PT CL-ML, CL	--- A-4, A-6	--- 0	--- 85-100	--- 80-100	--- 70-95	--- 50-90	--- 25-40	--- 5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
102A----- La Hogue	0-15	Loam-----	ML, CL, CL-ML	A-4	0	100	95-100	80-100	50-80	20-35	3-10
	15-52	Sandy clay loam, silt loam, clay loam.	CL, SC	A-6, A-4	0	100	100	80-100	40-85	25-40	8-20
	52-60	Stratified sand to silt loam.	CL, CL-ML, SC, SM-SC	A-4, A-2	0	90-100	80-100	50-95	20-60	<25	5-10
107----- Sawmill	0-32	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	32-56	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	56-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
107+----- Sawmill	0-15	Silt loam-----	CL	A-6	0	100	100	80-100	75-95	25-40	10-20
	15-42	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	42-49	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	49-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
119D2----- Elco	0-6	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	6-28	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	28-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
119D3----- Elco	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	15-30
	5-26	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	26-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
125----- Selma	0-19	Clay loam-----	CL	A-6	0	100	100	85-100	60-90	25-40	10-20
	19-55	Loam, silty clay loam, clay loam.	ML	A-6, A-7	0	100	90-100	80-95	60-85	35-50	10-20
	55-60	Sandy loam, loamy sand, sand.	SM, SM-SC, SC, SP-SM	A-4, A-2, A-3	0	90-100	85-95	50-80	5-40	20-30	NP-10
148B----- Proctor	0-15	Silt loam-----	CL	A-6	0	100	100	95-100	85-100	25-40	10-22
	15-32	Silty clay loam, clay loam.	CL	A-7, A-6	0	95-100	90-100	85-100	65-90	25-50	10-25
	32-60	Stratified loam to sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20
148C2----- Proctor	0-8	Silt loam-----	CL	A-6	0	100	100	95-100	85-100	25-40	10-22
	8-48	Silty clay loam, clay loam.	CL	A-7, A-6	0	95-100	90-100	85-100	65-90	25-50	10-25
	48-60	Stratified loam to sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20
149A----- Brenton	0-19	Silt loam-----	CL, ML	A-6, A-4	0	100	95-100	95-100	85-100	30-40	8-15
	19-29	Silty clay loam	CL, ML	A-6, A-7	0	100	95-100	95-100	85-100	35-50	10-25
	29-39	Clay loam, loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	75-95	30-45	10-20
	39-60	Stratified loamy sand to silty clay loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	0	95-100	85-100	80-100	30-85	20-35	5-20
152----- Drummer	0-22	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	22-54	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	54-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
153----- Pella	0-15	Silty clay loam	CL	A-7	0	100	95-100	90-100	85-95	40-50	15-25
	15-32	Silty clay loam, silty clay, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	30-50	15-30
	32-38	Stratified silty clay loam to sandy loam.	CL	A-6, A-7	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	38-60	Stratified sandy loam to silty clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0-5	90-100	80-100	50-100	30-85	20-35	7-20
171A----- Catlin	0-22	Silt loam-----	ML, CL	A-6, A-7	0	100	100	95-100	85-100	30-50	11-20
	22-49	Silty clay loam	CL, CH	A-7, A-6	0	100	100	90-100	80-100	35-55	20-30
	49-60	Loam, silt loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	85-100	60-100	25-45	11-20
171B----- Catlin	0-22	Silt loam-----	ML, CL	A-6, A-7	0	100	100	95-100	85-100	30-50	11-20
	22-49	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	100	100	90-100	80-100	35-55	20-30
	49-60	Loam, silt loam, clay loam.	CL	A-6, A-7	0	90-100	90-100	85-100	60-100	25-45	11-20
172----- Hoopeston	0-31	Sandy loam-----	SM	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	31-60	Loamy sand, sand, fine sand.	SP-SM, SM, SC, SM-SC	A-2, A-3	0	90-100	90-100	50-80	5-20	<25	NP-10
198A----- Elburn	0-16	Silt loam-----	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	16-52	Silty clay loam	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	52-60	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20
199A, 199B, 199C2----- Plano	0-19	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	19-40	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	40-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	85-95	60-90	30-70	<25	NP-10
200----- Orio	0-9	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	75-90	50-85	25-40	5-15
	9-18	Loam, sandy loam, loamy sand.	SM, SC, ML, CL	A-4, A-2-4	0	100	100	75-90	15-60	20-30	3-10
	18-35	Sandy loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	35-75	30-45	10-20
	35-41	Sandy clay loam, sandy loam, loamy sand.	SM-SC, SC	A-4, A-2-4, A-6, A-2-6	0	100	100	75-90	15-45	25-35	5-15
	41-60	Loamy sand, sand, loamy fine sand.	SM, SC, SP-SM, SM-SC	A-2-4	0	100	100	60-80	5-35	20-30	NP-10
201----- Gilford	0-16	Fine sandy loam	SM, SC, SM-SC	A-4	0	95-100	90-100	65-80	35-45	<25	2-10
	16-28	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2-4	0	90-100	90-100	55-70	20-35	15-30	NP-8
	28-60	Loamy sand, sand	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	90-100	85-100	18-60	3-20	---	NP
206----- Thorp	0-14	Silt loam-----	CL	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	8-19
	14-48	Silty clay loam	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	48-58	Silt loam, clay loam, sandy clay loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
	58-60	Sandy loam, sand	SM, ML, CL-ML, SM-SC	A-2, A-4	0	85-100	75-95	65-85	20-60	<20	NP-6

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
219A----- Millbrook	0-17	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	95-100	85-100	20-35	5-15
	17-38	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	10-25
	38-42	Clay loam, loam, sandy loam.	SC, CL	A-6, A-7	0-5	95-100	90-100	70-90	40-80	25-50	10-25
	42-60	Stratified loamy sand to clay loam.	SM, SC, CL, ML	A-4, A-6, A-2	0-5	95-100	90-100	70-95	30-80	<30	NP-15
250C2, 250D2----- Velma	0-13	Silt loam-----	CL	A-4, A-6	0	100	100	90-100	70-95	20-40	8-25
	13-44	Clay loam, loam	CL	A-7, A-6	0-5	100	95-100	80-95	55-75	30-50	15-30
	44-60	Loam, clay loam, sandy loam.	CL, ML, SM, SC	A-4, A-6, A-2	0-5	90-100	80-100	60-90	30-80	20-40	3-20
250E2----- Velma	0-7	Loam-----	CL	A-4, A-6	0	100	100	90-100	70-90	20-40	8-25
	7-43	Clay loam, loam	CL	A-7, A-6	0-5	100	95-100	80-95	55-75	30-50	15-30
	43-60	Loam, clay loam, sandy loam.	CL, ML, SM, SC	A-4, A-6, A-2	0-5	90-100	80-100	60-90	30-80	20-40	3-20
257A----- Clarksdale	0-13	Silt loam-----	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	13-54	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	25-40
	54-60	Silt loam, silty clay loam.	CL	A-6	0	98-100	98-100	95-100	90-100	25-40	10-25
259B, 259C2, 259D2----- Assumption	0-16	Silt loam-----	CL, ML	A-6, A-4	0	100	100	95-100	90-100	25-40	8-20
	16-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-30
	35-60	Clay loam, clay	CL	A-6, A-7	0-5	100	95-100	90-100	70-90	35-50	20-35
261----- Niota	0-10	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	30-40	5-15
	10-14	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	14-54	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	95-100	95-100	52-76	26-42
	54-60	Silt loam, loam, loamy fine sand.	ML, CL, SM, SC	A-4, A-6, A-2, A-7	0	100	95-100	60-90	20-90	18-48	NP-20
262----- Denrock	0-8	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	90-100	30-40	9-19
	8-36	Silty clay loam, silty clay, clay.	CH, MH	A-7	0	100	95-100	95-100	90-100	50-75	25-40
	36-54 54-60	Clay loam, loam Stratified sand to loam.	CL SM, SP-SM, ML, CL-ML	A-6, A-4 A-2, A-3, A-4	0 0	100 100	95-100 90-100	90-100 50-75	60-80 5-60	20-40 <20	8-25 NP-7
274B, 274C2, 274D2----- Seaton	0-13	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	4-15
	13-55	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	55-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
275----- Joy	0-18	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	18-50	Silt loam-----	CL	A-6	0	100	100	100	95-100	25-40	10-20
	50-60	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
277A, 277B----- Port Byron	0-22	Silt loam-----	CL, ML	A-6, A-4	0	100	100	100	95-100	30-40	5-15
	22-60	Silt loam-----	CL	A-6, A-4	0	100	100	100	95-100	25-40	7-15
277C2----- Port Byron	0-22	Silt loam-----	CL	A-4, A-6	0	100	100	100	95-100	25-40	5-18
	22-60	Silt loam-----	CL	A-4, A-6	0	100	100	100	95-100	25-40	7-18
279A----- Rozetta	0-14	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	14-54	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	54-60	Silt loam-----	CL	A-6	0	100	100	95-100	95-100	25-40	10-20
280B, 280C2, 280D2----- Fayette	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam-----	CL	A-6	0	100	100	100	95-100	30-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
280D3----- Fayette	0-6	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	6-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam-----	CL	A-6	0	100	100	100	95-100	30-40	10-20
280E2----- Fayette	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam-----	CL	A-6	0	100	100	100	95-100	30-40	10-20
386A----- Downs	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	11-43	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	43-60	Silt loam-----	CL	A-6	0	100	100	100	95-100	30-40	11-20
386B, 386C2----- Downs	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	11-43	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	43-60	Silt loam-----	CL	A-6	0	100	100	100	95-100	30-40	10-20
400----- Calco	0-32	Silty clay loam	CH, CL	A-7	0	100	100	95-100	85-100	40-60	15-30
	32-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	100	90-100	80-100	30-45	10-20
415----- Orion	0-8	Silt loam-----	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	8-36	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	36-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
439A, 439B, 439D3----- Jasper	0-11	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	11-46	Loam, clay loam, silty clay loam.	CL-ML, CL, SM-SC, SC	A-6, A-4	0	100	100	60-100	35-85	20-35	5-20
	46-60	Loamy sand, sand	SM, SP-SM, SC, SM-SC	A-2-4, A-3	0	100	100	50-75	5-30	<25	NP-10
447----- Canisteo	0-13	Loam-----	CL	A-4, A-6	0	100	95-100	80-100	55-85	25-35	7-17
	13-40	Clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	90-100	85-95	65-85	30-45	10-20
	40-60	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	95-100	90-100	50-75	5-25	---	NP
457----- Booker	0-12	Silty clay-----	CL, CH	A-7	0	100	100	95-100	95-100	45-75	30-45
	12-60	Clay-----	CH	A-7	0	100	100	100	95-100	65-96	40-55
465----- Montgomery	0-17	Silty clay-----	CH, CL	A-7	0	100	100	95-100	85-100	45-60	25-35
	17-55	Silty clay loam, silty clay.	CH	A-7	0	100	100	95-100	90-100	50-70	30-50
	55-60	Stratified clay to silty clay loam.	CL, CH	A-7	0	100	100	90-100	85-100	40-55	20-32
546B, 546C2----- Keltner	0-17	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	30-40	8-15
	17-48	Silty clay loam	CL, MH	A-7, A-6	0	100	100	95-100	90-100	35-45	15-25
	48-53	Silty clay, clay	CL, CH	A-7, A-6	0-5	95-100	85-100	85-100	75-95	30-55	15-35
	53-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
549D2, 549F2----- Marseilles	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	5-15
	12-37	Silty clay loam, silty clay, clay loam.	CL, CH, MH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	37-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
562A, 562B----- Port Byron	0-14	Silt loam-----	CL	A-4, A-6	0	100	100	100	95-100	25-40	7-18
	14-57	Silt loam-----	CL	A-4, A-6	0	100	100	100	95-100	25-40	7-18
	57-60	Sand, loamy sand	SM, SW-SM, SM-SC	A-2, A-3	0	100	95-100	80-90	5-20	<20	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
564A, 564B----- Waukegan	0-19	Silt loam-----	ML	A-4	0	95-100	95-100	95-100	85-95	25-40	3-10
	19-30	Silt loam, loam	CL-ML, CL	A-4, A-6	0	95-100	95-100	95-100	85-95	25-40	5-15
	30-60	Coarse sand, gravelly sand.	SP, SW, SP-SM	A-1	0-2	80-95	65-85	30-50	3-10	---	NP
565A, 565B, 565C2----- Tell	0-7	Silt loam-----	CL	A-4	0	100	100	90-100	85-95	25-30	7-10
	7-26	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	85-95	30-40	10-16
	26-31	Loam, sandy loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6 A-2	0	100	90-100	55-95	25-75	20-30	4-14
	31-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3, A-1	0	100	90-100	45-75	0-30	---	NP
567D2----- Elkhart	0-10	Silt loam-----	CL	A-4, A-6	0	100	100	100	95-100	25-35	8-15
	10-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	30-60	Silt loam, silt	CL	A-6, A-4	0	100	100	95-100	95-100	20-37	8-20
572A, 572B, 572C2----- Loran	0-12	Silt loam-----	CL, ML	A-4, A-6	0	100	100	95-100	90-100	30-40	6-15
	12-43	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-25
	43-60	Clay loam, shaly clay, shaly silty clay.	CL	A-7, A-6	0-5	100	95-100	90-100	80-100	30-50	15-35
575----- Joy	0-20	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	20-41	Silt loam-----	CL	A-6	0	100	100	100	95-100	25-40	10-20
	41-60	Loamy sand, sand	SM, SW-SM, SM-SC	A-2, A-3	0	100	95-100	80-90	5-20	<20	NP-5
670----- Aholt	0-51	Silty clay-----	CH	A-7-6	0	100	100	95-100	90-100	60-80	35-55
	51-60	Silty clay loam, silty clay, clay.	CH, CL	A-7-6	0	100	100	85-100	85-100	45-75	30-50
741B, 741D, 741E- Oakville	0-3	Loamy fine sand	SM	A-2	0	100	100	55-75	15-25	---	NP
	3-60	Fine sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-100	0-25	---	NP
764A----- Coyne	0-23	Fine sandy loam	SC, SM-SC, SM	A-2, A-4, A-6	0	100	95-100	60-70	20-50	20-35	3-15
	23-44	Fine sandy loam, loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	95-100	60-70	20-50	20-35	3-15
	44-60	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	100	100	85-100	80-95	30-45	11-25
764B----- Coyne	0-7	Loam-----	SC, SM-SC, SM	A-2, A-4, A-6	0	100	95-100	60-70	20-50	20-35	3-15
	7-42	Fine sandy loam, loam, very fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	95-100	60-70	20-50	20-35	3-15
	42-55	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	100	100	85-100	80-95	30-45	11-25
	55-60	Gravelly sand, sand.	SP, SM, SP-SM	A-1	0	70-90	60-80	20-45	0-15	<15	NP-3
777----- Adrian	0-24	Sapric material	PT	A-8	---	---	---	---	---	---	---
	24-60	Sand, loamy sand, fine sand.	SP, SM	A-2, A-3, A-1	0	80-100	60-100	35-75	0-30	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
800C*. Psamments											
802B*. Orthents											
871B----- Lenzburg	0-7	Silt loam-----	CL	A-6, A-7 A-4	2-10	90-95	75-90	65-90	55-85	25-45	8-25
	7-17	Silt loam, shaly clay loam, clay loam.	CL	A-6, A-7	2-10	80-95	70-90	70-90	55-85	25-45	10-25
	17-60	Silty clay loam, shaly loam, shaly sandy loam.	CL	A-6, A-7	2-15	75-95	70-90	65-85	60-85	25-45	10-25
871G----- Lenzburg	0-7	Clay loam-----	CL	A-6, A-7, A-4	2-10	80-95	75-90	65-90	55-85	25-45	8-25
	7-17	Silt loam, shaly clay loam, clay loam.	CL	A-6, A-7	2-10	80-95	70-90	70-90	55-85	25-45	10-25
	17-60	Silty clay loam, shaly loam, shaly sandy loam.	CL	A-6, A-7	2-15	75-95	70-90	65-85	60-85	25-45	10-25
910G*: Timula-----	0-60	Silt loam-----	ML, CL-ML	A-4	0	100	100	95-100	85-100	26-35	5-10
910G*: Miami-----	0-8	Loam-----	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	8-25	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	25-60	Loam, clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
913D*: Marseilles-----	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	5-15
	12-37	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	37-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hickory-----	0-5	Silt loam-----	CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	8-15
	5-47	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
913D3*: Marseilles-----	0-9	Silty clay loam	ML	A-6, A-7	0-5	95-100	95-100	90-100	85-100	35-50	10-20
	9-34	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hickory-----	0-5	Clay loam-----	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	5-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	40-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
913F2*: Marseilles-----	0-12	Silty clay loam	ML	A-6, A-7	0-5	95-100	95-100	90-100	85-100	35-50	10-20
	12-37	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	37-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plasticity index
			Unified	AASHTO		4	10	40	200		
913F2*: Hickory-----	0-5	Loam-----	CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	8-15
	5-47	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
917B*, 917D*: Oakville-----	0-3	Loamy fine sand	SM	A-2	0	100	100	55-75	15-25	---	NP
	3-60	Fine sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-100	0-25	---	NP
Tell-----	0-7	Silt loam-----	CL	A-4	0	100	100	90-100	85-95	25-30	7-10
	7-26	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	85-95	30-40	10-16
	26-31	Loam, sandy loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-2	0	100	90-100	55-95	25-75	20-35	4-14
	31-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3, A-1	0	100	90-100	45-75	0-30	---	NP
918D3*: Marseilles-----	0-9	Silty clay loam	ML	A-6, A-7	0-5	95-100	95-100	90-100	85-100	35-50	10-20
	9-34	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Atlas-----	0-3	Silty clay loam	CH, CL	A-7	0	100	100	95-100	75-95	45-65	30-50
	3-60	Silty clay loam, clay, clay loam.	CH	A-7	0	100	100	95-100	80-95	50-70	35-55
943D3*, 943G*: Seaton-----	0-6	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	24-35	6-16
	6-45	Silt loam-----	CL	A-6, A-4	0	100	100	100	90-100	28-40	9-21
	45-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	26-40	5-17
Timula-----	0-60	Silt loam-----	ML, CL-ML	A-4	0	100	100	95-100	85-100	26-35	5-10
946D2*: Hickory-----	0-5	Silt loam-----	CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	8-15
	5-47	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Atlas-----	0-5	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	75-95	25-35	8-15
	5-48	Silty clay loam, clay, clay loam.	CH	A-7	0	100	100	95-100	80-95	50-70	35-55
	48-60	Clay loam, loam	CH, CL	A-6, A-7	0-5	100	95-100	95-100	75-95	35-55	20-40
946D3*: Hickory-----	0-5	Clay loam-----	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	5-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	100	90-100	80-95	75-90	30-50	15-30
	40-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Atlas-----	0-7	Silty clay loam	CH, CL	A-7	0	100	100	95-100	75-95	45-65	30-50
	7-42	Silty clay loam, clay, clay loam.	CH	A-7	0	100	100	95-100	80-95	50-70	35-55
	42-60	Clay loam, loam	CH, CL	A-6, A-7	0-5	100	95-100	95-100	75-95	35-55	20-40
957D3*: Elco-----	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	15-30
	5-26	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	26-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
957D3*: Atlas-----	0-7	Silty clay loam	CH, CL	A-7	0	100	100	95-100	75-95	45-65	30-50
	7-42	Silty clay loam, clay, clay loam.	CH	A-7	0	100	100	95-100	80-95	50-70	35-55
	42-60	Clay loam, loam	CH, CL	A-6, A-7	0-5	100	95-100	95-100	75-95	35-55	20-40
962D3*: Sylvan-----	0-4	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	4-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	24-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
Bold-----	0-8	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	8-60	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	G/cm ³	In/hr	In/in	pH					Pct
8D2----- Hickory	0-5	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----	0.37	5	6	1-2
	5-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate----	0.37			
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37			
8D3----- Hickory	0-5	27-35	1.40-1.65	0.6-2.0	0.17-0.19	4.5-6.0	Moderate----	0.37	4	4	.5-1
	5-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate----	0.37			
	40-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37			
8F2----- Hickory	0-14	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----	0.37	5	6	1-2
	14-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate----	0.37			
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37			
17A----- Keomah	0-11	16-22	1.30-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	5	6	1-2
	11-50	27-42	1.30-1.45	0.2-0.6	0.18-0.20	4.5-5.5	High-----	0.37			
	50-60	27-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-6.5	Moderate----	0.37			
19D2----- Sylvan	0-4	18-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.37	5	6	1-2
	4-24	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.37			
	24-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----	0.37			
19D3----- Sylvan	0-4	27-32	1.25-1.45	0.6-2.0	0.20-0.22	6.1-7.3	Moderate----	0.37	4	7	<1
	4-24	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.37			
	24-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----	0.37			
19F----- Sylvan	0-4	18-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.37	5	6	1-2
	4-24	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.37			
	24-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----	0.37			
22D2----- Westville	0-5	18-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-6.5	Low-----	0.37	5	5	1-3
	5-60	25-35	1.35-1.55	0.6-2.0	0.15-0.19	5.1-7.3	Moderate----	0.37			
22D3----- Westville	0-5	25-35	1.30-1.50	0.6-2.0	0.15-0.19	5.1-7.3	Moderate----	0.37	4	6	.5-1
	5-60	25-35	1.35-1.55	0.6-2.0	0.15-0.19	5.1-7.3	Moderate----	0.37			
27C2, 27D2----- Miami	0-8	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	5	5	.5-3
	8-25	25-35	1.45-1.65	0.6-2.0	0.15-0.20	5.6-6.0	Moderate----	0.37			
	25-60	15-30	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Moderate----	0.37			
36A, 36B----- Tama	0-15	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate----	0.32	5	7	3-4
	15-50	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate----	0.43			
	50-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.43			
36C2----- Tama	0-15	24-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate----	0.32	5	7	3-4
	15-50	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate----	0.43			
	50-60	22-28	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.43			
41A----- Muscatine	0-10	24-27	1.28-1.32	0.6-2.0	0.22-0.24	5.1-7.3	Moderate----	0.28	5	6	5-6
	10-44	30-35	1.28-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate----	0.43			
	44-60	22-30	1.35-1.40	0.6-2.0	0.18-0.20	6.6-7.8	Moderate----	0.43			
43A----- Ipava	0-7	20-30	1.15-1.35	0.2-0.6	0.22-0.24	5.6-7.3	Moderate----	0.28	5	6	4-5
	7-40	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High-----	0.43			
	40-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate----	0.43			
45----- Denny	0-7	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	3	6	3-4
	7-14	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.6-6.5	Low-----	0.37			
	14-47	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-6.5	High-----	0.37			
	47-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.8	Low-----	0.37			
49----- Watseka	0-13	8-13	1.35-1.55	6.0-20	0.10-0.12	6.1-7.3	Low-----	0.17	5	2	1-3
	13-60	1-10	1.70-2.00	6.0-20	0.05-0.10	5.1-7.3	Low-----	0.17			
67----- Harpster	0-16	22-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate----	0.28	5	4L	5-6
	16-41	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate----	0.28			
	41-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	G/cm ³	In/hr	In/in	pH					Pct
68----- Sable	0-15	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	6	5-6
	15-40	24-35	1.30-1.50	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.28			
	40-60	20-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-7.8	Low-----	0.28			
69----- Milford	0-17	35-42	1.30-1.50	0.6-2.0	0.12-0.23	5.6-7.3	High-----	0.28	5	4	5-6
	17-55	35-42	1.40-1.65	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	55-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	6.6-8.4	Moderate-----	0.43			
74----- Radford	0-28	18-27	1.40-1.60	0.6-2.0	0.22-0.24	6.1-7.8	Low-----	0.28	5	6	2-4
	28-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.28			
87A, 87B, 87C2--- Dickinson	0-19	10-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low-----	0.20	4	3	1-2
	19-32	10-15	1.45-1.55	2.0-6.0	0.12-0.15	5.1-6.5	Low-----	0.20			
	32-36	4-10	1.55-1.65	6.0-20	0.08-0.10	5.1-6.5	Low-----	0.20			
	36-60	4-10	1.60-1.70	6.0-20	0.02-0.04	5.6-6.5	Low-----	0.15			
88B, 88D----- Sparta	0-15	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low-----	0.17	5	2	1-2
	15-29	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-6.5	Low-----	0.17			
	29-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-6.0	Low-----	0.17			
100----- Palms	0-24	---	2.25-0.45	2.0-6.0	0.35-0.45	5.1-7.8	-----	---	2	3	>75
	24-60	7-35	1.45-1.75	0.6-2.0	0.14-0.22	6.1-8.4	Low-----	---			
102A----- La Hogue	0-15	10-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low-----	0.28	5	5	3-4
	15-52	18-35	1.50-1.70	0.6-2.0	0.12-0.20	5.1-7.3	Moderate-----	0.28			
	52-60	5-20	1.60-1.80	0.6-6.0	0.05-0.22	5.6-7.8	Low-----	0.20			
107----- Sawmill	0-32	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	32-56	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	56-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	7.4-8.4	Moderate-----	0.28			
107+----- Sawmill	0-15	18-27	1.25-1.40	0.6-2.0	0.22-0.24	6.1-7.8	Low-----	0.28	5	6	2-3
	15-42	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	42-49	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	49-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	7.4-8.4	Moderate-----	0.28			
119D2----- Elco	0-6	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	4	6	1-3
	6-28	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.3	Moderate-----	0.37			
	28-60	25-37	1.40-1.60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate-----	0.37			
119D3----- Elco	0-5	25-33	1.20-1.35	0.6-2.0	0.18-0.21	5.6-7.3	Moderate-----	0.37	3	7	.5-1
	5-26	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.3	Moderate-----	0.37			
	26-60	25-37	1.40-1.60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate-----	0.37			
125----- Selma	0-19	25-30	1.35-1.55	0.6-2.0	0.17-0.23	6.1-7.8	Moderate-----	0.28	5	6	4-6
	19-55	20-30	1.40-1.60	0.6-2.0	0.15-0.20	6.1-8.4	Moderate-----	0.28			
	55-60	3-15	1.60-1.90	2.0-6.0	0.05-0.13	6.6-8.4	Low-----	0.28			
148B----- Proctor	0-15	18-25	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5-4	6	3-4
	15-32	25-35	1.20-1.45	0.6-2.0	0.15-0.20	5.6-6.5	Moderate-----	0.43			
	32-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.3	Low-----	0.43			
148C2----- Proctor	0-8	18-25	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5-4	6	3-4
	8-48	25-35	1.20-1.45	0.6-2.0	0.15-0.20	5.6-6.5	Moderate-----	0.43			
	48-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.3	Low-----	0.43			
149A----- Brenton	0-19	20-27	1.25-1.50	0.6-2.0	0.22-0.24	5.6-7.8	Low-----	0.28	5	6	4-5
	19-29	25-35	1.30-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
	29-39	20-30	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.28			
	39-60	15-30	1.50-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low-----	0.28			
152----- Drummer	0-22	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
	22-54	27-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	54-60	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low-----	0.28			
153----- Pella	0-15	27-35	1.10-1.30	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	5-6
	15-32	27-35	1.20-1.45	0.6-2.0	0.21-0.24	6.6-7.8	Moderate-----	0.28			
	32-38	15-30	1.35-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Moderate-----	0.28			
	38-60	15-30	1.40-1.70	0.6-2.0	0.10-0.22	7.4-8.4	Low-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	G/cm ³	In/hr	In/in	pH					Pct
171A----- Catlin	0-22	18-27	1.15-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	5	6	3-4
	22-49	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate----	0.43			
	49-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low-----	0.43			
171B----- Catlin	0-22	18-27	1.15-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	5	6	3-4
	22-49	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate----	0.43			
	49-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	5.1-8.4	Low-----	0.43			
172----- Hoopeston	0-31	8-18	1.35-1.70	2.0-6.0	0.12-0.15	5.1-6.5	Low-----	0.20	4	3	2-3
	31-60	2-10	1.50-1.80	6.0-20	0.05-0.10	4.5-8.4	Low-----	0.17			
198A----- Elburn	0-16	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low-----	0.28	5	6	4-5
	16-52	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate----	0.43			
	52-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low-----	0.43			
199A, 199B, 199C2----- Plano	0-19	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.32	5	6	3-5
	19-40	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.43			
	40-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	6.6-8.4	Low-----	0.43			
200----- Orio	0-9	10-20	1.25-1.45	0.6-2.0	0.20-0.24	4.5-7.8	Low-----	0.28	5	5	1-2
	9-18	8-20	1.30-1.50	0.6-2.0	0.09-0.18	4.5-7.8	Low-----	0.28			
	18-35	18-30	1.40-1.60	0.2-0.6	0.12-0.19	4.5-7.8	Moderate----	0.28			
	35-41	10-22	1.50-1.70	0.6-2.0	0.09-0.17	4.5-7.8	Low-----	0.28			
	41-60	3-10	1.55-1.75	6.0-20	0.05-0.13	4.5-7.8	Low-----	0.28			
201----- Gilford	0-16	10-20	1.50-1.70	2.0-6.0	0.16-0.18	5.6-7.3	Low-----	0.20	4	3	2-4
	16-28	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low-----	0.20			
	28-60	3-12	1.70-1.90	6.0-20	0.05-0.08	6.6-8.4	Low-----	0.15			
206----- Thorp	0-14	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low-----	0.37	4	6	5-6
	14-48	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate----	0.37			
	48-58	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate----	0.37			
	58-60	5-20	1.50-1.70	2.0-6.0	0.05-0.13	7.4-8.4	Low-----	0.37			
219A----- Millbrook	0-17	18-27	1.40-1.60	0.6-2.0	0.22-0.24	5.1-7.8	Low-----	0.32	5	6	2-4
	17-38	25-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-7.3	Moderate----	0.43			
	38-42	18-35	1.45-1.70	0.6-2.0	0.12-0.19	5.1-7.3	Moderate----	0.32			
	42-60	10-25	1.50-1.75	0.6-2.0	0.11-0.19	5.6-8.4	Low-----	0.32			
250C2, 250D2----- Velma	0-13	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.32	5	5	3-4
	13-44	25-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate----	0.32			
	44-60	20-30	1.50-1.70	0.6-2.0	0.06-0.09	7.4-8.4	Low-----	0.32			
250E2----- Velma	0-7	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.32	5	5	3-4
	7-43	25-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate----	0.32			
	43-60	20-30	1.50-1.70	0.6-2.0	0.06-0.09	7.4-8.4	Low-----	0.32			
257A----- Clarksdale	0-13	20-27	1.25-1.50	0.6-2.0	0.22-0.24	5.1-6.0	Moderate----	0.37	5	6	2-3
	13-54	35-42	1.30-1.50	0.2-0.6	0.11-0.20	5.1-7.3	High-----	0.37			
	54-60	20-30	1.40-1.60	0.2-0.6	0.20-0.22	6.1-8.4	Moderate----	0.37			
259B, 259C2, 259D2----- Assumption	0-16	20-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-6.5	Low-----	0.32	4	6	3-4
	16-35	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate----	0.43			
	35-60	30-45	1.40-1.65	0.2-0.6	0.14-0.20	5.1-6.5	Moderate----	0.43			
261----- Niota	0-10	20-27	1.20-1.35	0.2-0.6	0.22-0.24	5.1-7.3	Low-----	0.37	3	6	1-3
	10-14	18-25	1.30-1.55	0.2-0.6	0.18-0.22	5.1-6.0	Low-----	0.37			
	14-54	40-60	1.40-1.60	<0.06	0.09-0.13	3.6-5.0	High-----	0.37			
	54-60	12-25	1.50-1.70	0.2-2.0	0.08-0.20	5.6-6.5	Moderate----	0.37			
262----- Denrock	0-8	18-27	1.20-1.35	0.2-0.6	0.22-0.24	5.6-7.8	Low-----	0.37	3	6	3-5
	8-36	35-58	1.40-1.60	<0.06	0.09-0.13	5.1-6.0	Moderate----	0.37			
	36-54	25-40	1.40-1.60	0.2-0.6	0.15-0.19	5.1-6.5	Moderate----	0.37			
	54-60	5-20	1.60-1.80	6.0-20	0.05-0.10	6.1-7.3	Low-----	0.15			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	G/cm ³	In/hr	In/in	pH					Pct
549D2, 549F2----- Marseilles	0-12	20-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-6.5	Low-----	0.37	4	6	1-3
	12-37	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37			
	37-60	---	---	---	---	---	-----	---			
562A, 562B----- Port Byron	0-14	18-27	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5-4	6	2-4
	14-57	15-27	1.15-1.30	0.6-2.0	0.20-0.22	5.6-8.4	Low-----	0.43			
	57-60	2-10	1.80-1.95	6.0-2.0	0.05-0.10	5.6-8.4	Low-----	0.24			
564A, 564B----- Waukegan	0-19	18-27	1.35-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	4	6	2-5
	19-30	18-27	1.35-1.55	0.6-2.0	0.20-0.22	5.1-7.3	Low-----	0.43			
	30-60	1-10	1.50-1.70	6.0-2.0	0.02-0.04	5.6-7.8	Low-----	0.10			
565A, 565B, 565C2----- Tell	0-7	14-18	1.35-1.45	0.6-2.0	0.22-0.24	5.1-6.5	Low-----	0.37	4	5	1-3
	7-26	20-28	1.50-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37			
	26-31	10-25	1.50-1.60	0.6-2.0	0.11-0.19	5.1-6.5	Low-----	0.37			
	31-60	2-8	1.55-1.70	6.0-2.0	0.04-0.07	5.1-6.5	Low-----	0.15			
567D2----- Elkhart	0-10	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5	6	2-4
	10-30	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	30-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low-----	0.43			
572A, 572B, 572C2----- Loran	0-12	20-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.28	4	6	4-5
	12-43	22-35	1.30-1.50	0.2-0.6	0.18-0.20	6.1-7.3	Moderate-----	0.43			
	43-60	35-50	1.50-1.75	0.06-0.2	0.04-0.08	6.6-8.4	Moderate-----	0.32			
575----- Joy	0-20	15-25	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.28	5	6	3-4
	20-41	18-27	1.15-1.25	0.6-2.0	0.20-0.22	5.1-6.5	Low-----	0.43			
	41-60	2-10	1.80-1.95	6.0-2.0	0.05-0.10	5.6-7.3	Low-----	0.24			
670----- Aholt	0-51	60-80	1.30-1.50	<0.06	0.11-0.14	6.6-8.4	Very high----	0.28	5	4	4-6
	51-60	35-60	1.30-1.60	<0.06	0.09-0.18	6.6-8.4	Very high----	0.28			
741B, 741D, 741E- Oakville	0-3	2-14	1.30-1.55	6.0-2.0	0.09-0.12	5.6-7.3	Low-----	0.15	5	2	.5-2
	3-60	0-10	1.30-1.65	6.0-2.0	0.06-0.10	5.6-7.3	Low-----	0.15			
764A----- Coyne	0-23	5-18	1.55-1.70	2.0-6.0	0.10-0.18	5.6-7.3	Low-----	0.20	5	3	2-4
	23-44	5-18	1.40-1.60	2.0-6.0	0.15-0.19	5.6-7.3	Low-----	0.20			
	44-60	18-35	1.35-1.55	0.2-0.6	0.15-0.20	5.6-7.3	Moderate-----	0.43			
764B----- Coyne	0-7	5-18	1.55-1.70	2.0-6.0	0.10-0.18	5.6-7.3	Low-----	0.20	5	5	2-4
	7-42	5-18	1.40-1.60	2.0-6.0	0.15-0.19	5.6-7.3	Low-----	0.20			
	42-55	18-35	1.35-1.55	0.2-0.6	0.15-0.20	5.6-7.3	Moderate-----	0.43			
	55-60	2-10	1.70-1.90	6.0-2.0	0.02-0.04	5.6-8.4	Low-----	0.10			
777----- Adrian	0-24	---	0.30-0.55	0.2-6.0	0.35-0.45	5.1-7.8	-----	---	---	3	55-75
	24-60	2-10	1.40-1.75	6.0-2.0	0.03-0.08	5.6-8.4	Low-----	---			
800C*. Psamments											
802B*. Orthents											
871B, 871G----- Lenzburg	0-7	20-35	1.35-1.50	0.6-2.0	0.17-0.20	6.6-8.4	Moderate-----	0.37	5	4L	.5-1
	7-17	20-35	1.40-1.50	0.2-0.6	0.15-0.18	6.6-8.4	Moderate-----	0.37			
	17-60	20-35	1.50-1.70	0.2-0.6	0.11-0.17	7.4-8.4	Moderate-----	0.37			
910G*: Timula-----	0-60	10-18	1.30-1.60	0.6-2.0	0.20-0.24	6.1-8.4	Low-----	0.37	5-4	5	1-2
Miami-----	0-8	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	5	5	.5-3
	8-25	25-35	1.45-1.65	0.6-2.0	0.15-0.20	5.6-6.0	Moderate-----	0.37			
	25-60	15-30	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Moderate-----	0.37			

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Clay Pct	Moist bulk density G/cm ³	Permeability In/hr	Available water capacity In/in	Soil reaction pH	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter Pct
	In	Pct							K	T		
913D*: Marseilles-----	0-12	20-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-6.5	Low-----	0.37	4	6	1-3	
	12-37	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37				
	37-60	---	---	---	---	---	-----	---				
Hickory-----	0-5	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----	0.37	5	6	1-2	
	5-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37				
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37				
913D3*: Marseilles-----	0-9	27-35	1.25-1.45	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37	3	7	.5-1	
	9-34	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37				
	34-60	---	---	---	---	---	-----	---				
Hickory-----	0-5	27-35	1.40-1.65	0.6-2.0	0.17-0.19	4.5-6.0	Moderate-----	0.37	4	4	.5-1	
	5-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37				
	40-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37				
913F2*: Marseilles-----	0-12	27-35	1.25-1.45	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37	3	7	.5-1	
	12-37	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37				
	37-60	---	---	---	---	---	-----	---				
Hickory-----	0-5	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----	0.37	5	6	1-2	
	5-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37				
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37				
917B*, 917D*: Oakville-----	0-3	2-14	1.30-1.55	6.0-20	0.09-0.12	5.6-7.3	Low-----	0.15	5	2	.5-2	
	3-60	0-10	1.30-1.65	6.0-20	0.06-0.10	5.6-7.3	Low-----	0.15				
Tell-----	0-7	14-18	1.35-1.45	0.6-2.0	0.22-0.24	5.1-6.5	Low-----	0.37	4	5	1-3	
	7-26	20-28	1.50-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37				
	26-31	10-25	1.50-1.60	0.6-2.0	0.11-0.19	5.1-6.5	Low-----	0.37				
	31-60	2-8	1.55-1.70	6.0-20	0.04-0.07	5.1-6.5	Low-----	0.15				
918D3*: Marseilles-----	0-9	27-35	1.25-1.45	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37	3	7	.5-1	
	9-34	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37				
	34-60	---	---	---	---	---	-----	---				
Atlas-----	0-3	30-40	1.45-1.65	0.06-0.2	0.18-0.20	4.5-7.3	High-----	0.32	2	7	.5-2	
	3-60	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High-----	0.32				
943D3*, 943G*: Seaton-----	0-6	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	5-4	6	1-3	
	6-45	18-27	1.15-1.30	0.6-2.0	0.20-0.22	5.1-7.3	Low-----	0.37				
	45-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low-----	0.37				
Timula-----	0-60	10-18	1.30-1.60	0.6-2.0	0.20-0.24	6.1-8.4	Low-----	0.37	5-4	5	1-2	
946D2*: Hickory-----	0-5	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----	0.37	5	6	1-2	
	5-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37				
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37				
Atlas-----	0-5	20-27	1.30-1.50	0.2-0.6	0.20-0.24	4.5-7.3	Moderate-----	0.43	3	6	1-3	
	5-48	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High-----	0.32				
	48-60	20-30	1.55-1.75	0.06-0.2	0.12-0.15	6.1-7.8	Moderate-----	0.32				
946D3*: Hickory-----	0-5	27-35	1.40-1.65	0.6-2.0	0.17-0.19	4.5-6.0	Moderate-----	0.37	4	4	.5-1	
	5-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37				
	40-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low-----	0.37				
Atlas-----	0-7	30-40	1.45-1.65	0.06-0.2	0.18-0.20	4.5-7.3	High-----	0.32	2	7	.5-2	
	7-42	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High-----	0.32				
	42-60	20-30	1.55-1.75	0.06-0.2	0.12-0.15	6.1-7.8	Moderate-----	0.32				

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	<u>In</u>	<u>Pct</u>	<u>G/cm³</u>	<u>In/hr</u>	<u>In/in</u>	<u>pH</u>					<u>Pct</u>
957D3*: Elco-----	0-5 5-26 26-60	25-33 23-35 25-37	1.20-1.35 1.25-1.45 1.40-1.60	0.6-2.0 0.6-2.0 0.2-0.6	0.18-0.21 0.18-0.21 0.14-0.20	5.6-7.3 5.1-7.3 5.1-7.3	Moderate----- Moderate----- Moderate-----	0.37 0.37 0.37	3	7	.5-1
Atlas-----	0-7 7-42 42-60	30-40 35-45 20-30	1.45-1.65 1.50-1.70 1.55-1.75	0.06-0.2 <0.06 0.06-0.2	0.18-0.20 0.09-0.13 0.12-0.15	4.5-7.3 4.5-7.3 6.1-7.8	High----- High----- Moderate-----	0.32 0.32 0.32	2	7	.5-2
962D3*: Sylvan-----	0-4 4-24 24-60	27-32 25-35 18-27	1.25-1.45 1.30-1.50 1.30-1.50	0.6-2.0 0.6-2.0 0.6-2.0	0.20-0.22 0.18-0.20 0.20-0.22	6.1-7.3 5.6-7.3 6.6-8.4	Moderate----- Moderate----- Low-----	0.37 0.37 0.37	4	7	<.5
Bold-----	0-8 8-60	12-18 12-18	1.10-1.30 1.10-1.30	0.6-2.0 0.6-2.0	0.20-0.24 0.20-0.24	7.4-8.4 7.4-8.4	Low----- Low-----	0.43 0.43	5-4	4L	<.5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
8D2, 8D3, 8F2----- Hickory	C	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
17A----- Keomah	C	None-----	---	---	2.0-4.0	Apparent	Nov-Jul	>60	---	High-----	High-----	Moderate.
19D2, 19D3, 19F--- Sylvan	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
22D2, 22D3----- Westville	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
27C2, 27D2----- Miami	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
36A, 36B----- Tama	B	None-----	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	High-----	Moderate	Moderate.
36C2----- Tama	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
41A----- Muscatine	B	None-----	---	---	2.0-4.0	Apparent	Nov-Jul	>60	---	High-----	High-----	Moderate.
43A----- Ipava	B	None-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
45----- Denny	D	None-----	---	---	+5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
49----- Watseka	B	None-----	---	---	1.0-3.0	Apparent	Feb-May	>60	---	Moderate	Low-----	High.
67----- Harpster	B/D	None-----	---	---	+5-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Low.
68----- Sable	B/D	None-----	---	---	+5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
69----- Milford	B/D	None-----	---	---	+5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
74----- Radford	B	Rare-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
87A, 87B, 87C2---- Dickinson	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Low-----	Moderate.
88B, 88D----- Sparta	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
100----- Palms	A/D	None-----	---	---	+1 -1.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
102A----- La Hogue	B	None-----	---	---	1.0-3.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
107, 107+----- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
119D2, 119D3----- Elco	B	None-----	---	---	1.5-3.5	Perched	Mar-May	>60	---	High-----	High-----	Moderate.
125----- Selma	B/D	None-----	---	---	+ .5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
148B, 148C2----- Proctor	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
149A----- Brenton	B	None-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
152----- Drummer	B/D	None-----	---	---	+ .5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
153----- Pella	B/D	None-----	---	---	+ .5-2.0	Apparent	Dec-Jun	>60	---	High-----	High-----	Low.
171A----- Catlin	B	None-----	---	---	4.0-6.0	Apparent	Feb-May	>60	---	High-----	High-----	Moderate.
171B----- Catlin	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
172----- Hoopeston	B	None-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	Low-----	Moderate.
198A----- Elburn	B	None-----	---	---	1.0-3.0	Apparent	Jan-May	>60	---	High-----	High-----	Moderate.
199A, 199B, 199C2----- Plano	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Low.
200----- Orio	B/D	None-----	---	---	+ .5-1.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
201----- Gilford	B/D	None-----	---	---	+ .5-1.0	Apparent	Dec-May	>60	---	High-----	High-----	Moderate.
206----- Thorp	C/D	None-----	---	---	+ .5-2.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
219A----- Millbrook	B	None-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
250C2, 250D2, 250E2 Velma	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	High.
257A----- Clarksdale	C	None-----	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
259B, 259C2, 259D2----- Assumption	B	None-----	---	---	3.0-4.5	Perched	Feb-May	>60	---	High-----	High-----	Moderate.
261----- Niota	D	None-----	---	---	0-2.0	Perched	Mar-Jun	>60	---	High-----	High-----	High.
262----- Denrock	D	None-----	---	---	1.0-2.0	Perched	Mar-Jun	>60	---	High-----	High-----	Moderate.
274B, 274C2, 274D2----- Seaton	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Moderate.
275----- Joy	B	None-----	---	---	2.0-4.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
277A, 277B----- Port Byron	B	None-----	---	---	4.0-6.0	Apparent	Mar-May	>60	---	High-----	Low-----	Moderate.
277C2----- Port Byron	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Moderate.
279A----- Rozetta	B	None-----	---	---	4.0-6.0	Apparent	Apr-Jun	>60	---	High-----	Moderate	Moderate.
280B, 280C2, 280D2, 280D3, 280E2----- Fayette	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
386A----- Downs	B	None-----	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	Moderate	Moderate.
386B, 386C2----- Downs	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
400----- Calco	B/D	Occasional	Brief-----	Mar-May	1.0-3.0	Apparent	Nov-Jul	>60	---	High-----	High-----	Low.
415----- Orion	C	Frequent	Brief-----	Mar-Jun	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High-----	Low.
439A, 439B, 439D3----- Jasper	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
447----- Canisteo	C/D	None-----	---	---	0-1.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
457----- Booker	D	None-----	---	---	+ .5-1.0	Perched	Nov-May	>60	---	Moderate	High-----	Moderate.
465----- Montgomery	D	None-----	---	---	+1-1.0	Apparent	Dec-May	>60	---	Moderate	High-----	Low.
546B, 546C2----- Keltner	B	None-----	---	---	>6.0	---	---	40-60	Soft	High-----	High-----	Moderate.
549D2, 549F2----- Marseilles	B	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	High-----	Moderate.
562A, 562B----- Port Byron	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Moderate.
564A, 564B----- Waukegan	B	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Moderate.
565A, 565B, 565C2----- Tell	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
567D2----- Elkhart	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
572A, 572B, 572C2----- Loran	B	None-----	---	---	1.0-3.0	Perched	Feb-Jun	>60	---	High-----	High-----	Low.
575----- Joy	B	None-----	---	---	2.0-4.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
670----- Aholt	D	None-----	---	---	+ .5-1.0	Apparent	Dec-May	>60	---	Moderate	High-----	Low.
741B, 741D, 741E-- Oakville	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Moderate.
764A, 764B----- Coyne	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
777----- Adrian	A/D	None-----	---	---	+1-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
800C*. Psamments												
802B*. Orthents												
871B, 871G----- Lenzburg	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
910G*: Timula-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Pt</u>			<u>In</u>				
910G*: Miami-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
913D*, 913D3*, 913F2*: Marseilles-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	High-----	Moderate.
Hickory-----	C	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
917B*, 917D*: Oakville-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Moderate.
Tell-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
918D3*: Marseilles-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	High-----	Moderate.
Atlas-----	D	None-----	---	---	0-2.0	Perched	Apr-Jun	>60	---	High-----	High-----	Moderate.
943D3*, 943G*: Seaton-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Moderate.
Timula-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Low.
946D2*, 946D3*: Hickory-----	C	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Atlas-----	D	None-----	---	---	0-2.0	Perched	Apr-Jun	>60	---	High-----	High-----	Moderate.
957D3*: Elco-----	B	None-----	---	---	1.5-3.5	Perched	Mar-May	>60	---	High-----	High-----	Moderate.
Atlas-----	D	None-----	---	---	0-2.0	Perched	Apr-Jun	>60	---	High-----	High-----	Moderate.
962D3*: Sylvan-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
Bold-----	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Low-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

Soil name and location	Parent material	Report number	Depth	Moisture density		Percentage passing sieve--				Liquid limit	Plasticity index	Classification	
				Maximum dry density	Optimum moisture	No. 4	No. 10	No. 40	No. 200			AASHTO	Unified
			In	Lb/cu ft	Pct					Pct			
Assumption silt loam: 2,140 feet east and 2,440 feet south of the northwest corner of sec. 33, T. 15 N., R. 4 E.	Loess and glacial till.	S78IL-37											
		42-1	0-7	95	24	---	100	99	97	36	10	A-4(11)	ML
		42-4	17-22	97	25	---	100	98	95	45	22	A-7-6 (23)	CL
		42-8	36-51	114	16	100	99	95	77	40	23	A-6(17)	CL
Booker silty clay: 100 feet south and 1,270 feet east of the northwest corner of sec. 3, T. 17 N., R. 4 E.	Lacustrine clayey material.	S78IL-37											
		44-1	0-8	88	24	---	100	99	96	54	30	A-7-6 (33)	CH
		44-5	22-33	86	31	---	---	---	100	96	64	A-7-6 (77)	CH
Downs silt loam: 700 feet west and 920 feet north of the southeast corner of sec. 18, T. 15 N., R. 3 E.	Loess.	S78IL-37											
		47-1	0-7	101	21	---	---	100	98	38	11	A-6(13)	ML
		47-4	16-24	98	23	---	---	---	100	49	27	A-7-6 (30)	CL
		47-8	50-60	109	17	---	---	100	99	40	21	A-6(22)	CL
Ipava silt loam: 100 feet north and 800 feet east of the southwest corner of sec. 31, T. 16 N., R. 3 E.	Loess.	S78IL-37											
		51-1	0-7	93	25	---	---	100	99	46	17	A-7-6 (20)	ML
		51-6	32-43	101	19	---	100	99	98	46	25	A-7-6 (27)	CL
		51-7	43-54	103	18	---	---	100	99	47	27	A-6(20)	CL
		51-8	54-60	106	17	---	---	---	100	38	19	A-6(20)	CL
Marseilles silt loam: 265 feet east and 530 feet south of the center of sec. 33, T. 14 N., R. 1 E.	Shale residuum.	S77IL-37											
		16-1	0-7	103	19	---	100	98	94	32	11	A-6(10†)	CL
		16-2	7-11	106	19	95	89	88	79	33	10	A-6(7)	CL
		16-3	11-17	100	23	95	87	81	76	42	15	A-7-6 (12)	ML
		16-4	17-32	98	23	95	92	87	80	52	22	A-7-5 (20)	MH
		16-5	32-56	100	25	98	96	92	87	54	24	A-7-5 (24)	MH
		16-6	56-60	99	22	92	92	89	86	47	20	A-7-6 (19)	ML
Milford silty clay loam: 590 feet south and 45 feet west of the northeast corner of sec. 19, T. 17 N., R. 5 E.	Lacustrine material.	S77IL-37											
		19-1	0-9	97	24	---	---	100	95	46	26	A-7-6 (26)	CL
		19-4	23-28	102	21	---	100	99	93	49	30	A-7-6 (30)	CL
		19-6	35-45	103	19	---	---	100	96	55	33	A-7-6 (35)	CL
		19-8	55-60	123	11	---	100	99	49	21	7	A-4	SM-SC

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name and location	Parent material	Report number	Depth	Moisture density		Percentage passing sieve--				Liquid limit	Plasticity index	Classification	
				Maximum dry density	Optimum moisture	No. 4	No. 10	No. 40	No. 200			AASHTO	Unified
			In	Lb/cu ft	Pct					Pct			
Montgomery silty clay: 1,400 feet west and 250 feet north of the southeast corner of sec. 7, T. 18 N., R. 4 E.	Lacustrine silts and clays.	S78IL-37 45-1	0-8	92	26	---	---	100	98	65	35	A-7-6 (41)	CH
		45-4	17-21	99	22	---	---	100	99	56	35	A-7-6	CH
		45-7	30-38	92	26	100	99	98	97	70	46	A-7-6	CH
Oakville loamy fine sand: 80 feet south and 2,400 feet west of the northeast corner of sec. 5, T. 18 N., R. 4 E.	Outwash sand.	S78IL-37 46-3	8-15	115	11	---	100	99	21	---	NP	A-2-4	SM
Port Byron silt loam: 2,145 feet south and 130 feet east of the northwest corner of sec. 27, T. 18 N., R. 3 E.	Loess.	S78IL-37 66-1	0-5	100	20	---	---	100	98	30	5	A-4(5)	ML
		66-5	17-25	115	18	---	---	100	99	38	16	A-6(17)	CL
		66-6	25-35	106	19	---	---	100	99	38	17	A-6(18)	CL
		66-8	50-60	109	16	---	---	100	99	35	13	A-6(14)	CL
Radford silt loam: 78 feet south and 1,268 feet west of the northeast corner of sec. 27, T. 14 N., R. 2 E.	Alluvium.	S77IL-37 25-2	7-17	98	21	---	---	100	98	41	15	A-7-6 (17)	ML
		25-5	37-46	95	23	---	---	100	97	54	28	A-7-6 (31)	CH
Seaton silt loam: 780 feet east and 240 feet south of the northwest corner of sec. 25, T. 18 N., R. 2 E.	Loess.	S78IL-35 67-1	0-7	102	17	---	100	99	96	23	4	A-4(2)	CL-ML
		67-5	18-23	111	16	---	---	100	98	29	7	A-4(6)	CL-ML
		67-7	36-55	109	17	---	---	100	97	34	12	A-6	CL
Sylvan silty clay loam: 160 feet east and 2,600 feet north of the southwest corner of sec. 9, T. 15 N., R. 3 E.	Loess.	S78IL-37 50-1	0-8	103	20	---	---	---	100	41	21	A-7-6 (22)	CL
		50-2	8-17	105	18	---	---	---	100	43	21	A-7-6 (23)	CL
		50-3	17-24	109	18	---	---	---	100	32	13	A-6(13)	CL
		50-5	34-42	110	16	100	99	99	98	26	7	A-4(5)	CL-ML
Velma silt loam: 260 feet east and 1,880 feet north of the southwest corner of sec. 25, T. 14 N., R. 3 E.	Loess and glacial till.	S78IL-37 43-1	0-10	96	22	---	---	100	93	38	12	A-6(9)	ML
		43-3	13-18	111	18	97	95	87	63	36	16	A-6(8)	CL
		43-7	34-44	127	12	94	91	87	75	26	10	A-4(5)	CL
		43-8	44-60	127	11	92	88	80	58	27	11	A-6(3)	CL

TABLE 19.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Adrian-----	Sandy or sandy-skeletal, mixed, euc, mesic Terric Medisaprists
Aholt-----	Very-fine, montmorillonitic (calcareous), mesic Vertic Haplaquolls
Assumption-----	Fine-silty, mixed, mesic Typic Argiudolls
*Atlas-----	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Bold-----	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Booker-----	Very-fine, montmorillonitic, mesic Vertic Haplaquolls
Brenton-----	Fine-silty, mixed, mesic Aquic Argiudolls
Calco-----	Fine-silty, mixed (calcareous), mesic Cumulic Haplaquolls
Canisteo-----	Fine-loamy, mixed (calcareous), mesic Typic Haplaquolls
Catlin-----	Fine-silty, mixed, mesic Typic Argiudolls
Clarksdale-----	Fine, montmorillonitic, mesic Udollic Ochraqualfs
*Coyne-----	Coarse-loamy, mixed, mesic Typic Argiudolls
Denny-----	Fine, montmorillonitic, mesic Mollic Albaqualfs
Denrock-----	Fine, mixed, mesic Aquic Argiudolls
Dickinson-----	Coarse-loamy, mixed, mesic Typic Hapludolls
Downs-----	Fine-silty, mixed, mesic Mollic Hapludalfs
Drummer-----	Fine-silty, mixed, mesic Typic Haplaquolls
Elburn-----	Fine-silty, mixed, mesic Aquic Argiudolls
Elco-----	Fine-silty, mixed, mesic Typic Hapludalfs
Elkhart-----	Fine-silty, mixed, mesic Typic Argiudolls
Fayette-----	Fine-silty, mixed, mesic Typic Hapludalfs
Gilford-----	Coarse-loamy, mixed, mesic Typic Haplaquolls
Harpster-----	Fine-silty, mesic Typic Calcicquolls
Hickory-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Hoopeston-----	Coarse-loamy, mixed, mesic Aquic Hapludolls
Ipava-----	Fine, montmorillonitic, mesic Aquic Argiudolls
Jasper-----	Fine-loamy, mixed, mesic Typic Argiudolls
Joy-----	Fine-silty, mixed, mesic Aquic Hapludolls
Keltner-----	Fine-silty, mixed, mesic Typic Argiudolls
Keomah-----	Fine, montmorillonitic, mesic Aeric Ochraqualfs
La Hogue-----	Fine-loamy, mixed, mesic Aquic Argiudolls
Lenzburg-----	Fine-loamy, mixed (calcareous), mesic Typic Udorthents
Loran-----	Fine-silty, mixed, mesic Aquic Argiudolls
Marseilles-----	Fine-silty, mixed, mesic Typic Hapludalfs
Miami-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford-----	Fine, mixed, mesic Typic Haplaquolls
Millbrook-----	Fine-silty, mixed, mesic Udollic Ochraqualfs
*Montgomery-----	Fine, mixed, mesic Typic Haplaquolls
*Muscatine-----	Fine-silty, mixed, mesic Aquic Hapludolls
*Niota-----	Fine, mixed, mesic Mollic Albaqualfs
Oakville-----	Mixed, mesic Typic Udipsamments
Orio-----	Fine-loamy, mixed, mesic Mollic Ochraqualfs
Orion-----	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents-----	Loamy, mixed, nonacid, mesic Typic Udorthents
Palms-----	Loamy, mixed, euc, mesic Terric Medisaprists
Pella-----	Fine-silty, mixed, mesic Typic Haplaquolls
Plano-----	Fine-silty, mixed, mesic Typic Argiudolls
Port Byron-----	Fine-silty, mixed, mesic Typic Hapludolls
Proctor-----	Fine-silty, mixed, mesic Typic Argiudolls
Psamments-----	Mixed, mesic Udipsamments
Radford-----	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Rozetta-----	Fine-silty, mixed, mesic Typic Hapludalfs
Sable-----	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill-----	Fine-silty, mixed, mesic Cumulic Haplaquolls
Seaton-----	Fine-silty, mixed, mesic Typic Hapludalfs
Selma-----	Fine-loamy, mixed, mesic Typic Haplaquolls
Sparta-----	Sandy, mixed, mesic Entic Hapludolls
Sylvan-----	Fine-silty, mixed, mesic Typic Hapludalfs
Tama-----	Fine-silty, mixed, mesic Typic Argiudolls
Tell-----	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Thorp-----	Fine-silty, mixed, mesic Argiaquic Argialbolls
Timula-----	Coarse-silty, mixed, mesic Typic Eutrochrepts
Velma-----	Fine-loamy, mixed, mesic Typic Argiudolls
Watseka-----	Sandy, mixed, mesic Aquic Hapludolls
Waukegan-----	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Hapludolls
Westville-----	Fine-loamy, mixed, mesic Typic Hapludalfs

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at <http://offices.sc.egov.usda.gov/locator/app>.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.