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IOWA STATE UNIVERSITY
Iowa Agriculture and Home Economics Experiment Station

IOWA STATE UNIVERSITY
University Extension

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

Soil Survey of Adams County, Iowa

Part II

How To Use This Soil Survey

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

On the **general soil map**, the survey area is divided into groups of soils called associations. This map is useful in planning the use and management of large areas.

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

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

To find information about your area of interest, locate that area on the **Index to Map Sheets** in Part III. Note the number of the map sheet, and turn to that sheet. Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. The **Contents** in Part I lists the map units and shows the page where each map unit is described.

The **Contents** in Part II shows which table has information on a specific land use or soil property for each detailed soil map unit. Also, see the **Contents** in Part I and Part II for other sections of this publication that may address your specific needs.

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

Major fieldwork for this soil survey was completed in 2006. Soil names and descriptions were approved in 2007. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. The most current official data are available through the NRCS Web Soil Survey (http://soils.usda.gov).

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

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

Cover: A pond in an area of the Ladoga-Gara association provides erosion control and a source of water for livestock.

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

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Soil Survey of
Adams County, Iowa

Introduction to Part II

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

This part of the soil survey includes interpretations for various uses of the soils and data on soil properties. This information can be used to plan the use and management of soils for crops and pasture or as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Soils are rated in their natural state. No unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in 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 gravel, sand, reclamation material, 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.

The table “Classification of the Soils” is at the end of this section. Information about the system of soil taxonomy used by the Natural Resources Conservation Service is available in Part I of this publication. The extent of the map units in this survey area is shown in the table “Acreage and Proportionate Extent of the Soils.”

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate

the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text in Part I for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
*Adair	Fine, smectitic, mesic Aquertic Hapludalfs
Aquolls	Aquolls
Armstrong	Fine, smectitic, mesic Aquertic Hapludalfs
Bremer	Fine, smectitic, mesic Typic Argiaquolls
Bucknell	Fine, smectitic, mesic Vertic Epiaqualfs
Clarinda	Fine, smectitic, mesic Vertic Argiaquolls
*Clarinda	Fine, smectitic, mesic Vertic Epiaqualfs
Clearfield	Fine, smectitic, mesic Typic Endoaquolls
*Dickman	Sandy, mixed, mesic Typic Dystrudepts
Ely	Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls
Gara	Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs
*Hedrick	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs
Humeston	Fine, smectitic, mesic Argiaquic Argialbolls
Judson	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Kennebec	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Ladoga	Fine, smectitic, mesic Mollic Hapludalfs
*Lamoni	Fine, smectitic, mesic Vertic Epiaqualfs
Macksburg	Fine, smectitic, mesic Aquic Argiudolls
Mt. Sterling	Fine-silty, mixed, superactive, nonacid, mesic Aeric Fluvaquents
Nevin	Fine-silty, mixed, superactive, mesic Aquic Pachic Argiudolls
Nira	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludolls
*Nira	Fine-silty, mixed, superactive, mesic Oxyaquic Dystrudepts
Nodaway	Fine-silty, mixed, superactive, nonacid, mesic Mollic Udifluvents
Olmitz	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Sharpsburg	Fine, smectitic, mesic Typic Argiudolls
*Sharpsburg	Fine, smectitic, mesic Mollic Hapludalfs
Shelby	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
*Shelby	Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs
*Shelby	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs

Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Udorthents, loamy	Udorthents
Wabash	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
Winterset	Fine, smectitic, mesic Vertic Argiaquolls
Wiota	Fine-silty, mixed, superactive, mesic Pachic Argiudolls
Zook	Fine, smectitic, mesic Cumulic Vertic Endoaquolls

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
7	Wiota silty clay loam, 0 to 2 percent slopes, rarely flooded	209	*
7B	Wiota silty clay loam, 2 to 5 percent slopes, rarely flooded	555	0.2
8B	Judson silty clay loam, 2 to 5 percent slopes	2,747	1.0
15B	Olmitz-Ely-Zook complex, 2 to 5 percent slopes	4,440	1.6
16	Nodaway-Kennebec complex, 0 to 2 percent slopes, occasionally flooded	1,175	0.4
24C2	Shelby clay loam, 5 to 9 percent slopes, moderately eroded	186	*
24D2	Shelby clay loam, 9 to 14 percent slopes, moderately eroded	10,146	3.7
24E	Shelby clay loam, 14 to 18 percent slopes	2,117	0.8
24E2	Shelby clay loam, 14 to 18 percent slopes, moderately eroded	9,780	3.6
24F	Shelby clay loam, 18 to 25 percent slopes	1,240	0.5
43	Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded	642	0.2
45B	Zook-Ely complex, 2 to 5 percent slopes	4,850	1.8
54	Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	8,436	3.1
54+	Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	2,251	0.8
76B	Ladoga silt loam, 2 to 5 percent slopes	892	0.3
76C	Ladoga silt loam, 5 to 9 percent slopes	7,692	2.8
76D	Ladoga silt loam, 9 to 14 percent slopes	873	0.3
76D2	Ladoga silt loam, 9 to 14 percent slopes, moderately eroded	3,426	1.3
86	Mt. Sterling-Zook, overwash, complex, 0 to 2 percent slopes, occasionally flooded	433	0.2
88	Nevin silt loam, 0 to 2 percent slopes, rarely flooded	1,079	0.4
93D2	Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded	3,445	1.3
93E2	Shelby-Adair complex, 14 to 18 percent slopes, moderately eroded	3,608	1.3
172	Wabash silty clay, frequently ponded, 0 to 2 percent slopes, occasionally flooded	532	0.2
179E	Gara loam, 14 to 18 percent slopes	5,469	2.0
179F	Gara loam, 18 to 25 percent slopes	2,314	0.8
179G	Gara loam, 25 to 40 percent slopes	142	*
192D2	Adair clay loam, 9 to 14 percent slopes, moderately eroded	1,273	0.5
220	Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded	4,460	1.6
222C2	Clarinda silty clay loam, 5 to 9 percent slopes, moderately eroded	5,019	1.8
222D	Clarinda silty clay loam, 9 to 14 percent slopes	1,594	0.6
222D2	Clarinda silty clay loam, 9 to 14 percent slopes, moderately eroded	1,206	0.4
222D3	Clarinda silty clay, 9 to 14 percent slopes, severely eroded	136	*
248	Wabash silty clay loam, occasionally ponded, 0 to 2 percent slopes, occasionally flooded	3,779	1.4
269	Humeston silt loam, 0 to 2 percent slopes, occasionally flooded	240	*
273B	Olmitz loam, 2 to 5 percent slopes	409	0.1
273C	Olmitz loam, 5 to 9 percent slopes	498	0.2
324C2	Dickman fine sandy loam, loamy substratum, 5 to 9 percent slopes, moderately eroded	89	*
324D2	Dickman fine sandy loam, loamy substratum, 9 to 14 percent slopes, moderately eroded	90	*
354	Aquolls, ponded, 0 to 1 percent slopes	48	*
368	Macksburg silty clay loam, 0 to 2 percent slopes	5,725	2.1
369	Winterset silty clay loam, 0 to 2 percent slopes	966	0.4

See footnote at end of table.

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
370	Sharpsburg silty clay loam, 0 to 2 percent slopes	350	0.1
370B	Sharpsburg silty clay loam, 2 to 5 percent slopes	23,628	8.7
371C2	Sharpsburg-Nira complex, 5 to 9 percent slopes, moderately eroded	39,670	14.5
371D2	Sharpsburg-Nira complex, 9 to 14 percent slopes, moderately eroded	9,685	3.6
421C2	Gara-Bucknell complex, 5 to 9 percent slopes, moderately eroded	357	0.1
421D2	Gara-Bucknell complex, 9 to 14 percent slopes, moderately eroded	8,266	3.0
421E2	Gara-Bucknell complex, 14 to 18 percent slopes, moderately eroded	754	0.3
435	Zook-Mt. Sterling complex, 0 to 2 percent slopes, occasionally flooded	3,609	1.3
469C2	Lamoni-Clarinda-Shelby complex, 5 to 9 percent slopes, moderately eroded	5,956	2.2
469C3	Lamoni-Clarinda-Shelby complex, 5 to 9 percent slopes, severely eroded	217	*
470D2	Lamoni-Shelby complex, 9 to 14 percent slopes, moderately eroded	22,560	8.3
545B	Zook-Ely-Gullied land complex, 2 to 5 percent slopes	32,583	11.9
569C	Nira-Clearfield complex, 5 to 9 percent slopes	10,855	4.0
579E3	Bucknell-Hedrick complex, 14 to 18 percent slopes, severely eroded	247	*
794C2	Armstrong-Ladoga complex, 5 to 9 percent slopes, moderately eroded	72	*
822D2	Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded	1,068	0.4
870B	Sharpsburg silty clay loam, terrace, 1 to 5 percent slopes	1,005	0.4
870C2	Sharpsburg silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded	467	0.2
870D2	Sharpsburg silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded	118	*
876B	Ladoga silt loam, terrace, 1 to 5 percent slopes	920	0.3
876C2	Ladoga silt loam, terrace, 5 to 9 percent slopes, moderately eroded	627	0.2
876D2	Ladoga silt loam, terrace, 9 to 14 percent slopes, moderately eroded	303	0.1
2368B	Macksburg-Nira complex, 2 to 5 percent slopes	1,888	0.7
5030	Pits, limestone quarries	136	*
5040	Udorthents, loamy	335	0.1
5041	Udorthents, reclaimed	164	*
AW	Animal waste lagoon	6	*
SL	Sewage lagoon	8	*
W	Water	2,635	1.0
	Total	272,700	100.0

* Less than 0.1 percent.

Agronomy

This section provides some general information about managing the soils for crops and for hay and pasture. The Iowa corn suitability rating system and the system of land capability classification used by the Natural Resources Conservation Service are explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil. Prime farmland is described, and interpretations for agricultural waste management are provided.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Management Considerations

The management concerns affecting the use of the detailed soil map units in the county for crops are shown in the table "Cropland Management Considerations" at the end of this section. The main concerns in managing nonirrigated cropland are conserving moisture, controlling wind erosion and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water infiltration rate. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control wind erosion and water erosion. Conservation tillage, stripcropping, field windbreaks, contour farming, conservation cropping systems, crop residue management, terraces, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in maintaining soil fertility include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the considerations shown in the table cannot be easily overcome. These are channels, flooding, gullies, and ponding.

Additional considerations are as follows:

Lime content, limited available water capacity, limited content of organic matter, potential poor tilth and compaction, and restricted permeability.—These limitations can be minimized by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer to soils that have a high content of lime.

Potential for ground-water contamination.—The proper use of nutrients and pesticides can reduce the risk of ground-water contamination.

Potential for surface-water contamination.—The risk of surface-water contamination can be reduced by the proper use of nutrients and pesticides and by conservation farming practices that reduce the runoff rate.

Surface crusting.—This limitation retards seedling development after periods of heavy rainfall.

Surface rock fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Surface stones.—Stones or boulders on or near the surface can hinder normal tillage unless they are removed.

Salt content.—In areas where this is a limitation, only salt-tolerant crops should be grown.

On irrigated soils the main management concerns are efficient water use, nutrient management, control of erosion, pest and weed control, and timely planting and harvesting for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion. Also, it can increase wetness and soil salinity.

Explanation of Criteria

Acid soil.—The pH is less than 6.1.

Channeled.—The word "channeled" is included in the map unit name.

Dense layer.—The bulk density is 1.80 g/cc or greater within the soil profile.

Depth to rock.—The depth to bedrock is less than 40 inches.

Eroded.—The word "eroded" is included in the map unit name.

Excessive permeability.—Saturated hydraulic conductivity is 42 micrometers per second or more within the soil profile.

Flooding.—Flooding is occasional, frequent, or very frequent.

Gullied.—The word "gullied" is included in the map unit name.

High content of organic matter.—The surface layer has more than 20 percent organic matter.

Lime content.—The pH is 7.4 or more in the surface layer, or the wind erodibility group is 4L.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 6 inches or less.

Limited content of organic matter.—The content of organic matter is 2 percent or less in the surface layer.

Ponding.—Ponding duration is assigned to the map unit component. Water is above the surface.

Potential poor tilth and compaction.—The content of clay is 27 percent or more in the surface layer.

Potential for ground-water contamination (by nutrients or pesticides).—The depth to a seasonal high water table is 4 feet or less, the saturated hydraulic conductivity of any layer is more than 42 micrometers per second, or the depth to bedrock is less than 60 inches.

Potential for surface-water contamination (by nutrients or pesticides).—The map unit component is occasionally, frequently, or very frequently flooded, is subject to ponding, is assigned to hydrologic group C or D and has a slope of more than 2 percent, is assigned to hydrologic group A and has a slope of more than 6 percent, or is assigned to hydrologic group B, has a slope of 3 percent or more, and has a K factor of more than 0.17.

Previously eroded.—The word "eroded" is included in the map unit name.

Restricted permeability.—Saturated hydraulic conductivity is less than 0.42 micrometer per second within the soil profile.

Salt content.—The electrical conductivity is 4 or more in the surface layer or 8 or more within a depth of 30 inches.

Slope (equipment limitation).—The slope is more than 15 percent.

Surface crusting.—The content of clay is 27 percent or more and the content of organic matter is 2 percent or less in the surface layer.

Surface rock fragments (equipment limitation).—The terms describing the texture of the surface layer include any rock fragment modifier, except for gravelly, channery, stony, very stony, extremely stony, bouldery, very bouldery, and extremely bouldery.

Surface stones (equipment limitation).—The word "stony" or "bouldery" is included in the description of the surface layer, or 0.01 to 0.1 percent of the surface is covered by stones or boulders.

Water erosion.—Either the slope is 6 percent or more, or the slope is more than 3 percent and less than 6 percent and the surface layer is not sandy.

Water table.—A water table is within 2.5 feet of the surface.

Wind erosion.—The wind erodibility group is 1, 2, 3, or 4L.

Hydrologic groups are described under the heading "Water Features." Erosion factors (e.g., K factor) and wind erodibility groups are described under the heading "Physical Properties."

Cropland Management Considerations

(See text for a description of the considerations listed in this table)

Map symbol and soil name	Pct. of map unit	Cropland management considerations
7:		
Wiota, rarely flooded	85	Potential for ground-water contamination
7B:		
Wiota, rarely flooded	85	Potential for ground-water contamination Potential for surface-water contamination Water erosion
8B:		
Judson	85	Potential for surface-water contamination Water erosion
15B:		
Olmitz	35	Potential for ground-water contamination Potential for surface-water contamination Water erosion
Ely	30	Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
Zook	20	Potential poor tilth and compaction Potential for ground-water contamination Restricted permeability Water erosion Water table
16:		
Nodaway, occasionally flooded	55	Flooding Potential for ground-water contamination Potential for surface-water contamination
Kennebec, occasionally flooded	35	Flooding Potential for ground-water contamination Potential for surface-water contamination
24C2:		
Shelby, moderately eroded	85	Potential for surface-water contamination Previously eroded Water erosion
24D2:		
Shelby, moderately eroded	70	Potential for surface-water contamination Previously eroded Water erosion
24E:		
Shelby	60	Slope Potential for surface-water contamination Water erosion
24E2:		
Shelby, moderately eroded	65	Slope Potential for surface-water contamination Previously eroded Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
24F:		
Shelby	65	Slope Potential for surface-water contamination Water erosion
43:		
Bremer, rarely flooded	85	Potential poor tilth and compaction Potential for ground-water contamination Water table
45B:		
Zook	75	Potential poor tilth and compaction Potential for ground-water contamination Restricted permeability Water erosion Water table
Ely	20	Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
54:		
Zook, occasionally flooded	90	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
54+:		
Zook, occasionally flooded, overwash	80	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
76B:		
Ladoga	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
76C:		
Ladoga	75	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
76D:		
Ladoga	85	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
76D2:		
Ladoga, moderately eroded	60	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
86:		
Mt. Sterling, occasionally flooded	60	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
Zook, occasionally flooded, overwash	25	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
88:		
Nevin, rarely flooded	90	Potential for ground-water contamination Water table
93D2:		
Shelby, moderately eroded	35	Potential for surface-water contamination Previously eroded Water erosion
Adair, moderately eroded	25	Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
93E2:		
Shelby, moderately eroded	45	Slope Potential for surface-water contamination Previously eroded Water erosion
Adair, moderately eroded	30	Slope Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
172:		
Wabash, frequently ponded, occasionally flooded	90	Flooding Ponding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
179E:		
Gara	60	Slope Potential for surface-water contamination Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
179F:		
Gara	65	Slope Potential for surface-water contamination Water erosion
179G:		
Gara	70	Slope Potential for surface-water contamination Water erosion
192D2:		
Adair, moderately eroded	55	Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
220:		
Nodaway, occasionally flooded	80	Flooding Potential for ground-water contamination Potential for surface-water contamination
222C2:		
Clarinda, moderately eroded	75	Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
222D:		
Clarinda	75	Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Water table
222D2:		
Clarinda, moderately eroded	70	Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
222D3:		
Clarinda, severely eroded	70	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
248:		
Wabash, occasionally ponded, occasionally flooded	85	Flooding Ponding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
269:		
Humeston, occasionally flooded	100	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
273B:		
Olmitz	80	Potential for ground-water contamination Potential for surface-water contamination Water erosion
273C:		
Olmitz	75	Potential for ground-water contamination Potential for surface-water contamination Water erosion
324C2:		
Dickman, moderately eroded	90	Excessive permeability Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Wind erosion
324D2:		
Dickman, moderately eroded	90	Excessive permeability Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Wind erosion
354:		
Aquolls, ponded	100	Onsite investigation required
368:		
Macksburg	85	Potential poor tilth and compaction Potential for ground-water contamination Water table
369:		
Winterset	100	Potential poor tilth and compaction Potential for ground-water contamination Water table
370:		
Sharpsburg	95	Potential poor tilth and compaction Potential for ground-water contamination
370B:		
Sharpsburg	95	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
371C2:		
Sharpsburg, moderately eroded	35	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
Nira, moderately eroded------	30	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Water table
371D2:		
Sharpsburg, moderately eroded	50	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
Nira, moderately eroded------	20	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Water table
421C2:		
Gara, moderately eroded------	35	Potential for surface-water contamination Previously eroded Water erosion
Bucknell, moderately eroded--	35	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
421D2:		
Gara, moderately eroded------	35	Potential for surface-water contamination Previously eroded Water erosion
Bucknell, moderately eroded--	30	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
421E2:		
Gara, moderately eroded------	40	Slope Potential for surface-water contamination Previously eroded Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
421E2:		
Bucknell, moderately eroded--	25	Acid soil Slope Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
435:		
Zook, occasionally flooded---	40	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
Mt. Sterling, occasionally flooded----------	35	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water table
469C2:		
Lamoni, moderately eroded----	35	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
Clarinda, moderately eroded--	30	Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
Shelby, moderately eroded----	20	Potential for surface-water contamination Previously eroded Water erosion
469C3:		
Lamoni, severely eroded------	35	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
Clarinda, severely eroded----	30	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
469C3:		
Shelby, severely eroded------	20	Potential for surface-water contamination Previously eroded Water erosion
470D2:		
Lamoni, moderately eroded----	40	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
Shelby, moderately eroded----	35	Potential for surface-water contamination Previously eroded Water erosion
545B:		
Zook-------------------------	35	Gullied Potential poor tilth and compaction Potential for ground-water contamination Restricted permeability Water erosion Water table
Ely--------------------------	30	Gullied Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
Gullied land-----------------	20	Not applicable
569C:		
Nira-------------------------	45	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
Clearfield-------------------	35	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Water table
579E3:		
Bucknell, severely eroded----	55	Acid soil Slope Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
579E3:		
Hedrick, severely eroded-----	35	Slope Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
794C2:		
Armstrong, moderately eroded	65	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
Ladoga, moderately eroded----	30	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
822D2:		
Lamoni, moderately eroded----	55	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Water table
870B:		
Sharpsburg, terrace----------	85	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion
870C2:		
Sharpsburg, terrace, moderately eroded----------	85	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
870D2:		
Sharpsburg, terrace, moderately eroded----------	75	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
876B:		
Ladoga, terrace--------------	100	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
876C2:		
Ladoga, terrace, moderately eroded	70	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
876D2:		
Ladoga, terrace, moderately eroded	75	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
2368B:		
Macksburg	70	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
Nira	25	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
5030:		
Pits, limestone quarries	100	Not applicable
5040:		
Udorthents, loamy	100	No major considerations
5041:		
Udorthents, reclaimed	100	Onsite investigation required
AW:		
Animal waste lagoon	100	Not applicable
SL:		
Sewage lagoon	100	Not applicable
W:		
Water	100	Not applicable

Crop Yield Estimates

The tables “Land Capability, Corn Suitability Rating, and Yields per Acre of Crops” and “Land Capability and Yields per Acre of Pasture” are described in this section. Crops other than those shown in the tables are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or 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 forestland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

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, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the

soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, or wildlife habitat.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

[Reference: United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. USDA Handbook 210.]

Corn Suitability Rating

The corn suitability rating (CSR) system was developed in Iowa to rate the productivity of each different kind of soil for row crops. CSRs provide a relative ranking of all soils mapped in the State of Iowa. They can be used to compare the potential yield production of one soil with that of other soils. Ratings range from 5 to 100. A rating of 5 indicates severe limitations for row crop production. Soil properties and weather conditions are the dominant factors that affect productivity.

Crop Yields

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table. 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. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Pasture Yields

Some pasture yields are expressed in the table in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about forage yields other than those shown in the table.

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops

(The crop yields estimates were determined through recent research conducted by Iowa State University. They are based on a high level of management and are for nonirrigated areas. See text for additional information. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
7—Wiota, rarely flooded	85	1	91	198	53	79
7B—Wiota, rarely flooded	85	2e	85	190	51	76
8B—Judson	85	2e	82	186	50	74
15B—			64	161	43	64
Olmitz	35	2e				
Ely	30	2e				
Zook	20	2w				
16—Nodaway, occasionally flooded	55	2w	86	191	52	76
Kennebec, occasionally flooded	35	1				
24C2—Shelby, moderately eroded	85	3e	58	153	41	61
24D2—Shelby, moderately eroded	70	3e	48	140	38	56
24E—Shelby	60	4e	40	129	35	52
24E2—Shelby, moderately eroded	65	4e	38	126	34	50
24F—Shelby	65	6e	20	102	28	41
43—Bremer, rarely flooded	85	2w	80	183	49	73
45B—			65	163	44	65
Zook	75	2w				
Ely	20	2e				
54—Zook, occasionally flooded	90	2w	70	170	46	68
54+—Zook, occasionally flooded, overwash	80	2w	75	176	48	70
76B—Ladoga	95	2e	82	186	50	74

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
76C---------- Ladoga	75	3e	67	165	45	66
76D---------- Ladoga	85	3e	57	152	41	61
76D2---------- Ladoga, moderately eroded	60	3e	52	145	39	58
86---------- Mt. Sterling, occasionally flooded---			78	180	49	72
Zook, occasionally flooded, overwash------	60	2w				
	25	2w				
88---------- Nevin, rarely flooded	90	1	90	197	53	79
93D2---------- Shelby, moderately eroded----------			33	120	32	48
Adair, moderately eroded	35	3e				
	25	4e				
93E2---------- Shelby, moderately eroded----------			23	106	29	42
Adair, moderately eroded	45	4e				
	30	6e				
172---------- Wabash, frequently ponded, occasionally flooded	90	3w	45	136	37	54
179E---------- Gara	60	6e	35	122	33	49
179F---------- Gara	65	6e	15	95	26	38
179G---------- Gara	70	7e	5	82	22	33
192D2---------- Adair, moderately eroded	55	4e	15	95	26	38
220---------- Nodaway, occasionally flooded	80	2w	85	190	51	76
222C2---------- Clarinda, moderately eroded	75	4w	25	109	29	44
222D---------- Clarinda	75	4w	15	95	26	38
222D2---------- Clarinda, moderately eroded	70	4e	10	89	24	36

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
222D3---------- Clarinda, severely eroded	70	6e	5	82	22	33
248---------- Wabash, occasionally ponded, occasionally flooded	85	3w	60	156	42	62
269---------- Humeston, occasionally flooded	100	3w	58	153	41	61
273B---------- Olmitz	80	2e	72	172	46	69
273C---------- Olmitz	75	3e	57	152	41	61
324C2---------- Dickman, moderately eroded	90	3e	38	126	34	50
324D2---------- Dickman, moderately eroded	90	4e	28	113	31	45
354---------- Aquolls, ponded	100	5w	5	82	22	33
368---------- Macksburg	85	1	95	203	55	81
369---------- Winterset	100	2w	87	192	52	77
370---------- Sharpsburg	95	1	92	199	54	80
370B---------- Sharpsburg	95	2e	87	192	52	77
371C2---------- Sharpsburg, moderately eroded----------	35	3e	64	161	43	64
Nira, moderately eroded	30	3e				
371D2---------- Sharpsburg, moderately eroded----------	50	3e	54	148	40	59
Nira, moderately eroded	20	3e				
421C2---------- Gara, moderately eroded	35	3e	38	126	34	50
Bucknell, moderately eroded----------	35	3e				
421D2---------- Gara, moderately eroded	35	4e	28	113	31	45
Bucknell, moderately eroded----------	30	4e				

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
421E2			18	99	27	40
Gara, moderately eroded	40	6e				
Bucknell, moderately eroded	25	6e				
435			75	176	48	70
Zook, occasionally flooded	40	2w				
Mt. Sterling, occasionally flooded	35	2w				
469C2			30	116	31	46
Lamoni, moderately eroded	35	3e				
Clarinda, moderately eroded	30	4w				
Shelby, moderately eroded	20	3e				
469C3			20	102	28	41
Lamoni, severely eroded	35	4e				
Clarinda, severely eroded	30	6e				
Shelby, severely eroded	20	3e				
470D2			25	109	29	44
Lamoni, moderately eroded	40	4e				
Shelby, moderately eroded	35	3e				
545B			52	145	39	58
Zook	35	2w				
Ely	30	2e				
Gullied land	20	---				
569C			60	156	42	62
Nira	45	3e				
Clearfield	35	3w				
579E3			5	82	22	33
Bucknell, severely eroded	55	7e				
Hedrick, severely eroded	35	6e				
794C2			36	124	33	50
Armstrong, moderately eroded	65	3e				
Ladoga, moderately eroded	30	3e				
822D2	55	4e	15	95	26	38
Lamoni, moderately eroded						
870B	85	2e	87	192	52	77
Sharpsburg, terrace						
870C2	85	3e	67	165	45	66
Sharpsburg, terrace, moderately eroded						

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
870D2---------- Sharpsburg, terrace, moderately eroded	75	3e	62	159	43	64
876B---------- Ladoga, terrace	100	2e	82	186	50	74
876C2---------- Ladoga, terrace, moderately eroded	70	3e	62	159	43	64
876D2---------- Ladoga, terrace, moderately eroded	75	3e	52	145	39	58
2368B----------			90	197	53	79
Macksburg----------	70	2e				
Nira----------	25	2e				
5030. Pits, limestone quarries						
5040---------- Udorthents, loamy	100	---	5	---	---	---
5041. Udorthents, reclaimed						
AW. Animal waste lagoon						
SL. Sewage lagoon						
W. Water						

Land Capability and Yields per Acre of Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-alfalfa hay	Smooth bromegrass	Kentucky bluegrass	Bromegrass-alfalfa
			Tons	AUM*	AUM*	AUM*
7—Wiota, rarely flooded	85	1	6.2	5.9	3.5	7.4
7B—Wiota, rarely flooded	85	2e	6.1	5.8	3.4	7.2
8B—Judson	85	2e	6.0	5.3	3.1	7.1
15B—			5.6	5.7	3.4	6.1
Olmitz	35	2e				
Ely	30	2e				
Zook	20	2w				
16—Nodaway, occasionally flooded	55	2w	5.9	5.6	3.3	7.0
Kennebec, occasionally flooded	35	1				
24C2—Shelby, moderately eroded	85	3e	5.0	4.7	2.8	5.9
24D2—Shelby, moderately eroded	70	3e	4.2	4.0	2.4	5.0
24E—Shelby	60	4e	4.2	4.0	2.3	5.0
24E2—Shelby, moderately eroded	65	4e	3.5	3.3	2.0	4.2
24F—Shelby	65	6e	3.8	3.6	2.1	4.5
43—Bremer, rarely flooded	85	2w	3.6	5.0	2.9	6.2
45B—			3.7	5.0	2.9	6.3
Zook	75	2w				
Ely	20	2e				
54—Zook, occasionally flooded	90	2w	3.6	5.0	2.9	6.2
54+—Zook, occasionally flooded, overwash	80	2w	3.8	5.2	3.0	6.5
76B—Ladoga	95	2e	5.8	5.6	3.3	7.0

See footnote at end of table.

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-alfalfa hay	Smooth bromegrass	Kentucky bluegrass	Bromegrass-alfalfa
			Tons	AUM*	AUM*	AUM*
76C---------- Ladoga	75	3e	5.5	5.2	3.1	6.5
76D---------- Ladoga	85	3e	5.2	5.0	2.9	6.2
76D2---------- Ladoga, moderately eroded	60	3e	4.6	4.4	2.6	5.5
86---------- Mt. Sterling, occasionally flooded---	60	2w	3.7	5.1	3.0	6.4
Zook, occasionally flooded, overwash------	25	2w				
88---------- Nevin, rarely flooded	90	1	5.6	5.8	3.4	7.3
93D2---------- Shelby, moderately eroded----------	35	3e	3.7	3.6	2.1	4.5
Adair, moderately eroded	25	4e				
93E2---------- Shelby, moderately eroded----------	45	4e	3.2	3.1	1.8	3.9
Adair, moderately eroded	30	6e				
172---------- Wabash, frequently ponded, occasionally flooded	90	3w	---	---	---	---
179E---------- Gara	60	6e	3.6	3.5	2.0	4.3
179F---------- Gara	65	6e	3.1	3.0	1.8	3.7
179G---------- Gara	70	7e	2.6	2.4	1.4	3.0
192D2---------- Adair, moderately eroded	55	4e	3.2	3.3	2.0	4.2
220---------- Nodaway, occasionally flooded	80	2w	5.9	5.6	3.3	7.0
222C2---------- Clarinda, moderately eroded	75	4w	2.3	3.2	1.9	4.0
222D---------- Clarinda	75	4w	2.5	3.4	2.0	4.3
222D2---------- Clarinda, moderately eroded	70	4e	2.0	2.8	1.6	3.5

See footnote at end of table.

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-alfalfa hay	Smooth bromegrass	Kentucky bluegrass	Bromegrass-alfalfa
			Tons	AUM*	AUM*	AUM*
222D3--- Clarinda, severely eroded	70	6e	1.5	2.1	1.2	2.6
248--- Wabash, occasionally ponded, occasionally flooded	85	3w	---	---	---	---
269--- Humeston, occasionally flooded	100	3w	3.0	4.2	2.4	5.2
273B--- Olmitz	80	2e	5.4	5.3	3.1	6.6
273C--- Olmitz	75	3e	5.4	5.1	3.0	6.4
324C2--- Dickman, moderately eroded	90	3e	3.7	3.5	2.1	4.4
324D2--- Dickman, moderately eroded	90	4e	3.3	3.2	1.9	3.9
354--- Aquolls, ponded	100	5w	---	---	---	---
368--- Macksburg	85	1	6.0	6.3	3.7	7.8
369--- Winterset	100	2w	4.3	5.9	3.5	7.4
370--- Sharpsburg	95	1	6.4	6.1	3.6	7.6
370B--- Sharpsburg	95	2e	6.2	5.9	3.5	7.4
371C2--- Sharpsburg, moderately eroded---			5.7	5.5	3.2	6.8
	35	3e				
Nira, moderately eroded	30	3e				
371D2--- Sharpsburg, moderately eroded---			5.3	5.0	3.0	6.3
	50	3e				
Nira, moderately eroded	20	3e				
421C2--- Gara, moderately eroded			3.7	3.5	2.1	4.4
	35	3e				
Bucknell, moderately eroded---	35	3e				

See footnote at end of table.

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-alfalfa hay	Smooth bromegrass	Kentucky bluegrass	Bromegrass-alfalfa
			Tons	AUM*	AUM*	AUM*
421D2			3.3	3.2	1.9	4.0
Gara, moderately eroded	35	4e				
Bucknell, moderately eroded	30	4e				
421E2			2.6	2.5	1.5	3.1
Gara, moderately eroded	40	6e				
Bucknell, moderately eroded	25	6e				
435			3.7	5.0	3.0	6.3
Zook, occasionally flooded	40	2w				
Mt. Sterling, occasionally flooded	35	2w				
469C2			3.5	3.6	2.1	4.5
Lamoni, moderately eroded	35	3e				
Clarinda, moderately eroded	30	4w				
Shelby, moderately eroded	20	3e				
469C3			2.8	2.9	1.7	3.7
Lamoni, severely eroded	35	4e				
Clarinda, severely eroded	30	6e				
Shelby, severely eroded	20	3e				
470D2			3.3	3.4	2.0	4.3
Lamoni, moderately eroded	40	4e				
Shelby, moderately eroded	35	3e				
545B			4.9	4.7	2.8	5.9
Zook	35	2w				
Ely	30	2e				
Gullied land	20	---				
569C			5.3	5.0	2.9	6.3
Nira	45	3e				
Clearfield	35	3w				
579E3			2.0	2.1	1.2	2.7
Bucknell, severely eroded	55	7e				
Hedrick, severely eroded	35	6e				
794C2			3.5	3.6	2.1	4.6
Armstrong, moderately eroded	65	3e				
Ladoga, moderately eroded	30	3e				
822D2	55	4e	3.1	3.3	1.9	4.1
Lamoni, moderately eroded						

See footnote at end of table.

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-alfalfa hay	Smooth bromegrass	Kentucky bluegrass	Bromegrass-alfalfa
			Tons	AUM*	AUM*	AUM*
870B---------- Sharpsburg, terrace	85	2e	6.3	6.0	3.5	7.5
870C2---------- Sharpsburg, terrace, moderately eroded	85	3e	5.8	5.5	3.2	6.9
870D2---------- Sharpsburg, terrace, moderately eroded	75	3e	5.3	5.1	3.0	6.4
876B---------- Ladoga, terrace	100	2e	5.9	5.6	3.3	7.0
876C2---------- Ladoga, terrace, moderately eroded	70	3e	5.2	5.0	2.9	6.2
876D2---------- Ladoga, terrace, moderately eroded	75	3e	4.9	4.7	2.8	5.9
2368B----------			5.7	6.0	3.5	7.5
Macksburg----------	70	2e				
Nira----------	25	2e				
5030. Pits, limestone quarries						
5040. Udorthents, loamy						
5041. Udorthents, reclaimed						
AW. Animal waste lagoon						
SL. Sewage lagoon						
W. Water						

* Animal unit month: The amount of forage required to feed one mature cow, of approximately 1,000 pounds weight, with or without a calf, for 30 days.

Prime Farmland and Other Important Farmland

The table “Prime Farmland and Other Important Farmland” lists the map units in the survey area that are considered prime farmland and farmland of statewide importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation’s food supply.

Prime farmland is of major importance in meeting the Nation’s short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation’s prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

For some soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

In some areas, land that does not meet the criteria for prime farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

Prime Farmland and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland. If a soil is prime or important farmland only under certain conditions, such as "where drained," those conditions are specified)

Map symbol	Map unit name	Farmland classification
7	Wiota silty clay loam, 0 to 2 percent slopes, rarely flooded	Prime farmland
7B	Wiota silty clay loam, 2 to 5 percent slopes, rarely flooded	Prime farmland
8B	Judson silty clay loam, 2 to 5 percent slopes	Prime farmland
15B	Olmitz-Ely-Zook complex, 2 to 5 percent slopes	Prime farmland where drained
16	Nodaway-Kennebec complex, 0 to 2 percent slopes, occasionally flooded	Prime farmland
24C2	Shelby clay loam, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
24D2	Shelby clay loam, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
24E	Shelby clay loam, 14 to 18 percent slopes	Farmland of statewide importance
24E2	Shelby clay loam, 14 to 18 percent slopes, moderately eroded	Farmland of statewide importance
43	Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded	Prime farmland where drained
45B	Zook-Ely complex, 2 to 5 percent slopes	Prime farmland where drained
54	Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained
54+	Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	Prime farmland where drained
76B	Ladoga silt loam, 2 to 5 percent slopes	Prime farmland
76C	Ladoga silt loam, 5 to 9 percent slopes	Farmland of statewide importance
76D	Ladoga silt loam, 9 to 14 percent slopes	Farmland of statewide importance
76D2	Ladoga silt loam, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
86	Mt. Sterling-Zook, overwash, complex, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
88	Nevin silt loam, 0 to 2 percent slopes, rarely flooded	Prime farmland
93D2	Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
93E2	Shelby-Adair complex, 14 to 18 percent slopes, moderately eroded	Farmland of statewide importance
172	Wabash silty clay, frequently ponded, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
179E	Gara loam, 14 to 18 percent slopes	Farmland of statewide importance
192D2	Adair clay loam, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
220	Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland
222C2	Clarinda silty clay loam, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
222D	Clarinda silty clay loam, 9 to 14 percent slopes	Farmland of statewide importance
222D2	Clarinda silty clay loam, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
248	Wabash silty clay loam, occasionally ponded, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
269	Humeston silt loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
273B	Olmitz loam, 2 to 5 percent slopes	Prime farmland
273C	Olmitz loam, 5 to 9 percent slopes	Farmland of statewide importance
324C2	Dickman fine sandy loam, loamy substratum, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
324D2	Dickman fine sandy loam, loamy substratum, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
368	Macksburg silty clay loam, 0 to 2 percent slopes	Prime farmland
369	Winterset silty clay loam, 0 to 2 percent slopes	Prime farmland where drained
370	Sharpsburg silty clay loam, 0 to 2 percent slopes	Prime farmland

Prime Farmland and Other Important Farmland--Continued

Map symbol	Map unit name	Farmland classification
370B	Sharpsburg silty clay loam, 2 to 5 percent slopes	Prime farmland
371C2	Sharpsburg-Nira complex, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
421D2	Gara-Bucknell complex, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
421E2	Gara-Bucknell complex, 14 to 18 percent slopes, moderately eroded	Farmland of statewide importance
435	Zook-Mt. Sterling complex, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
469C2	Lamoni-Clarinda-Shelby complex, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
470D2	Lamoni-Shelby complex, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
569C	Nira-Clearfield complex, 5 to 9 percent slopes	Farmland of statewide importance
794C2	Armstrong-Ladoga complex, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
822D2	Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
870B	Sharpsburg silty clay loam, terrace, 1 to 5 percent slopes	Prime farmland
870C2	Sharpsburg silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
870D2	Sharpsburg silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
876B	Ladoga silt loam, terrace, 1 to 5 percent slopes	Prime farmland
876C2	Ladoga silt loam, terrace, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance
876D2	Ladoga silt loam, terrace, 9 to 14 percent slopes, moderately eroded	Farmland of statewide importance
2368B	Macksburg-Nira complex, 2 to 5 percent slopes	Prime farmland

Agricultural Waste Management

The table “Agricultural Waste Management” is described in this section.

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

This table shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability,

depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

A soil feature considered in the ratings for application of manure, sewage sludge, and wastewater is depth to the top of a water table (saturated zone). During August, September, and October, this depth is generally more than 60 cm in normal years. For soils that are limited by wetness, “Nov-Jul” indicates the most problematic months of the year for application of manure, sewage sludge, and wastewater. These soils may be slow to drain and can become waterlogged and boggy during periods of heavy precipitation.

Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Somewhat limited Too acid	 0.03	Somewhat limited Flooding Too acid	 0.40 0.14	Somewhat limited Too acid	 0.14
7B:							
Wiota, rarely flooded	85	Somewhat limited Too acid	 0.03	Somewhat limited Flooding Too acid	 0.40 0.14	Somewhat limited Too acid Too steep for surface application	 0.14 0.08
8B:							
Judson	85	Not limited		Not limited		Somewhat limited Too steep for surface application	 0.08
15B:							
Olmitz	35	Not limited		Not limited		Somewhat limited Too steep for surface application	 0.08
Ely	30	Very limited Depth to saturated zone (Nov-Jul)	 1.00	Very limited Depth to saturated zone (Nov-Jul)	 1.00	Very limited Depth to saturated zone (Nov-Jul) Too steep for surface application	 1.00 0.08
Zook	20	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Leaching	 1.00 1.00 0.50	Very limited Slow water movement Depth to saturated zone (Nov-Jul)	 1.00 1.00	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too steep for surface application	 1.00 1.00 0.08
16:							
Nodaway, occasionally flooded	55	Somewhat limited Flooding	 0.60	Very limited Flooding	 1.00	Somewhat limited Flooding	 0.60
Kennebec, occasionally flooded	35	Somewhat limited Flooding	 0.60	Very limited Flooding	 1.00	Somewhat limited Flooding	 0.60

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24C2:							
Shelby, moderately eroded	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	0.92
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
						Too acid	0.07
24D2:							
Shelby, moderately eroded	70	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.64	Slope	0.63	Too steep for surface application	1.00
		Slope	0.63	Slow water movement	0.50	Too steep for sprinkler application	0.78
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
24E:							
Shelby	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for sprinkler application	1.00
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
24E2:							
Shelby, moderately eroded	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for sprinkler application	1.00
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
24F:							
Shelby	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for sprinkler application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	1.00
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43:							
Bremer, rarely flooded	85	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slow water movement	0.30	Flooding	0.40	Slow water movement	0.22
				Slow water movement	0.22		
45B:							
Zook	75	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Leaching	0.50			Too steep for surface application	0.08
Ely	20	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.08
54:							
Zook, occasionally flooded	90	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60
54+:							
Zook, occasionally flooded, overwash	80	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60
76B:							
Ladoga	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22
						Too steep for surface application	0.08

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
76C:							
Ladoga	75	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22	Too steep for surface application	0.92
						Slow water movement	0.22
						Too steep for sprinkler application	0.02
76D:							
Ladoga	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Slow water movement	0.30	Slow water movement	0.22		
						Too steep for sprinkler application	0.78
						Slow water movement	0.22
76D2:							
Ladoga, moderately eroded	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Slow water movement	0.30	Slow water movement	0.22		
						Too steep for sprinkler application	0.78
						Slow water movement	0.22
86:							
Mt. Sterling, occasionally flooded	60	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60
Zook, occasionally flooded, overwash	25	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
88:							
Nevin, rarely flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
				Flooding	0.40		
93D2:							
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.64	Slope	0.63	Too steep for surface application	1.00
		Slope	0.63	Slow water movement	0.50		
		Too acid	0.02	Too acid	0.07	Too steep for sprinkler application	0.78
						Slow water movement	0.50
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
93E2:							
Shelby, moderately eroded	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.64	Slow water movement	0.50		
		Too acid	0.02	Too acid	0.07	Too steep for sprinkler application	1.00
						Slow water movement	0.50
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Ponding	1.00	Flooding	1.00	Ponding	1.00
179E:							
Gara	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for sprinkler application	1.00
						Slow water movement	0.50
179F:							
Gara	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for sprinkler application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	1.00
						Slow water movement	0.50
179G:							
Gara	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for sprinkler application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	1.00
						Slow water movement	0.50
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Strongly contrasting textural stratification	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Strongly contrasting textural stratification	1.00	Depth to saturated zone (Nov-Jul)	1.00	Too steep for surface application	1.00

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
220: Nodaway, occasionally flooded	80	Somewhat limited Flooding	0.60	Very limited Flooding	1.00	Somewhat limited Flooding	0.60
222C2: Clarinda, moderately eroded	75	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Runoff	1.00 1.00 0.40	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too acid	1.00 1.00 0.07	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too steep for surface application	1.00 1.00 0.92
222D: Clarinda	75	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too steep for surface application	1.00 1.00 1.00
222D2: Clarinda, moderately eroded	70	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too steep for surface application	1.00 1.00 1.00
222D3: Clarinda, severely eroded	70	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Slope	1.00 1.00 0.63	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Too steep for surface application	1.00 1.00 1.00

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
248:							
Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Ponding	1.00	Flooding	1.00	Ponding	1.00
269:							
Humeston, occasionally flooded	100	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60
273B:							
Olmitz	80	Not limited		Not limited		Somewhat limited	
						Too steep for surface application	0.08
273C:							
Olmitz	75	Not limited		Not limited		Somewhat limited	
						Too steep for surface application	0.92
						Too steep for sprinkler application	0.02
324C2:							
Dickman, moderately eroded	90	Very limited		Very limited		Very limited	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Leaching	0.45			Too steep for surface application	0.92
						Too steep for sprinkler application	0.02

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
324D2:							
Dickman, moderately eroded	90	Very limited		Very limited		Very limited	
		Filtering capacity	1.00	Filtering capacity	1.00	Filtering capacity	1.00
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Leaching	0.45			Too steep for sprinkler application	0.78
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22
369:							
Winterset	100	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22
370:							
Sharpsburg	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Too acid	0.42	Too acid	0.42
		Too acid	0.11	Slow water movement	0.22	Slow water movement	0.22
370B:							
Sharpsburg	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Too acid	0.42	Too acid	0.42
		Too acid	0.11	Slow water movement	0.22	Slow water movement	0.22
						Too steep for surface application	0.08
371C2:							
Sharpsburg, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Too acid	0.42	Too steep for surface application	0.92
		Too acid	0.11	Slow water movement	0.22	Too acid	0.42
						Slow water movement	0.22

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:							
Nira, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.92
						Too steep for sprinkler application	0.02
371D2:							
Sharpsburg, moderately eroded	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Slow water movement	0.30	Too acid	0.42		
		Too acid	0.11	Slow water movement	0.22	Too steep for sprinkler application	0.78
						Too acid	0.42
Nira, moderately eroded	20	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Too steep for surface application	1.00
		Slope	0.63	Slope	0.63	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for sprinkler application	0.78
421C2:							
Gara, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	0.92
						Slow water movement	0.50
						Too steep for sprinkler application	0.02
Bucknell, moderately eroded	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Runoff	0.40	Too acid	0.55	Too steep for surface application	0.92

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421D2:							
Gara, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.64	Slope	0.63	Too steep for surface application	1.00
		Slope	0.63	Slow water movement	0.50	Too steep for sprinkler application	0.78
						Slow water movement	0.50
Bucknell, moderately eroded	30	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
421E2:							
Gara, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.64	Slow water movement	0.50	Too steep for sprinkler application	1.00
						Slow water movement	0.50
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
435:							
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Flooding	0.60	Flooding	1.00	Flooding	0.60
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Too acid	0.02	Too acid	0.07	Too steep for surface application	0.92
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Runoff	0.40	Too acid	0.07	Too steep for surface application	0.92
Shelby, moderately eroded	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	0.92
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
						Too acid	0.07
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Too acid	0.02	Too acid	0.07	Too steep for surface application	0.92

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Runoff	0.40	Too acid	0.07	Too steep for surface application	0.92
Shelby, severely eroded	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.64	Slow water movement	0.50	Too steep for surface application	0.92
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
						Too acid	0.07
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.64	Slope	0.63	Too steep for surface application	1.00
		Slope	0.63	Slow water movement	0.50	Too steep for sprinkler application	0.78
		Too acid	0.02	Too acid	0.07	Slow water movement	0.50
545B:							
Zook	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Leaching	0.50			Too steep for surface application	0.08

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
545B:							
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.08
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.92
						Too steep for sprinkler application	0.02
Clearfield	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.92
579E3:							
Bucknell, severely eroded	55	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
Hedrick, severely eroded	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Too steep for sprinkler application	1.00

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
794C2:							
Armstrong, moderately eroded--	65	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.92
Ladoga, moderately eroded----------	30	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22	Too steep for surface application	0.92
						Slow water movement	0.22
						Too steep for sprinkler application	0.02
822D2:							
Lamoni, moderately eroded----------	55	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
870B:							
Sharpsburg, terrace	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Too acid	0.42	Too acid	0.42
		Too acid	0.11	Slow water movement	0.22	Slow water movement	0.22
870C2:							
Sharpsburg, terrace, moderately eroded--	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Too acid	0.42	Too steep for surface application	0.92
		Too acid	0.11	Slow water movement	0.22		
						Too acid	0.42
						Slow water movement	0.22

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
870D2:							
Sharpsburg, terrace, moderately eroded--	75	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Slow water movement	0.30	Too acid	0.42		
		Too acid	0.11	Slow water movement	0.22	Too steep for sprinkler application	0.78
						Too acid	0.42
876B:							
Ladoga, terrace-----	100	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22
876C2:							
Ladoga, terrace, moderately eroded--	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22	Too steep for surface application	0.92
						Slow water movement	0.22
						Too steep for sprinkler application	0.02
876D2:							
Ladoga, terrace, moderately eroded--	75	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Slow water movement	0.30	Slow water movement	0.22	Too steep for sprinkler application	0.78
						Slow water movement	0.22
2368B:							
Macksburg----------	70	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
		Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22
						Too steep for surface application	0.08
Nira----------	25	Very limited		Very limited		Very limited	
		Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
						Too steep for surface application	0.08

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
5030:							
Pits, limestone quarries	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon	100	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	

Recreational Development

The titles of the tables described in this section are:

- "Camp Areas, Picnic Areas, and Playgrounds"
- "Paths, Trails, and Golf Fairways"

In the tables described in this section, the soils of the survey area are rated according to limitations that affect their suitability for recreational development. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in these tables can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption fields.

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 ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and

not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Camp Areas, Picnic Areas, and Playgrounds

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Very limited Flooding	 1.00	Not limited		Not limited	
7B:							
Wiota, rarely flooded	85	Very limited Flooding	 1.00	Not limited		Somewhat limited Slope	 0.50
8B:							
Judson	85	Not limited		Not limited		Somewhat limited Slope	 0.50
15B:							
Olmitz	35	Not limited		Not limited		Somewhat limited Slope	 0.50
Ely	30	Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone Slope	 1.00 0.50
Zook	20	Very limited Depth to saturated zone Slow water movement	 1.00 0.99	Very limited Depth to saturated zone Slow water movement	 1.00 0.99	Very limited Depth to saturated zone Slow water movement Slope	 1.00 0.99 0.50
16:							
Nodaway, occasionally flooded	55	Very limited Flooding	 1.00	Not limited		Somewhat limited Flooding	 0.60
Kennebec, occasionally flooded	35	Very limited Flooding	 1.00	Not limited		Somewhat limited Flooding	 0.60
24C2:							
Shelby, moderately eroded	85	Somewhat limited Slow water movement	 0.35	Somewhat limited Slow water movement	 0.35	Very limited Slope Slow water movement	 1.00 0.35
24D2:							
Shelby, moderately eroded	70	Somewhat limited Slope Slow water movement	 0.63 0.35	Somewhat limited Slope Slow water movement	 0.63 0.35	Very limited Slope Slow water movement	 1.00 0.35

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24E:							
Shelby	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
24E2:							
Shelby, moderately eroded	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
24F:							
Shelby	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
43:							
Bremer, rarely flooded	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.15	Slow water movement	0.15
		Slow water movement	0.15				
45B:							
Zook	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.99	Slow water movement	0.99	Slow water movement	0.99
						Slope	0.50
Ely	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	0.50
54:							
Zook, occasionally flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60
54+:							
Zook, occasionally flooded, overwash	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
76B:							
Ladoga	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	0.50
						Slow water movement	0.15
76C:							
Ladoga	75	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	1.00
						Slow water movement	0.15
76D:							
Ladoga	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
76D2:							
Ladoga, moderately eroded	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
86:							
Mt. Sterling, occasionally flooded	60	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60
Zook, occasionally flooded, overwash	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60
88:							
Nevin, rarely flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00				
93D2:							
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93D2:							
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	1.00
93E2:							
Shelby, moderately eroded	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Flooding	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Too clayey	1.00	Too clayey	1.00
179E:							
Gara	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
179F:							
Gara	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
179G:							
Gara	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	1.00
220:							
Nodaway, occasionally flooded	80	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
222C2:							
Clarinda, moderately eroded	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
						Slope	1.00
222D:							
Clarinda	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	1.00
222D2:							
Clarinda, moderately eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	1.00
222D3:							
Clarinda, severely eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Too clayey	1.00	Slope	1.00
248:							
Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Flooding	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Ponding	1.00	Ponding	1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
269:							
Humeston, occasionally flooded	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Flooding	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00			Flooding	0.60
273B:							
Olmitz	80	Not limited		Not limited		Somewhat limited	
						Slope	0.50
273C:							
Olmitz	75	Not limited		Not limited		Very limited	
						Slope	1.00
324C2:							
Dickman, moderately eroded	90	Not limited		Not limited		Very limited	
						Slope	1.00
324D2:							
Dickman, moderately eroded	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
369:							
Winterset	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
370:							
Sharpsburg	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
370B:							
Sharpsburg	95	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	0.50
						Slow water movement	0.15

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:							
Sharpsburg, moderately eroded--	35	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	1.00
						Slow water movement	0.15
Nira, moderately eroded----------	30	Somewhat limited		Somewhat limited		Very limited	
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope	1.00
						Depth to saturated zone	0.39
371D2:							
Sharpsburg, moderately eroded--	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
Nira, moderately eroded----------	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Depth to saturated zone	0.39
421C2:							
Gara, moderately eroded----------	35	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.35	Slow water movement	0.35	Slope	1.00
						Slow water movement	0.35
Bucknell, moderately eroded----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
						Slope	1.00
421D2:							
Gara, moderately eroded----------	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
Bucknell, moderately eroded----------	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421E2:							
Gara, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.99	Slow water movement	0.99
		Slow water movement	0.99			Flooding	0.60
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
						Slope	1.00
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
						Slope	1.00
Shelby, moderately eroded	20	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.35	Slow water movement	0.35	Slope	1.00
						Slow water movement	0.35

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
						Slope	1.00
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Too clayey	1.00	Slope	1.00
Shelby, severely eroded	20	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.35	Slow water movement	0.35	Slope	1.00
						Slow water movement	0.35
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	1.00
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.35	Slow water movement	0.35	Slow water movement	0.35
545B:							
Zook	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.99	Slow water movement	0.99	Slow water movement	0.99
						Slope	0.50
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	0.50
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Somewhat limited		Somewhat limited		Very limited	
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope	1.00
						Depth to saturated zone	0.39

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
569C:							
Clearfield----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	1.00
579E3:							
Bucknell, severely eroded----------	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
Hedrick, severely eroded----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Depth to saturated zone	0.39
794C2:							
Armstrong, moderately eroded--	65	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.99	Slow water movement	0.99	Slope	1.00
						Slow water movement	0.99
Ladoga, moderately eroded----------	30	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	1.00
						Slow water movement	0.15
822D2:							
Lamoni, moderately eroded----------	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	1.00
870B:							
Sharpsburg, terrace	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
						Slope	0.12
870C2:							
Sharpsburg, terrace, moderately eroded--	85	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	1.00
						Slow water movement	0.15

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
870D2:							
Sharpsburg, terrace, moderately eroded--	75	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
876B:							
Ladoga, terrace-----	100	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
						Slope	0.12
876C2:							
Ladoga, terrace, moderately eroded--	70	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.15	Slow water movement	0.15	Slope	1.00
						Slow water movement	0.15
876D2:							
Ladoga, terrace, moderately eroded--	75	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slow water movement	0.15
2368B:							
Macksburg----------	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.15	Slow water movement	0.15	Slope	0.50
						Slow water movement	0.15
Nira----------	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope	0.50
						Depth to saturated zone	0.39
5030:							
Pits, limestone quarries----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:							
Water	100	Not rated		Not rated		Not rated	

Paths, Trails, and Golf Fairways

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Not limited		Not limited		Not limited	
7B:							
Wiota, rarely flooded	85	Not limited		Not limited		Not limited	
8B:							
Judson	85	Not limited		Not limited		Not limited	
15B:							
Olmitz	35	Not limited		Not limited		Not limited	
Ely	30	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Zook	20	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
16:							
Nodaway, occasionally flooded	55	Not limited		Not limited		Somewhat limited Flooding	0.60
Kennebec, occasionally flooded	35	Not limited		Not limited		Somewhat limited Flooding	0.60
24C2:							
Shelby, moderately eroded	85	Not limited		Not limited		Not limited	
24D2:							
Shelby, moderately eroded	70	Not limited		Not limited		Somewhat limited Slope	0.63
24E:							
Shelby	60	Somewhat limited Slope	0.02	Not limited		Very limited Slope	1.00
24E2:							
Shelby, moderately eroded	65	Somewhat limited Slope	0.02	Not limited		Very limited Slope	1.00
24F:							
Shelby	65	Somewhat limited Slope	0.82	Not limited		Very limited Slope	1.00

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
43:							
Bremer, rarely flooded	85	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
45B:							
Zook	75	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Ely	20	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
54:							
Zook, occasionally flooded	90	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60
54+:							
Zook, occasionally flooded, overwash	80	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60
76B:							
Ladoga	95	Not limited		Not limited		Not limited	
76C:							
Ladoga	75	Not limited		Not limited		Not limited	
76D:							
Ladoga	85	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Slope	0.63
76D2:							
Ladoga, moderately eroded	60	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Slope	0.63
86:							
Mt. Sterling, occasionally flooded	60	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60
Zook, occasionally flooded, overwash	25	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
88:							
Nevin, rarely flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
93D2:							
Shelby, moderately eroded	35	Not limited		Not limited		Somewhat limited	
						Slope	0.63
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	0.63
93E2:							
Shelby, moderately eroded	45	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.02			Slope	1.00
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Too clayey	1.00	Too clayey	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
179E:							
Gara	60	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
179F:							
Gara	65	Somewhat limited		Not limited		Very limited	
		Slope	0.82			Slope	1.00
179G:							
Gara	70	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.56	Slope	1.00
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	0.63

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
220: Nodaway, occasionally flooded	80	Not limited		Not limited		Somewhat limited Flooding	0.60
222C2: Clarinda, moderately eroded	75	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
222D: Clarinda	75	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Slope	1.00 0.63
222D2: Clarinda, moderately eroded	70	Very limited Depth to saturated zone Water erosion	1.00 1.00	Very limited Depth to saturated zone Water erosion	1.00 1.00	Very limited Depth to saturated zone Slope	1.00 0.63
222D3: Clarinda, severely eroded	70	Very limited Depth to saturated zone Too clayey	1.00 1.00	Very limited Depth to saturated zone Too clayey	1.00 1.00	Very limited Depth to saturated zone Too clayey Slope	1.00 1.00 0.63
248: Wabash, occasionally ponded, occasionally flooded	85	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding Flooding	1.00 1.00 0.60
269: Humeston, occasionally flooded	100	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60
273B: Olmitz	80	Not limited		Not limited		Not limited	
273C: Olmitz	75	Not limited		Not limited		Not limited	
324C2: Dickman, moderately eroded	90	Not limited		Not limited		Not limited	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
324D2:							
Dickman, moderately eroded	90	Not limited		Not limited		Somewhat limited Slope	0.63
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
369:							
Winterset	100	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
370:							
Sharpsburg	95	Not limited		Not limited		Not limited	
370B:							
Sharpsburg	95	Not limited		Not limited		Not limited	
371C2:							
Sharpsburg, moderately eroded	35	Not limited		Not limited		Not limited	
Nira, moderately eroded	30	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
371D2:							
Sharpsburg, moderately eroded	50	Not limited		Not limited		Somewhat limited Slope	0.63
Nira, moderately eroded	20	Not limited		Not limited		Somewhat limited Slope Depth to saturated zone	0.63 0.19
421C2:							
Gara, moderately eroded	35	Not limited		Not limited		Not limited	
Bucknell, moderately eroded	35	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
421D2:							
Gara, moderately eroded	35	Not limited		Not limited		Somewhat limited Slope	0.63

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421D2:							
Bucknell, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Slope	0.63
421E2:							
Gara, moderately eroded	40	Somewhat limited		Not limited		Very limited	
		Slope	0.02			Slope	1.00
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.02			Slope	1.00
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Flooding	0.60
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
						Flooding	0.60
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Shelby, moderately eroded	20	Not limited		Not limited		Not limited	
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Too clayey	1.00	Too clayey	1.00
Shelby, severely eroded	20	Not limited		Not limited		Not limited	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
470D2:							
Lamoni, moderately eroded	40	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Slope	1.00 0.63
Shelby, moderately eroded	35	Not limited		Not limited		Somewhat limited Slope	0.63
545B:							
Zook	35	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Ely	30	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Clearfield	35	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
579E3:							
Bucknell, severely eroded	55	Very limited Depth to saturated zone Slope	1.00 0.02	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Slope	1.00 1.00
Hedrick, severely eroded	35	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to saturated zone	1.00 0.19
794C2:							
Armstrong, moderately eroded	65	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Ladoga, moderately eroded	30	Not limited		Not limited		Not limited	
822D2:							
Lamoni, moderately eroded	55	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Slope	1.00 0.63

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
870B:							
Sharpsburg, terrace	85	Not limited		Not limited		Not limited	
870C2:							
Sharpsburg, terrace, moderately eroded--	85	Not limited		Not limited		Not limited	
870D2:							
Sharpsburg, terrace, moderately eroded--	75	Not limited		Not limited		Somewhat limited Slope	0.63
876B:							
Ladoga, terrace-----	100	Not limited		Not limited		Not limited	
876C2:							
Ladoga, terrace, moderately eroded--	70	Not limited		Not limited		Not limited	
876D2:							
Ladoga, terrace, moderately eroded--	75	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Slope	0.63
2368B:							
Macksburg----------	70	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Nira----------	25	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
5030:							
Pits, limestone quarries----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading "Soil Properties."

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 between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, reclamation material, roadfill, and topsoil; plan structures for water management; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary, which is in Part I of this publication.

Building Site Development

The titles of the tables described in this section are:

- "Dwellings and Small Commercial Buildings"
- "Roads and Streets, Shallow Excavations, and Lawns and Landscaping"

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The tables described in this section show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

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 soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Dwellings and Small Commercial Buildings

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
7B:							
Wiota, rarely flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
8B:							
Judson	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
15B:							
Olmitz	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Zook	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
16:							
Nodaway, occasionally flooded	55	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
Kennebec, occasionally flooded	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24C2:							
Shelby, moderately eroded	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
24D2:							
Shelby, moderately eroded	70	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
24E:							
Shelby	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
24E2:							
Shelby, moderately eroded	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
24F:							
Shelby	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
43:							
Bremer, rarely flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
45B:							
Zook	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
Ely	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
54:							
Zook, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54+:							
Zook, occasionally flooded, overwash--	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
76B:							
Ladoga----------	95	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.61		
76C:							
Ladoga----------	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.61	Slope	0.88
76D:							
Ladoga----------	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
				Depth to saturated zone	0.61		
76D2:							
Ladoga, moderately eroded----------	60	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
				Depth to saturated zone	0.61		
86:							
Mt. Sterling, occasionally flooded----------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	1.00	Shrink-swell	0.50
Zook, occasionally flooded, overwash--	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
88:							
Nevin, rarely flooded----------	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93D2:							
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
						Depth to saturated zone	1.00
		Shrink-swell	0.73	Shrink-swell	0.73	Shrink-swell	0.73
		Slope	0.63	Slope	0.63		
93E2:							
Shelby, moderately eroded	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
						Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00		
		Shrink-swell	0.73	Shrink-swell	0.73	Shrink-swell	0.73
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
179E:							
Gara	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
179F:							
Gara	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
179G:							
Gara	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
						Depth to saturated zone	1.00
		Shrink-swell	0.73	Shrink-swell	0.73	Shrink-swell	0.73
		Slope	0.63	Slope	0.63		

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
220: Nodaway, occasionally flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
222C2: Clarinda, moderately eroded	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.88
222D: Clarinda	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
222D2: Clarinda, moderately eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
222D3: Clarinda, severely eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
248: Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
269: Humeston, occasionally flooded	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
273B:							
Olmitz	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	0.61	Shrink-swell	0.50
				Shrink-swell	0.50		
273C:							
Olmitz	75	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	0.61	Slope	0.88
				Shrink-swell	0.50	Shrink-swell	0.50
324C2:							
Dickman, moderately eroded	90	Not limited		Not limited		Somewhat limited	
						Slope	0.88
324D2:							
Dickman, moderately eroded	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
369:							
Winterset	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
370:							
Sharpsburg	95	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50		
370B:							
Sharpsburg	95	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50		
371C2:							
Sharpsburg, moderately eroded	35	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50	Slope	0.88

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:							
Nira, moderately eroded	30	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	1.00	Slope	0.88
		Depth to saturated zone	0.39	Shrink-swell	0.50	Shrink-swell	0.50
						Depth to saturated zone	0.39
371D2:							
Sharpsburg, moderately eroded	50	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Slope	0.63	Slope	1.00
		Slope	0.63	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50		
Nira, moderately eroded	20	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	0.50	Slope	0.63	Shrink-swell	0.50
		Depth to saturated zone	0.39	Shrink-swell	0.50	Depth to saturated zone	0.39
421C2:							
Gara, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
Bucknell, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	0.78	Shrink-swell	1.00
						Slope	0.88
421D2:							
Gara, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Bucknell, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	0.78	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
421E2:							
Gara, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421E2:							
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	1.00	Slope	1.00	Depth to saturated zone	1.00
		Slope	1.00	Shrink-swell	0.78	Shrink-swell	1.00
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	1.00	Shrink-swell	0.50
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.88
Shelby, moderately eroded	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.88

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Shelby, severely eroded	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
545B:							
Zook	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	1.00	Slope	0.88
		Depth to saturated zone	0.39	Shrink-swell	0.50	Shrink-swell	0.50
						Depth to saturated zone	0.39
Clearfield	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
579E3:							
Bucknell, severely eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Hedrick, severely eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Slope	1.00
		Shrink-swell	0.50	Slope	1.00	Shrink-swell	0.50
		Depth to saturated zone	0.39	Shrink-swell	0.50	Depth to saturated zone	0.39

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
794C2:							
Armstrong, moderately eroded--	65	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.88
						Shrink-swell	0.50
Ladoga, moderately eroded----------	30	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.61	Slope	0.88
822D2:							
Lamoni, moderately eroded----------	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to saturated zone	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
870B:							
Sharpsburg, terrace	85	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50		
870C2:							
Sharpsburg, terrace, moderately eroded--	85	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50	Slope	0.88
870D2:							
Sharpsburg, terrace, moderately eroded--	75	Very limited		Somewhat limited		Very limited	
		Shrink-swell	1.00	Slope	0.63	Slope	1.00
		Slope	0.63	Depth to saturated zone	0.61	Shrink-swell	1.00
				Shrink-swell	0.50		
876B:							
Ladoga, terrace-----	100	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.61		
876C2:							
Ladoga, terrace, moderately eroded--	70	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.61	Slope	0.88

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
876D2:							
Ladoga, terrace, moderately eroded--	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
				Depth to saturated zone	0.61		
2368B:							
Macksburg----------	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
Nira----------	25	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	1.00	Shrink-swell	0.50
		Depth to saturated zone	0.39	Shrink-swell	0.50	Depth to saturated zone	0.39
5030:							
Pits, limestone quarries----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00				
		Shrink-swell	0.50	Cutbanks cave	0.10		
7B:							
Wiota, rarely flooded	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00				
		Shrink-swell	0.50	Cutbanks cave	0.10		
8B:							
Judson	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
		Shrink-swell	0.50				
15B:							
Olmitz	35	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	0.50				
		Frost action	0.50	Cutbanks cave	0.10		
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
Zook	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00	Too clayey	0.01		
16:							
Nodaway, occasionally flooded	55	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	0.61	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00	Cutbanks cave	0.10		
Kennebec, occasionally flooded	35	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	0.61	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00	Cutbanks cave	0.10		

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24C2:							
Shelby, moderately eroded	85	Somewhat limited		Somewhat limited		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
24D2:							
Shelby, moderately eroded	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
24E:							
Shelby	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
24E2:							
Shelby, moderately eroded	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
24F:							
Shelby	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
43:							
Bremer, rarely flooded	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
45B:							
Zook	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00	Too clayey	0.01		
Ely	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
54:							
Zook, occasionally flooded	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54+:							
Zook, occasionally flooded, overwash--	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
76B:							
Ladoga----------	95	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
76C:							
Ladoga----------	75	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
76D:							
Ladoga----------	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	1.00	Depth to saturated zone	0.61		
		Slope	0.63	Cutbanks cave	0.10		
76D2:							
Ladoga, moderately eroded----------	60	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	1.00	Depth to saturated zone	0.61		
		Slope	0.63	Cutbanks cave	0.10		
86:							
Mt. Sterling, occasionally flooded----------	60	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
Zook, occasionally flooded, overwash--	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
88:							
Nevin, rarely flooded----------	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93D2:							
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	0.73	Cutbanks cave	0.10		
93E2:							
Shelby, moderately eroded	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Cutbanks cave	0.10		
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00	Too clayey	1.00
		Flooding	1.00	Flooding	0.60	Ponding	1.00
179E:							
Gara	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
179F:							
Gara	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
179G:							
Gara	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	0.73	Cutbanks cave	0.10		
220:							
Nodaway, occasionally flooded	80	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	0.61	Flooding	0.60
		Flooding	1.00	Flooding	0.60		
		Low strength	1.00	Cutbanks cave	0.10		
222C2:							
Clarinda, moderately eroded	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Too clayey	0.50		
		Frost action	1.00	Cutbanks cave	0.10		
222D:							
Clarinda	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.63	Slope	0.63
		Frost action	1.00	Too clayey	0.50		
222D2:							
Clarinda, moderately eroded	70	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.63	Slope	0.63
		Frost action	1.00	Too clayey	0.50		
222D3:							
Clarinda, severely eroded	70	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.63	Too clayey	1.00
		Frost action	1.00	Too clayey	0.50	Slope	0.63
248:							
Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
		Flooding	1.00	Flooding	0.60	Flooding	0.60

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
269:							
Humeston, occasionally flooded	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
273B:							
Olmitz	80	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
273C:							
Olmitz	75	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
324C2:							
Dickman, moderately eroded	90	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
324D2:							
Dickman, moderately eroded	90	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63		
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
369:							
Winterset	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
370:							
Sharpsburg	95	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	1.00				
370B:							
Sharpsburg	95	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	1.00				

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:							
Sharpsburg, moderately eroded--	35	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00				
		Shrink-swell	1.00	Cutbanks cave	0.10		
Nira, moderately eroded----------	30	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Low strength	1.00				
		Shrink-swell	0.50	Cutbanks cave	0.10		
371D2:							
Sharpsburg, moderately eroded--	50	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Slope	0.63	Slope	0.63
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	1.00				
				Cutbanks cave	0.10		
Nira, moderately eroded----------	20	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Slope	0.63
		Low strength	1.00			Depth to saturated zone	0.19
		Slope	0.63	Slope	0.63		
				Cutbanks cave	0.10		
421C2:							
Gara, moderately eroded----------	35	Somewhat limited		Somewhat limited		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Bucknell, moderately eroded----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Too clayey	0.12		
		Frost action	0.50	Cutbanks cave	0.10		
421D2:							
Gara, moderately eroded----------	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Bucknell, moderately eroded----------	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421E2:							
Gara, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Too clayey	0.12		
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Cutbanks cave	0.10		
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Too clayey	0.28		
		Frost action	0.50	Cutbanks cave	0.10		
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Too clayey	0.50		
		Frost action	1.00	Cutbanks cave	0.10		
Shelby, moderately eroded	20	Somewhat limited		Somewhat limited		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Too clayey	0.50	Too clayey	1.00
		Frost action	1.00	Cutbanks cave	0.10		
Shelby, severely eroded	20	Somewhat limited		Somewhat limited		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Too clayey	0.28		
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
545B:							
Zook	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00	Too clayey	0.01		
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
Clearfield	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Too clayey	0.50		
		Low strength	1.00	Cutbanks cave	0.10		

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
579E3:							
Bucknell, severely eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Too clayey	0.12		
Hedrick, severely eroded	35	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to saturated zone	1.00	Slope	1.00
		Low strength	1.00	Slope	1.00	Depth to saturated zone	0.19
		Slope	1.00	Cutbanks cave	0.10		
794C2:							
Armstrong, moderately eroded	65	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
Ladoga, moderately eroded	30	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
822D2:							
Lamoni, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Too clayey	0.28		
870B:							
Sharpsburg, terrace	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	1.00				
870C2:							
Sharpsburg, terrace, moderately eroded	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Depth to saturated zone	0.61		
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	1.00				
870D2:							
Sharpsburg, terrace, moderately eroded	75	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Slope	0.63	Slope	0.63
		Low strength	1.00	Depth to saturated zone	0.61		
		Shrink-swell	1.00	Cutbanks cave	0.10		

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
876B:							
Ladoga, terrace-----	100	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to	0.61		
		Shrink-swell	1.00	saturated zone			
		Frost action	0.50	Cutbanks cave	0.10		
876C2:							
Ladoga, terrace, moderately eroded--	70	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to	0.61		
		Shrink-swell	1.00	saturated zone			
		Frost action	0.50	Cutbanks cave	0.10		
876D2:							
Ladoga, terrace, moderately eroded--	75	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Shrink-swell	1.00	Depth to	0.61		
		Slope	0.63	saturated zone			
				Cutbanks cave	0.10		
2368B:							
Macksburg-----------	70	Very limited		Very limited		Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
Nira----------	25	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to	1.00	Depth to	0.19
		Low strength	1.00	saturated zone		saturated zone	
		Shrink-swell	0.50	Cutbanks cave	0.10		
5030:							
Pits, limestone quarries-----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	
W:							
Water---------------	100	Not rated		Not rated		Not rated	

Sanitary Facilities

The titles of the tables described in this section are:

- “Sewage Disposal”
- “Landfills”

These tables show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

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. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, 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. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid 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. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a

water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Sewage Disposal

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7:					
Wiota, rarely flooded	85	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Flooding	0.40
		Flooding	0.40	Seepage	0.05
7B:					
Wiota, rarely flooded	85	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Flooding	0.40
		Flooding	0.40	Slope	0.32
8B:					
Judson	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
15B:					
Olmitz	35	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
Ely	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
Zook	20	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.32
16:					
Nodaway, occasionally flooded	55	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
16:					
Kennebec, occasionally flooded	35	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Seepage	0.05
24C2:					
Shelby, moderately eroded	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Seepage	0.05
24D2:					
Shelby, moderately eroded	70	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.05
24E:					
Shelby	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
24E2:					
Shelby, moderately eroded	65	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
24F:					
Shelby	65	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
43:					
Bremer, rarely flooded	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Flooding	0.40
		Flooding	0.40	Seepage	0.05
45B:					
Zook	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.32

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
45B:					
Ely	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
54:					
Zook, occasionally flooded	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
54+:					
Zook, occasionally flooded, overwash	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.05
76B:					
Ladoga	95	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to saturated zone	0.99	Slope	0.32
				Seepage	0.05
76C:					
Ladoga	75	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
				Seepage	0.05
76D:					
Ladoga	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slope	0.63	Seepage	0.05
76D2:					
Ladoga, moderately eroded	60	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slope	0.63	Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
86:					
Mt. Sterling, occasionally flooded	60	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.05
Zook, occasionally flooded, overwash	25	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.05
88:					
Nevin, rarely flooded	90	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Flooding	0.40
		Flooding	0.40	Seepage	0.05
93D2:					
Shelby, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.05
Adair, moderately eroded	25	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
93E2:					
Shelby, moderately eroded	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
Adair, moderately eroded	30	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00		

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
172:					
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00
179E:					
Gara	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
179F:					
Gara	65	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
179G:					
Gara	70	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05
192D2:					
Adair, moderately eroded	55	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
220:					
Nodaway, occasionally flooded	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Seepage	0.05
222C2:					
Clarinda, moderately eroded	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
222D:					
Clarinda	75	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
222D2:					
Clarinda, moderately eroded	70	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
222D3:					
Clarinda, severely eroded	70	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
248:					
Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Ponding	1.00
269:					
Humeston, occasionally flooded	100	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.05
273B:					
Olmitz	80	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
273C:					
Olmitz	75	Somewhat limited		Very limited	
		Depth to saturated zone	0.99	Slope	1.00
		Slow water movement	0.95	Depth to saturated zone	0.71
				Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
324C2:					
Dickman, moderately eroded	90	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Slope	1.00
324D2:					
Dickman, moderately eroded	90	Very limited		Very limited	
		Filtering capacity	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.63		
354:					
Aquolls, ponded	100	Not rated		Not rated	
368:					
Macksburg	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage	0.05
369:					
Winterset	100	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage	0.05
370:					
Sharpsburg	95	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to saturated zone	0.99	Seepage	0.05
370B:					
Sharpsburg	95	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to saturated zone	0.99	Slope	0.32
				Seepage	0.05
371C2:					
Sharpsburg, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
				Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:					
Nira, moderately eroded	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	1.00
				Seepage	0.05
371D2:					
Sharpsburg, moderately eroded	50	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slope	0.63	Seepage	0.05
Nira, moderately eroded	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	0.95	Depth to saturated zone	1.00
		Slope	0.63	Seepage	0.05
421C2:					
Gara, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Seepage	0.05
Bucknell, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
421D2:					
Gara, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.05
Bucknell, moderately eroded	30	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
421E2:					
Gara, moderately eroded	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	1.00	Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
421E2:					
Bucknell, moderately eroded	25	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00		
435:					
Zook, occasionally flooded	40	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
Mt. Sterling, occasionally flooded	35	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.05
469C2:					
Lamoni, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
Clarinda, moderately eroded	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
Shelby, moderately eroded	20	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Seepage	0.05
469C3:					
Lamoni, severely eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:					
Clarinda, severely eroded	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
Shelby, severely eroded	20	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Seepage	0.05
470D2:					
Lamoni, moderately eroded	40	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
Shelby, moderately eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.05
545B:					
Zook	35	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	0.32
Ely	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
Gullied land	20	Not rated		Not rated	
569C:					
Nira	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	1.00
				Seepage	0.05
Clearfield	35	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
				Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
579E3:					
Bucknell, severely eroded	55	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00		
Hedrick, severely eroded	35	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Seepage	0.05
794C2:					
Armstrong, moderately eroded	65	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slope	1.00
Ladoga, moderately eroded	30	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
				Seepage	0.05
822D2:					
Lamoni, moderately eroded	55	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63		
870B:					
Sharpsburg, terrace	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to saturated zone	0.99	Slope	0.08
				Seepage	0.05
870C2:					
Sharpsburg, terrace, moderately eroded	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
				Seepage	0.05

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
870D2:					
Sharpsburg, terrace, moderately eroded--	75	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slope	0.63	Seepage	0.05
876B:					
Ladoga, terrace-----	100	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to saturated zone	0.99	Slope	0.08
				Seepage	0.05
876C2:					
Ladoga, terrace, moderately eroded--	70	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
				Seepage	0.05
876D2:					
Ladoga, terrace, moderately eroded--	75	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.71
		Slope	0.63	Seepage	0.05
2368B:					
Macksburg-----------	70	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slope	0.32
				Seepage	0.05
Nira----------	25	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.95	Slope	0.32
				Seepage	0.05
5030:					
Pits, limestone quarries-----------	100	Not rated		Not rated	
5040:					
Udorthents, loamy---	100	Not rated		Not rated	
5041:					
Udorthents, reclaimed----------	100	Not rated		Not rated	

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AW:					
Animal waste lagoon	100	Not rated		Not rated	
SL:					
Sewage lagoon-------	100	Not rated		Not rated	
W:					
Water----------	100	Not rated		Not rated	

Landfills

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50	Flooding	0.40		
		Flooding	0.40				
7B:							
Wiota, rarely flooded	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50	Flooding	0.40		
		Flooding	0.40				
8B:							
Judson	85	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
15B:							
Olmitz	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
Zook	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
16:							
Nodaway, occasionally flooded	55	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too clayey	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Too clayey	0.50				
Kennebec, occasionally flooded	35	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too clayey	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24C2:							
Shelby, moderately eroded	85	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
24D2:							
Shelby, moderately eroded	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
24E:							
Shelby	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
24E2:							
Shelby, moderately eroded	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
24F:							
Shelby	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
43:							
Bremer, rarely flooded	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50	Flooding	0.40	Hard to compact	1.00
		Flooding	0.40			Too clayey	0.50
45B:							
Zook	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
Ely	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
54:							
Zook, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54+:							
Zook, occasionally flooded, overwash--	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
76B:							
Ladoga----------	95	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
76C:							
Ladoga----------	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
76D:							
Ladoga----------	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Too clayey	0.50
		Too clayey	0.50				
76D2:							
Ladoga, moderately eroded----------	60	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Too clayey	0.50
		Too clayey	0.50				
86:							
Mt. Sterling, occasionally flooded----------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
Zook, occasionally flooded, overwash--	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
88:							
Nevin, rarely flooded----------	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93D2:							
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
93E2:							
Shelby, moderately eroded	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
172:							
Wabash, frequently ponded, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00	Ponding	1.00	Hard to compact	1.00
179E:							
Gara	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
179F:							
Gara	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
179G:							
Gara	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
220:							
Nodaway, occasionally flooded	80	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too clayey	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Too clayey	0.50				
222C2:							
Clarinda, moderately eroded	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
222D:							
Clarinda	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Slope	0.63			Hard to compact	1.00
222D2:							
Clarinda, moderately eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Slope	0.63			Hard to compact	1.00
222D3:							
Clarinda, severely eroded	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Slope	0.63			Hard to compact	1.00
248:							
Wabash, occasionally ponded, occasionally flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00	Ponding	1.00	Hard to compact	1.00
269:							
Humeston, occasionally flooded	100	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
273B:							
Olmitz	80	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
273C:							
Olmitz	75	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
324C2:							
Dickman, moderately eroded	90	Very limited		Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	1.00
		Too sandy	0.50			Too sandy	0.50
324D2:							
Dickman, moderately eroded	90	Very limited		Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too sandy	0.50			Too sandy	0.50
354:							
Aquolls, ponded	100	Not rated		Very limited		Not rated	
				Depth to saturated zone	1.00		
				Ponding	1.00		
368:							
Macksburg	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
369:							
Winterset	100	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
370:							
Sharpsburg	95	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
370B:							
Sharpsburg	95	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
371C2:							
Sharpsburg, moderately eroded--	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
Nira, moderately eroded----------	30	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
		Too clayey	0.50			Too clayey	0.50
371D2:							
Sharpsburg, moderately eroded--	50	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Too clayey	0.50
		Too clayey	0.50				
Nira, moderately eroded----------	20	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
421C2:							
Gara, moderately eroded----------	35	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
Bucknell, moderately eroded----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
421D2:							
Gara, moderately eroded----------	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
Bucknell, moderately eroded----------	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
421E2:							
Gara, moderately eroded----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421E2:							
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
435:							
Zook, occasionally flooded	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
Mt. Sterling, occasionally flooded	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Too clayey	0.50			Too clayey	0.50
469C2:							
Lamoni, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
Clarinda, moderately eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
Shelby, moderately eroded	20	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50
469C3:							
Lamoni, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
Clarinda, severely eroded	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
Shelby, severely eroded	20	Somewhat limited		Not limited		Somewhat limited	
		Too clayey	0.50			Too clayey	0.50

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
Shelby, moderately eroded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
545B:							
Zook	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
Ely	30	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
		Too clayey	0.50			Too clayey	0.50
Clearfield	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
579E3:							
Bucknell, severely eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Hedrick, severely eroded	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to saturated zone	0.86
		Too clayey	0.50			Too clayey	0.50
794C2:							
Armstrong, moderately eroded	65	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
794C2:							
Ladoga, moderately eroded	30	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
822D2:							
Lamoni, moderately eroded	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
870B:							
Sharpsburg, terrace	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
870C2:							
Sharpsburg, terrace, moderately eroded	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
870D2:							
Sharpsburg, terrace, moderately eroded	75	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Too clayey	0.50
		Too clayey	0.50				
876B:							
Ladoga, terrace	100	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
876C2:							
Ladoga, terrace, moderately eroded	70	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50				
876D2:							
Ladoga, terrace, moderately eroded	75	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Too clayey	0.50
		Too clayey	0.50				

Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2368B:							
Macksburg	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50			Too clayey	0.50
Nira	25	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
		Too clayey	0.50			Too clayey	0.50
5030:							
Pits, limestone quarries	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon	100	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	

Construction Materials

The titles of the tables described in this section are:

- "Source of Sand and Gravel"
- "Source of Reclamation Material, Roadfill, and Topsoil"

These tables give information about the soils as potential sources of gravel, sand, reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

Gravel and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table "Source of Sand and Gravel," only the likelihood 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 Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated as *improbable, possible, probable,* or *very likely* sources of gravel. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of gravel. The number 0.00 indicates an improbable source; 0.01 to 0.39, a possible source; 0.40 to 0.99, a probable source; and 1.00, a very likely source.

The soils are rated *good, fair,* or *poor* as potential sources of sand. A rating of good or fair means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. The larger the number, the greater the likelihood that the layer is a source of sand.

In the table "Source of Reclamation Material, Roadfill, and Topsoil," the rating class terms are *good, fair,* and *poor*. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, and topsoil. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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 whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in

place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a 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 AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

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. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

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.

Source of Sand and Gravel

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
7:					
Wiota, rarely flooded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
7B:					
Wiota, rarely flooded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
8B:					
Judson	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
15B:					
Olmitz	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Ely	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Zook	20	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
16:					
Nodaway, occasionally flooded	55	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Kennebec, occasionally flooded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
24C2:					
Shelby, moderately eroded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
24D2:					
Shelby, moderately eroded	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
24E:					
Shelby	60	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
24E2:					
Shelby, moderately eroded	65	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
24F:					
Shelby	65	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
43:					
Bremer, rarely flooded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
45B:					
Zook	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Ely	20	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
54:					
Zook, occasionally flooded	90	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
54+:					
Zook, occasionally flooded, overwash	80	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
76B:					
Ladoga	95	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
76C:					
Ladoga	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
76D:					
Ladoga	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
76D2:					
Ladoga, moderately eroded	60	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
86:					
Mt. Sterling, occasionally flooded	60	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Zook, occasionally flooded, overwash	25	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
88:					
Nevin, rarely flooded	90	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
93D2:					
Shelby, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Adair, moderately eroded	25	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
93E2:					
Shelby, moderately eroded	45	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Adair, moderately eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
172:					
Wabash, frequently ponded, occasionally flooded	90	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
179E:					
Gara	60	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
179F:					
Gara	65	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
179G:					
Gara	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
192D2:					
Adair, moderately eroded	55	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
220:					
Nodaway, occasionally flooded	80	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
222C2:					
Clarinda, moderately eroded	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
222D:					
Clarinda	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
222D2:					
Clarinda, moderately eroded	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
222D3:					
Clarinda, severely eroded	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
248:					
Wabash, occasionally ponded, occasionally flooded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
269:					
Humeston, occasionally flooded	100	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
273B:					
Olmitz	80	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
273C:					
Olmitz	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
324C2:					
Dickman, moderately eroded	90	Improbable		Fair	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.07
324D2:					
Dickman, moderately eroded	90	Improbable		Fair	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.07
354:					
Aquolls, ponded	100	Not rated		Not rated	
368:					
Macksburg	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
369:					
Winterset	100	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
370:					
Sharpsburg	95	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
370B:					
Sharpsburg	95	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
371C2:					
Sharpsburg, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
371C2:					
Nira, moderately eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
371D2:					
Sharpsburg, moderately eroded	50	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Nira, moderately eroded	20	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
421C2:					
Gara, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Bucknell, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
421D2:					
Gara, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Bucknell, moderately eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
421E2:					
Gara, moderately eroded	40	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Bucknell, moderately eroded	25	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
435:					
Zook, occasionally flooded	40	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Mt. Sterling, occasionally flooded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
469C2:					
Lamoni, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Clarinda, moderately eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Shelby, moderately eroded	20	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
469C3:					
Lamoni, severely eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Clarinda, severely eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Shelby, severely eroded	20	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
470D2:					
Lamoni, moderately eroded	40	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Shelby, moderately eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
545B:					
Zook	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Ely	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Gullied land	20	Not rated		Not rated	
569C:					
Nira	45	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
569C:					
Clearfield	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
579E3:					
Bucknell, severely eroded	55	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Hedrick, severely eroded	35	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
794C2:					
Armstrong, moderately eroded	65	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Ladoga, moderately eroded	30	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
822D2:					
Lamoni, moderately eroded	55	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
870B:					
Sharpsburg, terrace	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
870C2:					
Sharpsburg, terrace, moderately eroded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
870D2:					
Sharpsburg, terrace, moderately eroded	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
876B:					
Ladoga, terrace	100	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
876C2:					
Ladoga, terrace, moderately eroded	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of gravel		Potential as source of sand	
		Rating class	Value	Rating class	Value
876D2:					
Ladoga, terrace, moderately eroded--	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2368B:					
Macksburg----------	70	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Nira----------	25	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
5030:					
Pits, limestone quarries----------	100	Not rated		Not rated	
5040:					
Udorthents, loamy---	100	Not rated		Not rated	
5041:					
Udorthents, reclaimed----------	100	Not rated		Not rated	
AW:					
Animal waste lagoon	100	Not rated		Not rated	
SL:					
Sewage lagoon-------	100	Not rated		Not rated	
W:					
Water----------	100	Not rated		Not rated	

Source of Reclamation Material, Roadfill, and Topsoil

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Fair		Poor		Good	
		Too acid	0.84	Low strength	0.00		
		Water erosion	0.90	Shrink-swell	0.87		
7B:							
Wiota, rarely flooded	85	Fair		Poor		Good	
		Too acid	0.84	Low strength	0.00		
		Water erosion	0.90	Shrink-swell	0.87		
8B:							
Judson	85	Fair		Poor		Good	
		Organic matter content	0.50	Low strength	0.00		
				Shrink-swell	0.87		
		Water erosion	0.68				
15B:							
Olmitz	35	Fair		Poor		Good	
		Too acid	0.97	Low strength	0.00		
				Shrink-swell	0.87		
Ely	30	Fair		Poor		Poor	
		Water erosion	0.90	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
				Shrink-swell	0.87		
Zook	20	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.25		
16:							
Nodaway, occasionally flooded	55	Fair		Poor		Good	
		Organic matter content	0.12	Low strength	0.00		
				Shrink-swell	0.87		
		Water erosion	0.37				
Kennebec, occasionally flooded	35	Fair		Poor		Good	
		Water erosion	0.90	Low strength	0.00		
				Shrink-swell	0.87		
24C2:							
Shelby, moderately eroded	85	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Too clayey	0.44
						Rock fragments	0.95
		Too clayey	0.68				
		Too acid	0.97				

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24D2:							
Shelby, moderately eroded	70	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.37
		Too clayey	0.68			Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
24E:							
Shelby	60	Fair		Fair		Poor	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.00
		Too clayey	0.68	Slope	0.98	Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
24E2:							
Shelby, moderately eroded	65	Fair		Fair		Poor	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.00
		Too clayey	0.68	Slope	0.98	Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
24F:							
Shelby	65	Fair		Fair		Poor	
		Organic matter content	0.50	Slope	0.18	Slope	0.00
		Too clayey	0.68	Shrink-swell	0.87	Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
43:							
Bremer, rarely flooded	85	Fair		Poor		Poor	
		Too clayey	0.01	Wetness	0.00	Wetness	0.00
		Water erosion	0.99	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.69		
45B:							
Zook	75	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.25		
Ely	20	Fair		Poor		Poor	
		Water erosion	0.90	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
				Shrink-swell	0.87		
54:							
Zook, occasionally flooded	90	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.25		

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
54+:							
Zook, occasionally flooded, overwash--	80	Fair		Poor		Poor	
		Too clayey	0.12	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Low strength	0.00	Too clayey	0.12
				Shrink-swell	0.17		
76B:							
Ladoga	95	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Water erosion	0.37	Shrink-swell	0.28		
		Too acid	0.74				
76C:							
Ladoga	75	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Water erosion	0.37	Shrink-swell	0.28		
		Too acid	0.74				
76D:							
Ladoga	85	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Water erosion	0.37	Shrink-swell	0.28	Slope	0.37
		Too acid	0.74				
76D2:							
Ladoga, moderately eroded	60	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Too acid	0.74	Shrink-swell	0.35	Slope	0.37
		Organic matter content	0.88				
86:							
Mt. Sterling, occasionally flooded	60	Fair		Poor		Poor	
		Organic matter content	0.50	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
		Too acid	0.97	Shrink-swell	0.34		
		Water erosion	0.99				
Zook, occasionally flooded, overwash--	25	Fair		Poor		Poor	
		Too clayey	0.12	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Low strength	0.00	Too clayey	0.12
				Shrink-swell	0.17		
88:							
Nevin, rarely flooded	90	Fair		Poor		Poor	
		Water erosion	0.90	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
				Shrink-swell	0.87		

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93D2:							
Shelby, moderately eroded	35	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.37
		Too clayey	0.68			Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
Adair, moderately eroded	25	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
		Too clayey	0.68	Shrink-swell	0.71	Slope	0.37
		Too acid	0.84			Too clayey	0.39
						Rock fragments	0.95
93E2:							
Shelby, moderately eroded	45	Fair		Fair		Poor	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.00
		Too clayey	0.68	Slope	0.98	Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
Adair, moderately eroded	30	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
		Too clayey	0.68	Shrink-swell	0.71	Slope	0.00
		Too acid	0.84	Slope	0.98	Too clayey	0.39
						Rock fragments	0.95
172:							
Wabash, frequently ponded, occasionally flooded	90	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Too acid	0.97	Shrink-swell	0.00	Wetness	0.00
				Low strength	0.00		
179E:							
Gara	60	Fair		Fair		Poor	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.00
		Too clayey	0.88	Slope	0.98	Too clayey	0.57
		Too acid	0.95			Rock fragments	0.95
179F:							
Gara	65	Fair		Fair		Poor	
		Organic matter content	0.50	Slope	0.18	Slope	0.00
		Too clayey	0.88	Shrink-swell	0.87	Too clayey	0.57
		Too acid	0.95			Rock fragments	0.95
179G:							
Gara	70	Fair		Poor		Poor	
		Organic matter content	0.50	Slope	0.00	Slope	0.00
		Too clayey	0.88	Shrink-swell	0.87	Too clayey	0.57
		Too acid	0.95			Rock fragments	0.95

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
192D2:							
Adair, moderately eroded	55	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
				Shrink-swell	0.71	Slope	0.37
		Too clayey	0.68			Too clayey	0.39
		Too acid	0.84			Rock fragments	0.95
220:							
Nodaway, occasionally flooded	80	Fair		Poor		Good	
		Organic matter content	0.12	Low strength	0.00		
				Shrink-swell	0.87		
		Water erosion	0.37				
222C2:							
Clarinda, moderately eroded	75	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.00	Wetness	0.00
		Too acid	0.97				
222D:							
Clarinda	75	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Low strength	0.00	Wetness	0.00
				Shrink-swell	0.00	Slope	0.37
		Too acid	0.84				
222D2:							
Clarinda, moderately eroded	70	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.00	Wetness	0.00
						Slope	0.37
		Too acid	0.97				
222D3:							
Clarinda, severely eroded	70	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.00	Wetness	0.00
				Low strength	0.00	Slope	0.37
		Too acid	0.97				
248:							
Wabash, occasionally ponded, occasionally flooded	85	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Too acid	0.97	Low strength	0.00	Wetness	0.00
		Water erosion	0.99	Shrink-swell	0.00		

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
269:							
Humeston, occasionally flooded	100	Fair		Poor		Poor	
		Too clayey	0.02	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Low strength	0.00	Too clayey	0.02
		Too acid	0.97	Shrink-swell	0.51		
273B:							
Olmitz	80	Fair		Poor		Good	
		Too acid	0.97	Low strength	0.00		
				Shrink-swell	0.87		
273C:							
Olmitz	75	Fair		Poor		Good	
		Too acid	0.97	Low strength	0.00		
				Shrink-swell	0.87		
324C2:							
Dickman, moderately eroded	90	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Organic matter content	0.12				
		Too acid	0.84				
324D2:							
Dickman, moderately eroded	90	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Organic matter content	0.12			Slope	0.37
		Too acid	0.84				
354:							
Aquolls, ponded	100	Not rated		Not rated		Not rated	
368:							
Macksburg	85	Fair		Poor		Poor	
		Too acid	0.97	Wetness	0.00	Wetness	0.00
		Water erosion	0.99	Low strength	0.00	Too clayey	0.99
		Too clayey	0.99	Shrink-swell	0.62		
369:							
Winterset	100	Fair		Poor		Poor	
		Too clayey	0.02	Wetness	0.00	Wetness	0.00
		Water erosion	0.99	Low strength	0.00	Too clayey	0.02
				Shrink-swell	0.25		
370:							
Sharpsburg	95	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.02
		Organic matter content	0.50	Shrink-swell	0.56		
		Water erosion	0.68				

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
370B:							
Sharpsburg	95	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.02
		Organic matter content	0.50	Shrink-swell	0.56		
		Water erosion	0.68				
371C2:							
Sharpsburg, moderately eroded	35	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Organic matter content	0.50	Shrink-swell	0.56		
		Water erosion	0.68				
Nira, moderately eroded	30	Fair		Poor		Fair	
		Organic matter content	0.12	Low strength	0.00	Wetness	0.53
		Water erosion	0.90	Wetness	0.53	Too clayey	0.53
		Too clayey	0.92	Shrink-swell	0.87		
371D2:							
Sharpsburg, moderately eroded	50	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Organic matter content	0.50	Shrink-swell	0.56	Slope	0.37
		Water erosion	0.68				
Nira, moderately eroded	20	Fair		Poor		Fair	
		Organic matter content	0.12	Low strength	0.00	Slope	0.37
		Water erosion	0.90	Wetness	0.53	Wetness	0.53
		Too clayey	0.92	Shrink-swell	0.87	Too clayey	0.53
421C2:							
Gara, moderately eroded	35	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Too clayey	0.57
		Too clayey	0.88			Rock fragments	0.95
		Too acid	0.88				
Bucknell, moderately eroded	35	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.43	Wetness	0.00
		Too acid	0.54			Too acid	0.98
421D2:							
Gara, moderately eroded	35	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.37
		Too clayey	0.88			Too clayey	0.57
		Too acid	0.88			Rock fragments	0.95

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421D2:							
Bucknell, moderately eroded	30	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.43	Wetness	0.00
						Slope	0.37
		Too acid	0.54			Too acid	0.98
421E2:							
Gara, moderately eroded	40	Fair		Fair		Poor	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.00
				Slope	0.98	Too clayey	0.57
		Too clayey	0.88			Rock fragments	0.95
		Too acid	0.88				
Bucknell, moderately eroded	25	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.43	Wetness	0.00
				Slope	0.98	Slope	0.00
		Too acid	0.54			Too acid	0.98
435:							
Zook, occasionally flooded	40	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.25		
Mt. Sterling, occasionally flooded	35	Fair		Poor		Poor	
		Organic matter content	0.50	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
		Too acid	0.97	Shrink-swell	0.34		
		Water erosion	0.99				
469C2:							
Lamoni, moderately eroded	35	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Organic matter content	0.12	Shrink-swell	0.71	Too clayey	0.00
		Too acid	0.97				
Clarinda, moderately eroded	30	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.00	Wetness	0.00
		Too acid	0.97				
Shelby, moderately eroded	20	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Too clayey	0.44
						Rock fragments	0.95
		Too clayey	0.68				
		Too acid	0.97				

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Lamoni, severely eroded	35	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
		Too clayey	0.68	Shrink-swell	0.83	Too clayey	0.39
		Too acid	0.97				
Clarinda, severely eroded	30	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Organic matter content	0.12	Shrink-swell	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00		
Shelby, severely eroded	20	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Too clayey	0.44
		Too clayey	0.68			Rock fragments	0.95
		Too acid	0.97				
470D2:							
Lamoni, moderately eroded	40	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Organic matter content	0.12	Shrink-swell	0.71	Too clayey	0.00
		Too acid	0.97			Slope	0.37
Shelby, moderately eroded	35	Fair		Fair		Fair	
		Organic matter content	0.50	Shrink-swell	0.87	Slope	0.37
		Too clayey	0.68			Too clayey	0.44
		Too acid	0.97			Rock fragments	0.95
545B:							
Zook	35	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Too acid	0.97	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.25		
Ely	30	Fair		Poor		Poor	
		Water erosion	0.90	Wetness	0.00	Wetness	0.00
				Low strength	0.00		
				Shrink-swell	0.87		
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Fair		Poor		Fair	
		Organic matter content	0.12	Low strength	0.00	Wetness	0.53
		Water erosion	0.68	Wetness	0.53	Too clayey	0.53
		Too clayey	0.92	Shrink-swell	0.87		

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
569C:							
Clearfield----------	35	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
		Too clayey	0.18	Low strength	0.00	Too clayey	0.10
		Water erosion	0.90	Shrink-swell	0.75		
579E3:							
Bucknell, severely eroded----------	55	Fair		Poor		Poor	
		Organic matter content	0.12	Wetness	0.00	Wetness	0.00
		Too acid	0.74	Shrink-swell	0.78	Slope	0.00
		Too clayey	0.76	Slope	0.98	Too clayey	0.44
Hedrick, severely eroded----------	35	Fair		Poor		Poor	
		Organic matter content	0.12	Low strength	0.00	Slope	0.00
		Too clayey	0.59	Wetness	0.53	Too clayey	0.39
		Too acid	0.84	Shrink-swell	0.87	Wetness	0.53
794C2:							
Armstrong, moderately eroded--	65	Fair		Poor		Poor	
		Organic matter content	0.50	Wetness	0.00	Wetness	0.00
		Too acid	0.68	Low strength	0.00	Too clayey	0.54
		Too clayey	0.82	Shrink-swell	0.79	Rock fragments	0.92
Ladoga, moderately eroded----------	30	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Too acid	0.74	Shrink-swell	0.35		
		Organic matter content	0.88				
822D2:							
Lamoni, moderately eroded----------	55	Poor		Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Wetness	0.00
		Organic matter content	0.12	Shrink-swell	0.71	Too clayey	0.00
		Too acid	0.97			Slope	0.37
870B:							
Sharpsburg, terrace	85	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.02
		Organic matter content	0.50	Shrink-swell	0.56		
		Water erosion	0.68				
870C2:							
Sharpsburg, terrace, moderately eroded--	85	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Organic matter content	0.50	Shrink-swell	0.56		
		Water erosion	0.68				

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
870D2:							
Sharpsburg, terrace, moderately eroded--	75	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Organic matter content	0.50	Shrink-swell	0.56	Slope	0.37
		Water erosion	0.68				
876B:							
Ladoga, terrace-----	100	Fair		Poor		Fair	
		Too clayey	0.08	Low strength	0.00	Too clayey	0.06
		Water erosion	0.37	Shrink-swell	0.28		
		Too acid	0.74				
876C2:							
Ladoga, terrace, moderately eroded--	70	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Too acid	0.74	Shrink-swell	0.35		
		Organic matter content	0.88				
876D2:							
Ladoga, terrace, moderately eroded--	75	Fair		Poor		Fair	
		Too clayey	0.02	Low strength	0.00	Too clayey	0.01
		Too acid	0.74	Shrink-swell	0.35	Slope	0.37
		Organic matter content	0.88				
2368B:							
Macksburg----------	70	Fair		Poor		Poor	
		Too acid	0.97	Wetness	0.00	Wetness	0.00
		Water erosion	0.99	Low strength	0.00	Too clayey	0.99
		Too clayey	0.99	Shrink-swell	0.62		
Nira----------	25	Fair		Poor		Fair	
		Organic matter content	0.12	Low strength	0.00	Wetness	0.53
				Wetness	0.53	Too clayey	0.53
		Water erosion	0.68	Shrink-swell	0.87		
		Too clayey	0.92				
5030:							
Pits, limestone quarries----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W: Water	100	Not rated		Not rated		Not rated	

Water Management

The table “Ponds and Embankments” gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Ponds and Embankments

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Wiota, rarely flooded	85	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10
7B:							
Wiota, rarely flooded	85	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
		Slope	0.08			Slow refill	0.76
						Cutbanks cave	0.10
8B:							
Judson	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.24			Depth to water	1.00
		Slope	0.08				
15B:							
Olmitz	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.24	Piping	0.01	Depth to saturated zone	0.81
		Slope	0.08			Slow refill	0.76
						Cutbanks cave	0.10
Ely	30	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
		Slope	0.08			Cutbanks cave	0.10
Zook	20	Somewhat limited		Very limited		Very limited	
		Slope	0.08	Depth to saturated zone	1.00	Slow refill	1.00
				Hard to pack	0.18	Cutbanks cave	0.10
16:							
Nodaway, occasionally flooded	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.24	Piping	0.08	Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10
Kennebec, occasionally flooded	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.24	Piping	0.04	Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
24C2:							
Shelby, moderately eroded	85	Somewhat limited		Not limited		Very limited	
		Slope	0.92			Depth to water	1.00
		Seepage	0.24				
24D2:							
Shelby, moderately eroded	70	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
24E:							
Shelby	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
24E2:							
Shelby, moderately eroded	65	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
24F:							
Shelby	65	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
43:							
Bremer, rarely flooded	85	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
				Hard to pack	0.11		
45B:							
Zook	75	Somewhat limited		Very limited		Very limited	
		Slope	0.08	Depth to saturated zone	1.00	Slow refill	1.00
						Cutbanks cave	0.10
				Hard to pack	0.18		
Ely	20	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
		Slope	0.08			Cutbanks cave	0.10
54:							
Zook, occasionally flooded	90	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	Slow refill	1.00
						Cutbanks cave	0.10
				Hard to pack	0.18		
54+:							
Zook, occasionally flooded, overwash	80	Not limited		Very limited		Somewhat limited	
				Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
				Hard to pack	0.08		

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
76B:							
Ladoga	95	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
		Slope	0.08			Slow refill	0.76
						Cutbanks cave	0.10
76C:							
Ladoga	75	Somewhat limited		Not limited		Somewhat limited	
		Slope	0.92			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
76D:							
Ladoga	85	Very limited		Not limited		Somewhat limited	
		Slope	1.00			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
76D2:							
Ladoga, moderately eroded	60	Very limited		Not limited		Somewhat limited	
		Slope	1.00			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
86:							
Mt. Sterling, occasionally flooded	60	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
Zook, occasionally flooded, overwash	25	Not limited		Very limited		Somewhat limited	
				Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
				Hard to pack	0.08		
88:							
Nevin, rarely flooded	90	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
93D2:							
Shelby, moderately eroded	35	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
Adair, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
93E2:							
Shelby, moderately eroded	45	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
Adair, moderately eroded	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
172:							
Wabash, frequently ponded, occasionally flooded	90	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	Slow refill	1.00
						Cutbanks cave	0.10
				Ponding	1.00		
				Hard to pack	0.95		
179E:							
Gara	60	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
179F:							
Gara	65	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
179G:							
Gara	70	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
192D2:							
Adair, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
220:							
Nodaway, occasionally flooded	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.24	Piping	0.08	Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10
222C2:							
Clarinda, moderately eroded	75	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.92		
222D:							
Clarinda	75	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.84		

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
222D2:							
Clarinda, moderately eroded	70	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.92		
222D3:							
Clarinda, severely eroded	70	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.92		
248:							
Wabash, occasionally ponded, occasionally flooded	85	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	Slow refill	1.00
				Ponding	1.00	Cutbanks cave	0.10
				Hard to pack	0.88		
269:							
Humeston, occasionally flooded	100	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
273B:							
Olmitz	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.24	Piping	0.01	Depth to saturated zone	0.81
		Slope	0.08			Slow refill	0.76
						Cutbanks cave	0.10
273C:							
Olmitz	75	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.92	Piping	0.01	Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
324C2:							
Dickman, moderately eroded	90	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
		Slope	0.92				
324D2:							
Dickman, moderately eroded	90	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.07	Depth to water	1.00
		Slope	1.00				
354:							
Aquolls, ponded	100	Not limited		Not rated		Not rated	

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
368:							
Macksburg	85	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
369:							
Winterset	100	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
				Hard to pack	0.16	Cutbanks cave	0.10
370:							
Sharpsburg	95	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10
370B:							
Sharpsburg	95	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
		Slope	0.08			Slow refill	0.76
						Cutbanks cave	0.10
371C2:							
Sharpsburg, moderately eroded	35	Somewhat limited		Not limited		Somewhat limited	
		Slope	0.92			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
Nira, moderately eroded	30	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.92	Depth to saturated zone	0.99	Slow refill	0.76
		Seepage	0.24			Cutbanks cave	0.10
						Depth to saturated zone	0.01
371D2:							
Sharpsburg, moderately eroded	50	Very limited		Not limited		Somewhat limited	
		Slope	1.00			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
Nira, moderately eroded	20	Very limited		Very limited		Somewhat limited	
		Slope	1.00	Depth to saturated zone	0.99	Slow refill	0.76
		Seepage	0.24			Cutbanks cave	0.10
						Depth to saturated zone	0.01

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
421C2:							
Gara, moderately eroded	35	Somewhat limited		Not limited		Very limited	
		Slope	0.92			Depth to water	1.00
		Seepage	0.24				
Bucknell, moderately eroded	35	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
421D2:							
Gara, moderately eroded	35	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
Bucknell, moderately eroded	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
421E2:							
Gara, moderately eroded	40	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
Bucknell, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
435:							
Zook, occasionally flooded	40	Not limited		Very limited		Very limited	
				Depth to saturated zone	1.00	Slow refill	1.00
				Hard to pack	0.18	Cutbanks cave	0.10
Mt. Sterling, occasionally flooded	35	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
						Cutbanks cave	0.10
469C2:							
Lamoni, moderately eroded	35	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
Clarinda, moderately eroded	30	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.92		
Shelby, moderately eroded	20	Somewhat limited		Not limited		Very limited	
		Slope	0.92			Depth to water	1.00
		Seepage	0.24				

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
469C3:							
Lamoni, severely eroded	35	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
Clarinda, severely eroded	30	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
				Hard to pack	0.92		
Shelby, severely eroded	20	Somewhat limited		Not limited		Very limited	
		Slope	0.92			Depth to water	1.00
		Seepage	0.24				
470D2:							
Lamoni, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
Shelby, moderately eroded	35	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.24				
545B:							
Zook	35	Somewhat limited		Very limited		Very limited	
		Slope	0.08	Depth to saturated zone	1.00	Slow refill	1.00
						Cutbanks cave	0.10
				Hard to pack	0.18		
Ely	30	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
		Slope	0.08			Cutbanks cave	0.10
Gullied land	20	Not rated		Not rated		Not rated	
569C:							
Nira	45	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.92	Depth to saturated zone	0.99	Slow refill	0.76
		Seepage	0.24			Cutbanks cave	0.10
						Depth to saturated zone	0.01
Clearfield	35	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.92	Depth to saturated zone	1.00	Slow refill	0.76
		Seepage	0.24			Cutbanks cave	0.10
				Hard to pack	0.34		
579E3:							
Bucknell, severely eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
579E3:							
Hedrick, severely eroded	35	Very limited		Very limited		Somewhat limited	
		Slope	1.00	Depth to saturated zone	0.99	Slow refill	0.76
		Seepage	0.24			Cutbanks cave	0.10
						Depth to saturated zone	0.01
794C2:							
Armstrong, moderately eroded	65	Somewhat limited		Very limited		Very limited	
		Slope	0.92	Depth to saturated zone	1.00	Depth to water	1.00
Ladoga, moderately eroded	30	Somewhat limited		Not limited		Somewhat limited	
		Slope	0.92			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
822D2:							
Lamoni, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Depth to water	1.00
870B:							
Sharpsburg, terrace	85	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10
870C2:							
Sharpsburg, terrace, moderately eroded	85	Somewhat limited		Not limited		Somewhat limited	
		Slope	0.92			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
870D2:							
Sharpsburg, terrace, moderately eroded	75	Very limited		Not limited		Somewhat limited	
		Slope	1.00			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
876B:							
Ladoga, terrace	100	Somewhat limited		Not limited		Somewhat limited	
		Seepage	0.24			Depth to saturated zone	0.81
						Slow refill	0.76
						Cutbanks cave	0.10

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
876C2:							
Ladoga, terrace, moderately eroded--	70	Somewhat limited		Not limited		Somewhat limited	
		Slope	0.92			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
876D2:							
Ladoga, terrace, moderately eroded--	75	Very limited		Not limited		Somewhat limited	
		Slope	1.00			Depth to saturated zone	0.81
		Seepage	0.24			Slow refill	0.76
						Cutbanks cave	0.10
2368B:							
Macksburg----------	70	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	1.00	Slow refill	0.76
		Slope	0.08			Cutbanks cave	0.10
Nira----------	25	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.24	Depth to saturated zone	0.99	Slow refill	0.76
		Slope	0.08			Cutbanks cave	0.10
						Depth to saturated zone	0.01
5030:							
Pits, limestone quarries----------	100	Not rated		Not rated		Not rated	
5040:							
Udorthents, loamy---	100	Not rated		Not rated		Not rated	
5041:							
Udorthents, reclaimed----------	100	Not rated		Not rated		Not rated	
AW:							
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:							
Sewage lagoon-------	100	Not rated		Not rated		Not rated	
W:							
Water----------	100	Not rated		Not rated		Not rated	

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

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 particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Properties

The table described in this section gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

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 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary in Part I.

Classification of the soils is determined according to the Unified soil classification system (ASTM) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487–00.

Engineering Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7:												
Wiota, rarely flooded--------	0-8	Silty clay loam, silt loam	CL	A-7, A-6	0	0	100	100	92-100	87-99	38-52	13-22
	8-28	Silty clay loam, silt loam	CL	A-7, A-6	0	0	100	100	92-100	87-99	37-51	13-22
	28-59	Silty clay loam	CL	A-7	0	0	100	100	97-100	93-98	41-49	21-25
	59-80	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	98-100	94-100	35-46	17-24
7B:												
Wiota, rarely flooded--------	0-8	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	92-100	87-99	38-52	13-22
	8-28	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	92-100	87-99	37-51	13-22
	28-59	Silty clay loam	CL	A-7	0	0	100	100	97-100	93-98	41-49	21-25
	59-80	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	98-100	94-100	35-46	17-24
8B:												
Judson----------	0-9	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	92-100	40-51	16-22
	9-28	Silty clay loam	CL, ML	A-7	0	0	100	100	97-100	93-98	43-51	18-22
	28-35	Silty clay loam	CL	A-7	0	0	100	100	97-100	94-99	41-51	21-25
	35-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	96-100	92-99	35-45	17-23
15B:												
Olmitz----------	0-7	Loam	CL	A-6	0	0	100	90-100	79-91	59=68	40-47	16-19
	7-30	Loam, clay loam	CL	A-6	0	0	100	90-100	76-97	58-77	37-50	15-24
	30-60	Clay loam	CL	A-6, A-7	0	0	100	90-100	76-94	61-74	39-48	19-24
Ely----------	0-8	Silty clay loam, silt loam	CL	A-7	0	0	100	100	92-100	86-98	43-57	15-24
	8-24	Silty clay loam	CL	A-7	0	0	100	100	92-100	86-98	41-55	15-24
	24-58	Silty clay loam	CL	A-7, A-6	0	0	100	100	96-100	90-97	39-51	19-25
	58-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	89-100	83-100	30-47	12-25

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
15B:												
Zook	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	98-100	93-100	51-68	22-32
	7-20	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	90-100	51-68	22-32
	20-38	Silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	90-100	86-99	49-65	23-32
	38-61	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	61-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32
16:												
Nodaway, occasionally flooded	0-7	Silt loam, silty clay loam	CL	A-6	0	0	100	95-100	87-100	83-100	30-48	11-24
	7-80	Stratified silt loam to silty clay loam, silt loam, silty clay loam	CL	A-6	0	0	100	95-100	86-100	82-100	29-46	12-25
Kennebec, occasionally flooded	0-7	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	93-100	90-100	37-53	12-21
	7-16	Silt loam, silty clay loam	CL	A-6	0	0	100	100	89-100	86-100	36-54	12-22
	16-35	Silt loam, silty clay loam	CL	A-6	0	0	100	100	89-100	86-100	33-51	12-22
	35-48	Silt loam, silty clay loam	CL	A-6	0	0	100	100	94-100	90-99	36-48	16-23
	48-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	98-100	93-99	36-45	16-21
24C2:												
Shelby, moderately eroded	0-7	Clay loam, loam	CL	A-6	0	0	95-100	85-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
24D2:												
Shelby, moderately eroded	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
24E:												
Shelby	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	71-97	55-78	40-53	16-25
	7-11	Clay loam	CL	A-6, A-7	0	0-5	90-95	80-95	69-92	54-74	38-51	16-25
	11-46	Clay loam	CL	A-6, A-7	0	0-4	91-95	81-95	71-91	56-73	39-50	21-27
	46-60	Loam, clay loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	60-80	Loam, clay loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
24E2:												
Shelby, moderately eroded	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
24F:												
Shelby	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	71-97	55-78	40-53	16-25
	7-11	Clay loam	CL	A-6, A-7	0	0-5	90-95	80-95	69-92	54-74	38-51	16-25
	11-46	Clay loam	CL	A-6, A-7	0	0-4	91-95	81-95	71-91	56-73	39-50	21-27
	46-60	Loam, clay loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	60-80	Loam, clay loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
43:												
Bremer, rarely flooded	0-8	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	91-100	45-59	18-25
	8-19	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	91-100	45-59	18-25
	19-42	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	89-99	47-59	25-33
	42-50	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-51	21-29
	50-60	Silty clay loam	CH, CL	A-7	0	0	100	100	91-100	82-97	36-51	17-29

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
45B:												
Zook	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	98-100	93-100	51-68	22-32
	7-20	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	90-100	51-68	22-32
	20-38	Silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	90-100	86-99	49-65	23-32
	38-61	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	61-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32
Ely	0-8	Silty clay loam, silt loam	CL	A-7	0	0	100	100	92-100	86-98	43-57	15-24
	8-24	Silty clay loam	CL	A-7	0	0	100	100	92-100	86-98	41-55	15-24
	24-58	Silty clay loam	CL	A-7, A-6	0	0	100	100	96-100	90-97	39-51	19-25
	58-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	89-100	83-100	30-47	12-25
54:												
Zook, occasionally flooded	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	98-100	93-100	51-68	22-32
	7-20	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	90-100	51-68	22-32
	20-38	Silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	90-100	86-99	49-65	23-32
	38-61	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	61-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32
54+:												
Zook, occasionally flooded, overwash	0-7	Silt loam	CL	A-6	0	0	100	100	95-100	86-98	35-46	13-18
	7-13	Silt loam	CL	A-6	0	0	100	100	95-100	86-98	35-46	13-18
	13-50	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	93-100	88-100	49-65	23-32
	50-58	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	58-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
76B:												
Ladoga----------	0-7	Silt loam	CL	A-6	0	0	100	100	91-100	90-100	34-52	12-25
	7-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	89-100	88-100	27-47	10-25
	14-51	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	96-100	95-100	46-55	25-31
	51-60	Silty clay loam, silt loam	CL	A-6	0	0	100	100	97-100	96-100	34-44	16-23
76C:												
Ladoga----------	0-7	Silt loam	CH, CL	A-6	0	0	100	100	91-100	90-100	34-52	12-25
	7-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	89-100	88-100	27-47	10-25
	14-51	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	96-100	95-100	46-55	25-31
	51-60	Silty clay loam, silt loam	CL	A-6	0	0	100	100	97-100	96-100	34-44	16-23
76D:												
Ladoga----------	0-7	Silt loam	CL	A-6	0	0	100	100	91-100	90-100	34-52	12-25
	7-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	89-100	88-100	27-47	10-25
	14-51	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	96-100	95-100	46-55	25-31
	51-60	Silty clay loam, silt loam	CL	A-6	0	0	100	100	97-100	96-100	34-44	16-23
76D2:												
Ladoga, moderately eroded---------	0-7	Silt loam	CL	A-6	0	0	100	100	93-100	92-100	33-51	12-25
	7-49	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	94-100	46-55	25-31
	49-63	Silty clay loam	CL	A-7	0	0	100	100	97-100	95-100	37-44	19-23
	63-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	98-100	97-100	34-44	16-23
86:												
Mt. Sterling, occasionally flooded--------	0-7	Silt loam	ML	A-6, A-7	0	0	100	100	95-100	89-98	29-43	12-18
	7-26	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	94-100	88-100	28-41	12-21
	26-54	Silty clay loam, silty clay	CH	A-7	0	0	100	100	95-100	91-100	45-57	25-33
	54-80	Silty clay loam, silty clay	CL	A-7	0	0	100	100	93-100	89-100	45-60	25-35

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
86:												
Zook, occasionally flooded, overwash-------	0-7	Silt loam	CL	A-6	0	0	100	100	95-100	86-98	35-46	13-18
	7-13	Silt loam	CL	A-6	0	0	100	100	95-100	86-98	35-46	13-18
	13-50	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	93-100	88-100	49-65	23-32
	50-58	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	58-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32
88:												
Nevin, rarely flooded--------	0-8	Silt loam, silty clay loam	CL	A-7	0	0	100	100	99-100	93-96	44-53	18-20
	8-30	Silty clay loam	CL	A-7	0	0	100	100	96-99	90-93	44-53	18-20
	30-46	Silty clay loam	CL	A-7	0	0	100	100	97-100	91-96	41-49	21-25
	46-62	Silty clay loam, silt loam	CL	A-7	0	0	100	100	93-100	87-98	35-47	17-26
93D2:												
Shelby, moderately eroded---------	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
Adair, moderately eroded---------	0-7	Clay loam, silty clay loam	CL	A-7	0	0	100	100	86-100	73-89	39-55	16-28
	7-17	Clay, silty clay, clay loam	CH, CL	A-7	0	0	95-100	76-100	61-100	51-89	49-72	27-44
	17-60	Clay loam	CL	A-6, A-7	0	0	95-100	78-100	70-98	59-83	39-49	21-27
	60-76	Clay loam	CL	A-6, A-7	0	0	95-100	79-100	69-96	54-77	39-49	21-27
	76-80	Clay loam	CL	A-6, A-7	0	0	96-100	79-100	70-96	55-77	39-49	21-27

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
93E2:												
Shelby, moderately eroded	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
Adair, moderately eroded	0-7	Clay loam, silty clay loam	CL	A-7	0	0	100	100	86-100	73-89	39-55	16-28
	7-17	Clay, silty clay, clay loam	CH, CL	A-7	0	0	95-100	76-100	61-100	51-89	49-72	27-44
	17-60	Clay loam	CL	A-6, A-7	0	0	95-100	78-100	70-98	59-83	39-49	21-27
	60-76	Clay loam	CL	A-6, A-7	0	0	95-100	79-100	69-96	54-77	39-49	21-27
	76-80	Clay loam	CL	A-6, A-7	0	0	96-100	79-100	70-96	55-77	39-49	21-27
172:												
Wabash, frequently ponded, occasionally flooded	0-6	Silty clay	CH	A-7	0	0	100	100	90-100	88-100	58-81	28-43
	6-19	Silty clay, clay	CH	A-7	0	0	100	100	89-100	85-100	55-86	29-45
	19-60	Silty clay, clay	CH	A-7	0	0	100	100	89-100	85-100	53-82	29-46
179E:												
Gara	0-7	Loam	CL	A-4, A-6	0	0	95-100	82-100	65-100	49-92	29-52	7-25
	7-12	Loam	CL	A-6	0	0	95-100	82-100	68-99	51-79	31-49	12-25
	12-45	Clay loam, loam	CL	A-6	0	0-4	91-95	81-95	68-90	53-72	35-47	17-25
	45-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25
179F:												
Gara	0-7	Loam	CL	A-4, A-6	0	0	95-100	82-100	65-100	49-82	29-52	7-25
	7-12	Loam	CL	A-6	0	0	95-100	82-100	68-99	51-79	31-49	12-25
	12-45	Clay loam, loam	CL	A-6	0	0-4	91-95	81-95	68-90	53-72	35-47	17-25
	45-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25
179G:												
Gara	0-7	Loam	CL	A-4, A-6	0	0	95-100	82-100	65-100	49-82	29-52	7-25
	7-12	Loam	CL	A-6	0	0	95-100	82-100	68-99	51-79	31-49	12-25
	12-45	Clay loam, loam	CL	A-6	0	0-4	91-95	81-95	68-90	53-72	35-47	17-25
	45-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
192D2:												
Adair, moderately eroded	0-7	Clay loam, silty clay loam	CL	A-7	0	0	100	100	86-100	73-89	39-55	16-28
	7-17	Clay, silty clay, clay loam	CH, CL	A-7	0	0	95-100	76-100	61-100	51-89	49-72	27-44
	17-60	Clay loam	CL	A-6, A-7	0	0	95-100	78-100	70-98	59-83	39-49	21-27
	60-76	Clay loam	CL	A-6, A-7	0	0	95-100	79-100	69-96	54-77	39-49	21-27
	76-80	Clay loam	CL	A-6, A-7	0	0	96-100	79-100	70-96	55-77	39-49	21-27
220:												
Nodaway, occasionally flooded	0-7	Silt loam, silty clay loam	CL	A-6	0	0	100	95-100	87-100	83-100	30-48	11-24
	7-80	Stratified silt loam to silty clay loam, silt loam, silty clay loam	CL	A-6	0	0	100	95-100	86-100	82-100	29-46	12-25
222C2:												
Clarinda, moderately eroded	0-6	Silty clay loam	CL	A-7	0	0	100	94-100	87-100	84-100	39-56	17-28
	6-80	Clay, silty clay	CH	A-7	0	0	94-100	89-100	79-100	75-100	51-71	29-44
222D:												
Clarinda	0-5	Silty clay loam	CL	A-7	0	0	100	94-100	87-100	84-100	41-58	17-28
	5-11	Silty clay loam	CL	A-7	0	0	100	94-100	87-100	84-100	41-58	17-28
	11-19	Silty clay, clay	CH	A-7	0	0	100	94-100	86-100	82-100	50-66	29-40
	19-67	Silty clay, clay	CH	A-7	0	0	100	94-100	84-100	80-100	51-71	29-44
222D2:												
Clarinda, moderately eroded	0-6	Silty clay loam	CL	A-7	0	0	100	94-100	87-100	84-100	39-56	17-28
	6-80	Clay, silty clay	CH	A-7	0	0	94-100	89-100	79-100	75-100	51-71	29-44
222D3:												
Clarinda, severely eroded	0-4	Silty clay, clay	CH	A-7	0	0	100	94-100	86-100	82-100	53-69	29-40
	4-80	Clay, silty clay	CH	A-7	0	0	94-100	89-100	79-100	75-100	49-69	29-44

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
248:												
Wabash, occasionally ponded, occasionally flooded--------	0-7	Silty clay loam	CH	A-7	0	0	100	100	95-100	89-94	53-63	25-28
	7-15	Silty clay loam	CH	A-7	0	0	100	100	95-100	89-94	53-63	25-28
	15-36	Silty clay, clay	CH	A-7	0	0	100	100	89-100	85-100	57-86	29-45
	36-80	Silty clay, clay	CH	A-7	0	0	100	100	89-100	85-100	53-82	29-46
269:												
Humeston, occasionally flooded--------	0-8	Silt loam, silty clay loam	CL	A-6	0	0	100	100	95-100	87-93	40-49	16-21
	8-13	Silt loam, silty clay loam	CL	A-6	0	0	100	100	95-100	87-93	40-49	16-21
	13-22	Silt loam	CL	A-6	0	0	100	100	94-100	85-91	33-42	13-18
	22-26	Silty clay loam	CL	A-7	0	0	100	100	97-100	89-94	40-48	21-25
	26-50	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	94-100	90-100	47-61	25-35
	50-60	Silty clay loam	CL, CH	A-7	0	0	100	100	96-100	89-97	40-50	21-27
273B:												
Olmitz----------	0-7	Loam	CL	A-6	0	0	100	90-100	79-91	59-68	40-47	16-19
	7-30	Loam, clay loam	CL	A-6	0	0	100	90-100	76-97	58-77	37-50	15-24
	30-60	Clay loam	CL	A-6, A-7	0	0	100	90-100	79-94	61-74	39-48	19-24
273C:												
Olmitz----------	0-7	Loam	CL	A-6	0	0	100	90-100	79-91	59-68	40-47	16-19
	7-30	Loam, clay loam	CL	A-6	0	0	100	90-100	76-97	58-77	37-50	15-24
	30-60	Clay loam	CL	A-6, A-7	0	0	100	90-100	79-94	61-74	39-48	19-24
324C2:												
Dickman, moderately eroded---------	0-6	Fine sandy loam	SC-SM	A-4, A-2	0	0	95-100	90-100	76-92	46-59	22-33	6-12
	6-19	Fine sandy loam, sandy loam	SC-SM, SC	A-4, A-2	0	0	95-100	90-100	80-97	32-44	20-31	6-12
	19-46	Loamy fine sand	SM	A-2	0	0	95-100	90-100	82-97	21-29	15-23	1-6
	46-56	Fine sandy loam	SC-SM	A-2	0	0	95-100	90-100	80-97	32-44	20-30	6-12
	56-69	Fine sand	SM	A-2	0	0	95-100	91-100	83-97	15-22	15-23	1-6
	69-80	Silty clay loam, silt loam	CL	A-6	0	0	95-100	82-100	78-100	77-100	29-40	13-21

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
324D2:												
Dickman, moderately eroded	0-6	Fine sandy loam	SC-SM	A-6	0	0	95-100	90-100	76-92	46-59	22-33	6-12
	6-19	Fine sandy loam, sandy loam	SC-SM, SC	A-4, A-2	0	0	95-100	90-100	80-97	32-44	20-31	6-12
	19-46	Loamy fine sand	SM	A-2	0	0	95-100	90-100	82-97	21-29	15-23	1-6
	46-56	Fine sandy loam	SC-SM	A-2	0	0	95-100	90-100	80-97	32-44	20-30	6-12
	56-69	Fine sand	SM	A-2	0	0	95-100	91-100	83-97	15-22	15-23	1-6
	69-80	Silty clay loam, silt loam	CL	A-6	0	0	95-100	82-100	78-100	77-100	29-40	13-21
354.												
Aquolls, ponded												
368:												
Macksburg	0-6	Silty clay loam	CL	A-7	0	0	100	100	99-100	98-100	48-56	21-24
	6-24	Silty clay loam	CL	A-7	0	0	100	100	99-100	98-100	46-54	21-24
	24-42	Silty clay loam, silty clay	CH	A-7	0	0	100	100	96-100	95-100	50-59	26-30
	42-73	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	97-100	95-100	38-47	18-23
369:												
Winterset	0-7	Silty clay loam	CL	A-7	0	0	100	100	97-100	95-100	46-56	19-24
	7-19	Silty clay loam	CL	A-7	0	0	100	100	98-100	96-100	49-56	22-25
	19-58	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	95-100	48-59	26-30
	58-69	Silty clay loam, silt loam	CL	A-7	0	0	100	100	94-100	92-100	35-47	17-25
370:												
Sharpsburg	0-8	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	43-53	18-24
	8-17	Silty clay loam	CH, CL	A-7	0	0	100	100	97-100	95-99	43-50	21-24
	17-38	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	48-57	26-30
	38-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	95-100	94-100	35-46	17-24
370B:												
Sharpsburg	0-8	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	43-53	18-24
	8-17	Silty clay loam	CH, CL	A-7	0	0	100	100	97-100	95-99	43-50	21-24
	17-38	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	48-57	26-30
	38-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	95-100	94-100	35-46	17-24

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
371C2:												
Sharpsburg, moderately eroded---------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	42-52	18-24
	7-31	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	46-55	26-31
	31-70	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	93-100	92-100	35-50	17-27
	70-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	97-100	35-46	17-24
Nira, moderately eroded---------	0-7	Silty clay loam	CL, CH	A-7	0	0	100	100	98-100	96-100	44-51	21-24
	7-12	Silty clay loam	CL	A-7	0	0	100	100	99-100	97-100	42-49	23-27
	12-45	Silty clay loam	CL	A-6, A-7	0	0	100	100	98-100	96-100	39-45	21-24
	45-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	96-100	95-100	35-42	17-21
371D2:												
Sharpsburg, moderately eroded---------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	42-52	18-24
	7-31	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	46-55	26-31
	31-70	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	93-100	92-100	35-50	17-27
	70-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	97-100	35-46	17-24
Nira, moderately eroded---------	0-7	Silty clay loam	CL, CH	A-7	0	0	100	100	98-100	96-100	44-51	21-24
	7-12	Silty clay loam	CL	A-7	0	0	100	100	99-100	97-100	42-49	23-27
	12-45	Silty clay loam	CL	A-6, A-7	0	0	100	100	98-100	96-100	39-45	21-24
	45-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	96-100	95-100	35-42	17-21
421C2:												
Gara, moderately eroded---------	0-5	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	82-100	62-98	45-78	28-51	7-25
	5-43	Clay loam	CL	A-6	0	0-4	91-95	81-95	72-90	57-72	39-47	21-25
	43-62	Clay loam	CL	A-7, A-6	0	0-4	91-95	81-95	72-90	57-72	39-46	21-25
	62-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
421C2:												
Bucknell, moderately eroded---------	0-7	Silty clay loam	CL	A-7, A-6	0	0	94-100	89-100	84-100	74-93	39-52	17-25
	7-34	Clay	CH	A-7	0	0	95-100	89-100	81-100	68-86	49-61	29-37
	34-71	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	76-97	52-25	37-50	19-29
	71-80	Clay loam	CL	A-6, A-7	0	0	95-100	91-100	79-97	59-75	39-50	21-29
421D2:												
Gara, moderately eroded---------	0-5	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	82-100	62-98	45-78	28-51	7-25
	5-43	Clay loam	CL	A-6	0	0-4	91-95	81-95	72-90	57-72	39-47	21-25
	43-62	Clay loam	CL	A-7, A-6	0	0-4	91-95	81-95	72-90	57-72	39-46	21-25
	62-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25
Bucknell, moderately eroded---------	0-7	Silty clay loam	CL	A-7, A-6	0	0	94-100	89-100	84-100	74-93	39-52	17-25
	7-34	Clay	CH	A-7	0	0	95-100	89-100	81-100	68-86	49-61	29-37
	34-71	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	76-97	57-75	37-50	19-29
	71-80	Clay loam	CL	A-6, A-7	0	0	95-100	91-100	79-97	59-75	39-50	21-29
421E2:												
Gara, moderately eroded---------	0-5	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	82-100	62-98	45-78	28-51	7-25
	5-43	Clay loam	CL	A-6	0	0-4	91-95	81-95	72-90	57-72	39-47	21-25
	43-62	Clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	72-90	57-72	39-46	21-25
	62-80	Loam, clay loam	CL	A-7, A-6	0	0-4	91-95	82-95	70-92	55-75	34-46	16-25
Bucknell, moderately eroded---------	0-7	Silty clay loam	CL	A-7, A-6	0	0	94-100	89-100	84-100	74-93	39-52	17-25
	7-34	Clay	CH	A-7	0	0	95-100	89-100	81-100	68-86	49-61	29-37
	34-71	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	76-97	57-75	37-50	19-29
	71-80	Clay loam	CL	A-6, A-7	0	0	95-100	91-100	79-97	59-75	39-50	21-29

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
435:												
Zook, occasionally flooded--------	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	98-100	93-100	51-68	22-32
	7-20	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	90-100	51-68	22-32
	20-38	Silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	90-100	86-99	49-65	23-32
	38-61	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	61-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32
Mt. Sterling, occasionally flooded--------	0-7	Silt loam	ML	A-6, A-7	0	0	100	100	95-100	89-98	29-43	12-18
	7-26	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	94-100	88-100	28-41	12-21
	26-54	Silty clay loam, silty clay	CH	A-7	0	0	100	100	95-100	91-100	45-57	25-33
	54-80	Silty clay loam, silty clay	CL	A-7	0	0	100	100	93-100	89-100	45-60	25-35
469C2:												
Lamoni, moderately eroded---------	0-6	Clay loam, silty clay loam	CL	A-7	0	0	94-100	89-100	82-100	74-97	41-56	19-28
	6-23	Clay loam, clay	CH	A-7	0	0	95-100	89-100	69-100	62-94	42-68	21-40
	23-55	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-96	64-79	39-49	21-27
	55-80	Clay loam	CL	A-7, A-6	0	0	95-100	91-100	80-96	64-79	39-49	21-27
Clarinda, moderately eroded---------	0-6	Silty clay loam	CL	A-7	0	0	100	94-100	87-100	84-100	39-56	17-28
	6-80	Clay, silty clay	CH	A-7	0	0	94-100	89-100	79-100	75-100	51-71	29-44
Shelby, moderately eroded---------	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
469C3:												
Lamoni, severely eroded	0-7	Clay loam, silty clay loam	CL	A-6, A-7	0	0	95-100	90-100	78-100	65-86	40-55	19-28
	7-14	Clay loam, clay	CH	A-7	0	0	95-100	89-100	67-100	58-90	41-66	21-40
	14-48	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-96	64-79	39-49	21-27
	48-60	Clay loam	CL	A-7, A-6	0	0	95-100	91-100	80-96	64-79	39-49	21-27
Clarinda, severely eroded	0-4	Silty clay, clay	CH	A-7	0	0	100	94-100	86-100	82-100	53-69	29-40
	4-80	Clay, silty clay	CH	A-7	0	0	94-100	89-100	79-100	75-100	49-69	29-44
Shelby, severely eroded	0-2	Clay loam, loam	CL	A-6	0	0	95-100	83-100	70-96	55-77	36-50	16-25
	2-48	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	48-62	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	62-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
470D2:												
Lamoni, moderately eroded	0-6	Clay loam, silty clay loam	CL	A-7	0	0	94-100	89-100	82-100	74-97	41-56	19-28
	6-23	Clay loam, clay	CH	A-7	0	0	95-100	89-100	69-100	62-94	42-68	21-40
	23-55	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-96	64-79	39-49	21-27
	55-80	Clay loam	CL	A-7, A-6	0	0	95-100	91-100	80-96	64-79	39-49	21-27
Shelby, moderately eroded	0-7	Clay loam, loam	CL	A-6	0	0	95-100	82-100	70-96	54-77	39-52	16-25
	7-31	Clay loam	CL	A-6, A-7	0	0-5	90-95	81-95	71-91	56-73	39-50	21-27
	31-48	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	81-95	70-92	54-74	35-47	17-26
	48-80	Clay loam, loam	CL	A-6, A-7	0	0-4	91-95	82-95	70-92	55-74	35-47	17-26
545B:												
Zook	0-7	Silty clay loam, silty clay	CH	A-7	0	0	100	100	98-100	93-100	51-68	22-32
	7-20	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	90-100	51-68	22-32
	20-38	Silty clay, silty clay loam	CH, CL	A-7	0	0	100	100	90-100	86-99	49-65	23-32
	38-61	Silty clay, silty clay loam	CH	A-7	0	0	100	100	96-100	92-100	50-63	26-32
	61-80	Silty clay loam, silty clay, silt loam	CH, CL	A-6, A-7	0	0	100	100	87-100	83-100	31-56	13-32

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
545B:												
Ely----------	0-8	Silty clay loam, silt loam	CL	A-7	0	0	100	100	92-100	86-98	43-57	15-24
	8-24	Silty clay loam	CL	A-7	0	0	100	100	92-100	86-98	41-55	15-24
	24-58	Silty clay loam	CL	A-7, A-6	0	0	100	100	96-100	90-97	39-51	19-25
	58-80	Silt loam, silty clay loam	CL	A-6	0	0	100	100	89-100	83-100	30-47	12-25
Gullied land.												
569C:												
Nira----------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	98-100	96-100	45-53	21-24
	7-11	Silty clay loam	CL	A-7	0	0	100	100	98-100	96-100	43-50	21-24
	11-20	Silty clay loam	CL	A-7	0	0	100	100	99-100	97-100	42-49	23-27
	20-40	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	96-100	39-45	21-24
	40-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	97-100	95-100	35-42	17-21
Clearfield------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	97-100	95-100	47-56	22-27
	7-17	Silty clay loam	CH	A-7	0	0	100	100	97-100	95-100	45-54	22-27
	17-54	Silty clay loam, silty clay	CH	A-7	0	0	100	100	94-100	93-100	41-52	22-30
	54-71	Silty clay, silty clay loam, clay	CH	A-7	0	0	100	100	84-100	81-100	47-75	25-48
579E3:												
Bucknell, severely eroded	0-3	Clay loam, silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-99	69-86	37-50	17-25
	3-12	Clay loam	CH	A-7	0	0	95-100	90-100	79-100	67-88	37-50	19-29
	12-20	Clay	CH	A-7	0	0	94-100	89-100	81-100	68-86	49-61	29-37
	20-68	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	80-100	68-88	37-50	19-29
	68-80	Clay loam	CL	A-6, A-7	0	0	95-100	91-100	79-97	59-75	39-50	21-29
Hedrick, severely eroded	0-2	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	92-100	91-100	33-45	13-21
	2-22	Silty clay loam	CL	A-7	0	0	100	100	97-100	96-100	41-49	22-26
	22-53	Silty clay loam	CL	A-6	0	0	100	100	97-100	96-100	39-46	21-25
	53-74	Silty clay loam, silt loam	CL	A-7	0	0	100	100	95-100	93-100	35-45	17-24
	74-80	Clay loam	CL	A-6, A-7	0	0	95-100	78-100	70-98	59-83	40-49	21-27

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
794C2:												
Armstrong, moderately eroded	0-5	Silty clay loam, clay loam	CL	A-7	0	0-5	90-100	72-100	65-97	52-80	41-51	19-25
	5-11	Clay loam	CL	A-7	0	0-5	90-100	72-100	64-95	49-74	43-53	25-30
	11-18	Clay loam, clay	CH, CL	A-7	0	0-5	90-100	71-100	54-100	41-82	46-73	26-45
	18-50	Clay loam	CL	A-6	0	0-4	91-100	74-100	65-93	49-72	40-48	21-26
	50-80	Clay loam	CL	A-6	0	0-4	91-100	74-100	64-94	48-73	37-46	19-25
Ladoga, moderately eroded	0-7	Silt loam	CL	A-6	0	0	100	100	93-100	92-100	33-51	12-25
	7-49	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	94-100	46-55	25-31
	49-63	Silty clay loam	CL	A-7	0	0	100	100	97-100	95-100	37-44	19-23
	63-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	98-100	97-100	34-44	16-23
822D2:												
Lamoni, moderately eroded	0-6	Clay loam, silty clay loam	CL	A-7	0	0	94-100	89-100	82-100	74-97	41-56	19-28
	6-23	Clay loam, clay	CH	A-7	0	0	95-100	89-100	69-100	62-94	42-68	21-40
	23-55	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-96	64-79	39-49	21-27
	55-80	Clay loam	CL	A-7, A-6	0	0	95-100	91-100	80-96	64-79	39-49	21-27
870B:												
Sharpsburg, terrace	0-8	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	43-53	18-24
	8-17	Silty clay loam	CH, CL	A-7	0	0	100	100	97-100	95-99	43-50	21-24
	17-38	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	48-57	26-30
	38-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	95-100	94-100	35-46	17-24

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
870C2:												
Sharpsburg, terrace, moderately eroded---------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	42-52	18-24
	7-31	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	46-55	26-31
	31-70	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	93-100	92-100	35-50	17-27
	70-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	97-100	35-46	17-24
870D2:												
Sharpsburg, terrace, moderately eroded---------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	94-100	42-52	18-24
	7-31	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	96-100	95-100	46-55	26-31
	31-70	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	93-100	92-100	35-50	17-27
	70-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	97-100	35-46	17-24
876B:												
Ladoga, terrace	0-7	Silt loam	CL	A-6	0	0	100	100	91-100	90-100	34-52	12-25
	7-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	89-100	88-100	27-47	10-25
	14-51	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	96-100	95-100	46-55	25-31
	51-60	Silty clay loam, silt loam	CL	A-6	0	0	100	100	97-100	96-100	34-44	16-23
876C2:												
Ladoga, terrace, moderately eroded---------	0-7	Silt loam	CL	A-6	0	0	100	100	93-100	92-100	33-51	12-25
	7-49	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	94-100	46-55	25-31
	49-63	Silty clay loam	CL	A-7	0	0	100	100	97-100	95-100	37-44	19-23
	63-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	98-100	97-100	34-44	16-23

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
876D2:												
Ladoga, terrace, moderately												
eroded---------	0-7	Silt loam	CL	A-6	0	0	100	100	93-100	92-100	33-51	12-25
	7-49	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	94-100	46-55	25-31
	49-63	Silty clay loam	CL	A-7	0	0	100	100	97-100	95-100	37-44	19-23
	63-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	98-100	97-100	34-44	16-23
2368B:												
Macksburg-------	0-6	Silty clay loam	CL	A-7	0	0	100	100	99-100	98-100	48-56	21-24
	6-24	Silty clay loam	CL	A-7	0	0	100	100	99-100	98-100	46-54	21-24
	24-42	Silty clay loam, silty clay	CH	A-7	0	0	100	100	96-100	95-100	50-59	26-30
	42-73	Silt loam, silty clay loam	CL	A-7, A-6	0	0	100	100	97-100	95-100	38-47	18-23
Nira------------	0-7	Silty clay loam	CH, CL	A-7	0	0	100	100	98-100	96-100	45-53	21-24
	7-11	Silty clay loam	CL	A-7	0	0	100	100	98-100	96-100	43-50	21-24
	11-20	Silty clay loam	CL	A-7	0	0	100	100	99-100	97-100	42-49	23-27
	20-40	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	98-100	96-100	39-45	21-24
	40-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	97-100	95-100	35-42	17-21
5030.												
Pits, limestone quarries												
5040:												
Udorthents, loamy----------	0-80	Variable	---	---	0	---	100	100	---	---	---	15-30
5041.												
Udorthents, reclaimed												
AW.												
Animal waste lagoon												

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SL. Sewage lagoon												
W. Water												

Physical Properties

The table described in this section shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each 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 affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each 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 linear extensibility, 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. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (Ksat). The estimates in the table indicate the rate of water movement, in micrometers per second, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. 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.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. 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) and the Revised Universal Soil Loss Equation (RUSLE) 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 and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the “National Soil Survey Handbook,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
7:													
Wiota, rarely flooded	85	0-8	20-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.5-4.5	.32	.32	5	7	38
		8-28	20-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.43	.43			
		28-59	30-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		59-80	25-34	1.40-1.50	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
7B:													
Wiota, rarely flooded	85	0-8	20-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.5-4.5	.32	.32	5	7	38
		8-28	20-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.43	.43			
		28-59	30-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		59-80	25-34	1.40-1.50	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
8B:													
Judson	85	0-9	24-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		9-28	27-32	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.37	.37			
		28-35	30-35	1.35-1.45	1.00-10.00	0.21-0.23	3.0-5.9	1.0-3.0	.43	.43			
		35-60	25-32	1.35-1.45	1.00-10.00	0.21-0.23	3.0-5.9	0.0-1.0	.49	.49			
15B:													
Olmitz	35	0-7	24-27	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	3.0-4.0	.20	.24	5	6	48
		7-30	22-34	1.40-1.50	1.00-10.00	0.15-0.17	3.0-5.9	2.0-3.0	.28	.32			
		30-60	27-34	1.45-1.55	1.00-10.00	0.14-0.16	3.0-5.9	1.0-2.0	.28	.32			
Ely	30	0-8	22-34	1.30-1.35	1.00-10.00	0.21-0.23	0.0-2.9	5.0-6.0	.32	.32	5	4	86
		8-24	22-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	4.0-5.0	.37	.37			
		24-58	28-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-3.0	.43	.43			
		58-80	18-35	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.0	.49	.49			
Zook	20	0-7	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		7-20	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.32	.32			
		20-38	32-45	1.30-1.45	0.10-1.00	0.11-0.13	6.0-8.9	3.0-5.0	.32	.32			
		38-61	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		61-80	20-45	1.35-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
16:													
Nodaway, occasionally flooded	55	0-7	18-35	1.40-1.50	1.00-10.00	0.22-0.24	3.0-5.9	1.5-2.5	.43	.43	5	6	48
		7-80	18-35	1.40-1.50	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
16:													
Kennebec, occasionally flooded	35	0-7	18-30	1.40-1.50	1.00-10.00	0.22-0.24	0.0-2.9	4.0-6.0	.37	.37	5	6	48
		7-16	18-32	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.5-5.5	.37	.37			
		16-35	18-32	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	2.0-4.0	.43	.43			
		35-48	24-33	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		48-80	24-30	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	1.0-2.0	.49	.49			
24C2:													
Shelby, moderately eroded	85	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
24D2:													
Shelby, moderately eroded	70	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
24E:													
Shelby	60	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	3.0-4.0	.20	.24	5	6	48
		7-11	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.0-3.0	.20	.24			
		11-46	30-38	1.55-1.65	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		46-60	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		60-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
24E2:													
Shelby, moderately eroded	65	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
24F:													
Shelby	65	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	3.0-4.0	.20	.24	5	6	48
		7-11	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.0-3.0	.20	.24			
		11-46	30-38	1.55-1.65	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		46-60	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		60-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
43:													
Bremer, rarely flooded	85	0-8	27-36	1.30-1.35	1.00-10.00	0.21-0.23	0.0-2.9	5.0-7.0	.28	.28	5	7	38
		8-19	27-36	1.30-1.35	1.00-10.00	0.21-0.23	0.0-2.9	5.0-7.0	.37	.37			
		19-42	35-45	1.30-1.45	1.00-10.00	0.18-0.20	6.0-8.9	1.0-2.0	.37	.37			
		42-50	30-40	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		50-60	25-40	1.40-1.50	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
45B:													
Zook	75	0-7	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		7-20	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.32	.32			
		20-38	32-45	1.30-1.45	0.10-1.00	0.11-0.13	6.0-8.9	3.0-5.0	.32	.32			
		38-61	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		61-80	20-45	1.35-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
Ely	20	0-8	22-34	1.30-1.35	1.00-10.00	0.21-0.23	0.0-2.9	5.0-6.0	.32	.32	5	7	38
		8-24	22-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	4.0-5.0	.37	.37			
		24-58	28-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-3.0	.43	.43			
		58-80	18-35	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.0	.49	.49			
54:													
Zook, occasionally flooded	90	0-7	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		7-20	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.32	.32			
		20-38	32-45	1.30-1.45	0.10-1.00	0.11-0.13	6.0-8.9	3.0-5.0	.32	.32			
		38-61	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		61-80	20-45	1.35-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
54+:													
Zook, occasionally flooded, overwash	80	0-7	20-26	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-4.0	.43	.43	5	6	48
		7-13	20-26	1.45-1.50	1.00-10.00	0.22-0.24	3.0-5.9	2.0-4.0	.49	.49			
		13-50	32-45	1.30-1.45	0.10-1.00	0.21-0.23	6.0-8.9	3.0-5.0	.32	.32			
		50-58	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		58-80	20-45	1.30-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
76B:													
Ladoga	95	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.5-3.5	.37	.37	5	6	48
		7-14	15-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	0.5-1.0	.55	.55			
		14-51	35-42	1.30-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		51-60	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
76C:													
Ladoga	75	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.5-3.5	.37	.37	5	6	48
		7-14	15-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	0.5-1.0	.55	.55			
		14-51	35-42	1.30-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		51-60	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
76D:													
Ladoga	85	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.5-3.5	.37	.37	5	6	48
		7-14	15-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	0.5-1.0	.55	.55			
		14-51	35-42	1.30-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		51-60	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
76D2:													
Ladoga, moderately eroded	60	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-3.0	.43	.43	5	6	48
		7-49	35-42	1.35-1.45	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		49-63	27-32	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		63-80	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
86:													
Mt. Sterling, occasionally flooded	60	0-7	18-27	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	1.0-3.0	.37	.37	5	6	48
		7-26	18-30	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.5-1.0	.37	.37			
		26-54	35-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	0.0-1.0	.28	.28			
		54-80	35-48	1.30-1.35	0.10-1.00	0.10-0.12	6.0-8.9	0.0-1.0	.28	.28			
Zook, occasionally flooded, overwash	25	0-7	20-26	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-4.0	.43	.43	5	6	48
		7-13	20-26	1.45-1.50	1.00-10.00	0.22-0.24	3.0-5.9	2.0-4.0	.49	.49			
		13-50	32-45	1.30-1.45	0.10-1.00	0.21-0.23	6.0-8.9	3.0-5.0	.32	.32			
		50-58	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		58-80	20-45	1.30-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
88:													
Nevin, rarely flooded	90	0-8	26-29	1.30-1.40	1.00-10.00	0.22-0.24	0.0-2.9	4.0-6.0	.32	.32	5	6	48
		8-30	26-29	1.25-1.35	1.00-10.00	0.21-0.23	3.0-5.9	4.0-6.0	.37	.37			
		30-46	30-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		46-62	25-36	1.40-1.50	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
93D2:													
Shelby, moderately eroded	35	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
93D2:													
Adair, moderately eroded	25	0-7	24-40	1.45-1.55	0.10-1.00	0.17-0.19	3.0-5.0	2.2-3.2	.28	.28	3	6	48
		7-17	38-60	1.25-1.40	0.10-1.00	0.09-0.11	6.0-11.2	0.5-1.0	.20	.24			
		17-60	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.28	.37			
		60-76	30-38	1.55-1.65	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.28	.37			
		76-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
93E2:													
Shelby, moderately eroded	45	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
Adair, moderately eroded	30	0-7	24-40	1.45-1.55	0.10-1.00	0.17-0.19	3.0-5.0	2.2-3.2	.28	.28	3	6	48
		7-17	38-60	1.25-1.40	0.10-1.00	0.09-0.11	6.0-11.2	0.5-1.0	.20	.24			
		17-60	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.28	.37			
		60-76	30-38	1.55-1.65	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.28	.37			
		76-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
172:													
Wabash, frequently ponded, occasionally flooded	90	0-6	40-60	1.25-1.40	0.01-0.10	0.12-0.14	9.0-11.9	4.0-6.0	.20	.20	5	4	86
		6-19	40-60	1.25-1.40	0.01-0.10	0.11-0.13	9.0-11.9	2.0-4.0	.28	.28			
		19-60	40-60	1.25-1.40	0.01-0.10	0.10-0.12	9.0-11.9	1.0-2.0	.28	.28			
179E:													
Gara	60	0-7	12-35	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		7-12	18-35	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	1.0-2.0	.28	.28			
		12-45	25-35	1.55-1.65	1.00-10.00	0.15-0.19	3.0-5.9	0.0-1.0	.28	.32			
		45-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
179F:													
Gara	65	0-7	12-35	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		7-12	18-35	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	1.0-2.0	.28	.28			
		12-45	25-35	1.55-1.65	1.00-10.00	0.15-0.19	3.0-5.9	0.0-1.0	.28	.32			
		45-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
179G:													
Gara	70	0-7	12-35	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		7-12	18-35	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	1.0-2.0	.28	.28			
		12-45	25-35	1.55-1.65	1.00-10.00	0.15-0.19	3.0-5.9	0.0-1.0	.28	.32			
		45-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
192D2:													
Adair, moderately eroded	55	0-7	24-40	1.45-1.55	0.10-1.00	0.17-0.19	3.0-5.0	2.2-3.2	.28	.28	3	6	48
		7-17	38-60	1.25-1.40	0.10-1.00	0.09-0.11	6.0-11.2	0.5-1.0	.20	.24			
		17-60	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.28	.37			
		60-76	30-38	1.55-1.65	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.28	.37			
		76-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
220:													
Nodaway, occasionally flooded	80	0-7	18-35	1.40-1.50	1.00-10.00	0.22-0.24	3.0-5.9	1.5-2.5	.43	.43	5	6	48
		7-80	18-35	1.40-1.50	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
222C2:													
Clarinda, moderately eroded	75	0-6	25-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.37	.37	3	7	38
		6-80	40-60	1.30-1.40	0.01-0.10	0.08-0.12	9.0-11.9	0.0-0.5	.28	.32			
222D:													
Clarinda	75	0-5	25-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	3	7	38
		5-11	25-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32			
		11-19	40-55	1.30-1.40	0.01-0.10	0.11-0.13	6.0-8.9	0.5-1.0	.32	.32			
		19-67	40-60	1.30-1.40	0.01-0.10	0.08-0.10	9.0-11.9	0.0-0.5	.28	.28			
222D2:													
Clarinda, moderately eroded	70	0-6	25-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.37	.37	3	6	38
		6-80	40-60	1.30-1.40	0.01-0.10	0.08-0.12	9.0-11.9	0.0-0.5	.28	.32			
222D3:													
Clarinda, severely eroded	70	0-4	40-55	1.30-1.40	0.01-0.10	0.12-0.14	6.0-8.9	1.7-2.7	.24	.24	2	4	86
		4-80	40-60	1.30-1.40	0.01-0.10	0.08-0.12	9.0-11.9	0.0-0.5	.28	.32			
248:													
Wabash, occasionally ponded, occasionally flooded	85	0-7	35-40	1.35-1.50	0.01-0.10	0.21-0.23	6.0-8.9	4.0-6.0	.28	.28	5	4	86
		7-15	35-40	1.35-1.50	0.01-0.10	0.21-0.23	6.0-8.9	4.0-6.0	.37	.37			
		15-36	40-60	1.25-1.40	0.01-0.10	0.11-0.13	9.0-11.9	3.0-4.0	.24	.24			
		36-80	40-60	1.25-1.40	0.01-0.10	0.10-0.12	9.0-11.9	1.0-2.0	.28	.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
269:													
Humeston, occasionally flooded	100	0-8	24-30	1.35-1.45	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.37	.37	5	6	48
		8-13	24-30	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	3.0-4.0	.43	.43			
		13-22	20-26	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	1.0-2.0	.49	.49			
		22-26	30-35	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.5	.43	.43			
		26-50	35-48	1.30-1.50	0.01-0.10	0.13-0.18	6.0-8.9	1.0-1.5	.37	.37			
		50-60	30-38	1.40-1.50	0.01-0.10	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
273B:													
Olmitz	80	0-7	24-27	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	3.0-4.0	.20	.24	5	6	48
		7-30	22-34	1.40-1.50	1.00-10.00	0.15-0.17	3.0-5.9	2.0-3.0	.28	.32			
		30-60	27-34	1.45-1.55	1.00-10.00	0.14-0.16	3.0-5.9	1.0-2.0	.28	.32			
273C:													
Olmitz	75	0-7	24-27	1.50-1.55	1.00-10.00	0.20-0.22	3.0-5.9	3.0-4.0	.20	.24	5	6	48
		7-30	22-34	1.40-1.50	1.00-10.00	0.15-0.17	3.0-5.9	2.0-3.0	.28	.32			
		30-60	27-34	1.45-1.55	1.00-10.00	0.14-0.16	3.0-5.9	1.0-2.0	.28	.32			
324C2:													
Dickman, moderately eroded	90	0-6	10-18	1.50-1.60	10.00-100.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	5	3	86
		6-19	10-18	1.50-1.60	10.00-100.00	0.15-0.17	0.0-2.9	0.0-1.0	.28	.28			
		19-46	4-10	1.55-1.65	100.00-705.00	0.09-0.11	0.0-2.9	0.0-0.5	.28	.28			
		46-56	10-18	1.55-1.65	10.00-100.00	0.14-0.16	0.0-2.9	0.0-0.5	.20	.28			
		56-69	4-10	1.60-1.70	100.00-705.00	0.05-0.07	0.0-2.9	0.0-0.5	.20	.20			
		69-80	20-30	1.45-1.55	10.00-100.00	0.20-0.22	0.0-2.9	0.0-0.5	.55	.55			
324D2:													
Dickman, moderately eroded	90	0-6	10-18	1.50-1.60	10.00-100.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	5	3	86
		6-19	10-18	1.50-1.60	10.00-100.00	0.15-0.17	0.0-2.9	0.0-1.0	.28	.28			
		19-46	4-10	1.55-1.65	100.00-705.00	0.09-0.11	0.0-2.9	0.0-0.5	.28	.28			
		46-56	10-18	1.55-1.65	10.00-100.00	0.14-0.16	0.0-2.9	0.0-0.5	.20	.28			
		56-69	4-10	1.60-1.70	100.00-705.00	0.05-0.07	0.0-2.9	0.0-0.5	.20	.20			
		69-80	20-30	1.45-1.55	10.00-100.00	0.20-0.22	0.0-2.9	0.0-0.5	.55	.55			
354.													
Aquolls, ponded													
368:													
Macksburg	85	0-6	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	4.5-5.5	.32	.32	5	7	38
		6-24	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.5-4.5	.37	.37			
		24-42	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	2.0-3.0	.32	.32			
		42-73	26-32	1.40-1.50	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
369:													
Winterset	100	0-7	28-35	1.30-1.40	1.00-10.00	0.21-0.23	0.0-2.9	5.0-6.0	.28	.28	5	7	38
		7-19	32-36	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	4.0-5.0	.32	.32			
		19-58	36-42	1.30-1.40	1.00-10.00	0.18-0.20	6.0-8.9	1.0-3.0	.37	.37			
		58-69	25-35	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
370:													
Sharpsburg	95	0-8	27-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		8-17	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.0-3.0	.37	.37			
		17-38	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	1.0-2.0	.37	.37			
		38-60	25-34	1.40-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
370B:													
Sharpsburg	95	0-8	27-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		8-17	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.0-3.0	.37	.37			
		17-38	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	1.0-2.0	.37	.37			
		38-60	25-34	1.40-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
371C2:													
Sharpsburg, moderately eroded	35	0-7	27-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	2.7-3.7	.32	.32	5	7	38
		7-31	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.0-1.0	.37	.37			
		31-70	25-38	1.35-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
		70-80	25-34	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
Nira, moderately eroded	30	0-7	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.28	5	7	38
		7-12	33-38	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		12-45	30-34	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		45-80	25-30	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
371D2:													
Sharpsburg, moderately eroded	50	0-7	27-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	2.7-3.7	.32	.32	5	7	38
		7-31	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.0-1.0	.37	.37			
		31-70	25-38	1.35-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
		70-80	25-34	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
Nira, moderately eroded	20	0-7	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.28	5	7	38
		7-12	33-38	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		12-45	30-34	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		45-80	25-30	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
421C2:													
Gara, moderately eroded	35	0-5	12-35	1.45-1.55	1.00-10.00	0.17-0.18	3.0-5.9	2.0-3.0	.24	.24	5	6	48
		5-43	30-35	1.55-1.65	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.28	.32			
		43-62	30-35	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.32			
		62-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
Bucknell, moderately eroded	35	0-7	25-35	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.37	3	7	38
		7-34	40-50	1.35-1.45	0.10-1.00	0.09-0.11	6.0-8.9	0.0-0.5	.28	.28			
		34-71	28-40	1.50-1.60	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
		71-80	30-40	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
421D2:													
Gara, moderately eroded	35	0-5	12-35	1.45-1.55	1.00-10.00	0.17-0.18	3.0-5.9	2.0-3.0	.24	.24	5	6	48
		5-43	30-35	1.55-1.65	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.28	.32			
		43-62	30-35	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.32			
		62-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
Bucknell, moderately eroded	30	0-7	25-35	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.37	3	7	38
		7-34	40-50	1.35-1.45	0.10-1.00	0.09-0.11	6.0-8.9	0.0-0.5	.28	.28			
		34-71	28-40	1.50-1.60	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
		71-80	30-40	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
421E2:													
Gara, moderately eroded	40	0-5	12-35	1.45-1.55	1.00-10.00	0.17-0.18	3.0-5.9	2.0-3.0	.24	.24	5	6	48
		5-43	30-35	1.55-1.65	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.28	.32			
		43-62	30-35	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.32			
		62-80	24-35	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
Bucknell, moderately eroded	25	0-7	25-35	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.37	3	7	38
		7-34	40-50	1.35-1.45	0.10-1.00	0.09-0.11	6.0-8.9	0.0-0.5	.28	.28			
		34-71	28-40	1.50-1.60	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
		71-80	30-40	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
435:													
Zook, occasionally flooded	40	0-7	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		7-20	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.32	.32			
		20-38	32-45	1.30-1.45	0.10-1.00	0.11-0.13	6.0-8.9	3.0-5.0	.32	.32			
		38-61	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		61-80	20-45	1.35-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
435:													
Mt. Sterling, occasionally flooded	35	0-7	18-27	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	1.0-3.0	.37	.37	5	6	48
		7-26	18-30	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.5-1.0	.37	.37			
		26-54	35-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	0.0-1.0	.28	.28			
		54-80	35-48	1.30-1.35	0.10-1.00	0.10-0.12	6.0-8.9	0.0-1.0	.28	.28			
469C2:													
Lamoni, moderately eroded	35	0-6	27-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.32	3	7	38
		6-23	30-55	1.25-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.5-2.0	.24	.28			
		23-55	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.32	.37			
		55-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
Clarinda, moderately eroded	30	0-6	25-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.37	.37	3	7	38
		6-80	40-60	1.30-1.40	0.01-0.10	0.08-0.12	9.0-11.9	0.0-0.5	.28	.32			
Shelby, moderately eroded	20	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
469C3:													
Lamoni, severely eroded	35	0-7	27-40	1.40-1.50	0.10-1.00	0.17-0.19	3.0-5.9	1.7-2.7	.24	.28	2	7	48
		7-14	30-55	1.25-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.2-1.0	.24	.28			
		14-48	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.32	.37			
		48-60	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
Clarinda, severely eroded	30	0-4	40-55	1.30-1.40	0.01-0.10	0.12-0.14	6.0-8.9	1.7-2.7	.24	.24	2	4	86
		4-80	40-60	1.30-1.40	0.01-0.10	0.08-0.12	9.0-11.9	0.0-0.5	.28	.32			
Shelby, severely eroded	20	0-2	24-35	1.50-1.60	1.00-10.00	0.17-0.19	3.0-5.9	1.2-2.2	.24	.24	4	6	48
		2-48	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		48-62	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		62-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
470D2:													
Lamoni, moderately eroded	40	0-6	27-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.32	3	7	38
		6-23	30-55	1.25-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.5-2.0	.24	.28			
		23-55	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.32	.37			
		55-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
Shelby, moderately eroded	35	0-7	24-35	1.45-1.55	1.00-10.00	0.17-0.19	3.0-5.9	2.2-3.2	.24	.24	5	6	48
		7-31	30-38	1.50-1.60	1.00-10.00	0.15-0.17	3.0-5.9	0.0-1.0	.24	.32			
		31-48	25-36	1.55-1.65	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.28	.37			
		48-80	25-36	1.60-1.70	1.00-10.00	0.14-0.19	3.0-5.9	0.0-0.5	.24	.32			
545B:													
Zook	35	0-7	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		7-20	32-45	1.30-1.35	0.10-1.00	0.21-0.23	3.0-5.9	5.0-7.0	.32	.32			
		20-38	32-45	1.30-1.45	0.10-1.00	0.11-0.13	6.0-8.9	3.0-5.0	.32	.32			
		38-61	36-45	1.30-1.45	0.10-1.00	0.18-0.20	6.0-8.9	2.0-4.0	.32	.32			
		61-80	20-45	1.35-1.45	0.10-1.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
Ely	30	0-8	22-34	1.30-1.35	1.00-10.00	0.21-0.23	0.0-2.9	5.0-6.0	.32	.32	5	7	38
		8-24	22-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	4.0-5.0	.37	.37			
		24-58	28-35	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	1.0-3.0	.43	.43			
		58-80	18-35	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.5-1.0	.49	.49			
Gullied land	20	---	---	---	---	---	---	---	---	---	-	---	---
569C:													
Nira	45	0-7	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		7-11	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.0-3.0	.32	.32			
		11-20	33-38	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		20-40	25-34	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		40-80	25-30	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.55	.55			
Clearfield	35	0-7	32-38	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	4	4	86
		7-17	32-38	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	2.0-3.0	.37	.37			
		17-54	32-42	1.30-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		54-71	35-65	1.30-1.40	0.01-0.10	0.10-0.12	9.0-11.9	0.0-0.5	.28	.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
579E3:													
Bucknell, severely eroded	55	0-3	25-35	1.45-1.55	0.10-1.00	0.17-0.19	3.0-5.9	1.2-2.2	.32	.32	2	6	48
		3-12	27-40	1.45-1.55	0.10-1.00	0.17-0.19	3.0-5.9	0.0-0.5	.28	.32			
		12-20	40-50	1.30-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.0-0.5	.28	.28			
		20-68	28-40	1.50-1.60	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.37	.37			
		68-80	30-40	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
Hedrick, severely eroded	35	0-2	20-30	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	1.0-2.0	.32	.32	4	7	38
		2-22	32-37	1.30-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		22-53	30-35	1.30-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		53-74	25-34	1.40-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		74-80	30-40	1.50-1.60	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
794C2:													
Armstrong, moderately eroded	65	0-5	27-35	1.45-1.50	0.10-1.00	0.17-0.19	3.0-5.9	2.0-3.0	.24	.28	3	6	48
		5-11	35-42	1.45-1.50	0.10-1.00	0.15-0.17	3.0-5.9	0.0-1.0	.17	.24			
		11-18	36-60	1.25-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.0-1.0	.17	.24			
		18-50	30-36	1.55-1.65	0.10-1.00	0.14-0.16	3.0-5.9	0.0-1.0	.28	.32			
		50-80	27-35	1.55-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.28	.37			
Ladoga, moderately eroded	30	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-3.0	.43	.43	5	6	48
		7-49	35-42	1.35-1.45	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		49-63	27-32	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		63-80	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
822D2:													
Lamoni, moderately eroded	55	0-6	27-40	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.32	3	7	38
		6-23	30-55	1.25-1.40	0.10-1.00	0.09-0.11	6.0-8.9	0.5-2.0	.24	.28			
		23-55	30-38	1.50-1.60	0.10-1.00	0.15-0.17	3.0-5.9	0.0-0.5	.32	.37			
		55-80	30-38	1.60-1.70	0.10-1.00	0.14-0.16	3.0-5.9	0.0-0.5	.32	.37			
870B:													
Sharpsburg, terrace	85	0-8	27-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		8-17	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.0-3.0	.37	.37			
		17-38	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	1.0-2.0	.37	.37			
		38-60	25-34	1.40-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
870C2:													
Sharpsburg, terrace, moderately eroded---	85	0-7	27-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	2.7-3.7	.32	.32	5	7	38
		7-31	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.0-1.0	.37	.37			
		31-70	25-38	1.35-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
		70-80	25-34	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
870D2:													
Sharpsburg, terrace, moderately eroded---	75	0-7	27-34	1.30-1.35	1.00-10.00	0.21-0.23	3.0-5.9	2.7-3.7	.32	.32	5	7	38
		7-31	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.0-1.0	.37	.37			
		31-70	25-38	1.35-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-1.0	.49	.49			
		70-80	25-34	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-1.0	.55	.55			
876B:													
Ladoga, terrace------	100	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.5-3.5	.37	.37	5	6	48
		7-14	15-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	0.5-1.0	.55	.55			
		14-51	35-42	1.30-1.40	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		51-60	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
876C2:													
Ladoga, terrace, moderately eroded---	70	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-3.0	.43	.43	5	6	48
		7-49	35-42	1.35-1.45	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		49-63	27-32	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		63-80	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
876D2:													
Ladoga, terrace, moderately eroded---	75	0-7	18-35	1.45-1.55	1.00-10.00	0.22-0.24	3.0-5.9	2.0-3.0	.43	.43	5	6	48
		7-49	35-42	1.35-1.45	1.00-10.00	0.18-0.20	6.0-8.9	0.5-1.0	.37	.37			
		49-63	27-32	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		63-80	24-32	1.45-1.55	1.00-10.00	0.20-0.22	3.0-5.9	0.0-0.5	.55	.55			
2368B:													
Macksburg----------	70	0-6	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	4.5-5.5	.32	.32	5	7	38
		6-24	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.5-4.5	.37	.37			
		24-42	36-42	1.35-1.40	1.00-10.00	0.18-0.20	6.0-8.9	2.0-3.0	.32	.32			
		42-73	26-32	1.40-1.50	1.00-10.00	0.18-0.20	3.0-5.9	1.0-2.0	.49	.49			
Nira----------	25	0-7	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	3.0-4.0	.32	.32	5	7	38
		7-11	30-34	1.30-1.40	1.00-10.00	0.21-0.23	3.0-5.9	2.0-3.0	.32	.32			
		11-20	33-38	1.30-1.40	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		20-40	25-34	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.49	.49			
		40-80	25-30	1.35-1.45	1.00-10.00	0.18-0.20	3.0-5.9	0.0-0.5	.55	.55			

Physical Properties of the Soils--Continued

Map symbol and soil name	Pct. of map unit	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
									Kw	Kf	T		
		In	Pct	g/cc	um/sec	In/in	Pct	Pct					
5030. Pits, limestone quarries													
5040: Udorthents, loamy----	100	0-80	12-32	1.45-1.65	---	0.12-0.18	3.0-5.9	---	.32	---	-	---	---
5041. Udorthents, reclaimed													
AW. Animal waste lagoon													
SL. Sewage lagoon													
W. Water													

Chemical Properties

The table described in this section shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of exchangeable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
7:					
Wiota, rarely flooded	0-8	17-27	---	5.1-7.3	0
	8-28	17-27	---	5.1-7.3	0
	28-59	24-28	---	5.1-6.5	0
	59-80	17-27	---	5.6-6.5	0
7B:					
Wiota, rarely flooded	0-8	17-27	---	5.1-7.3	0
	8-28	17-27	---	5.1-7.3	0
	28-59	24-28	---	5.1-6.5	0
	59-80	17-27	---	5.6-6.5	0
8B:					
Judson----------	0-9	20-27	---	5.6-7.3	0
	9-28	23-27	---	5.6-7.3	0
	28-35	24-29	---	5.6-7.3	0
	35-60	17-25	---	6.1-7.8	0-10
15B:					
Olmitz----------	0-7	20-23	---	5.6-7.3	0
	7-30	19-28	---	5.1-7.3	0
	30-60	22-28	---	5.1-7.3	0
Ely----------	0-8	19-29	---	5.6-7.3	0
	8-24	19-28	---	5.6-7.3	0
	24-58	22-29	---	5.6-7.3	0
	58-80	15-28	---	5.6-7.3	0
Zook----------	0-7	26-36	---	5.6-7.8	0-5
	7-20	26-36	---	5.6-7.8	0-5
	20-38	26-35	---	5.6-7.8	0-5
	38-61	28-35	---	5.6-7.3	0
	61-80	14-33	---	5.6-7.3	0
16:					
Nodaway, occasionally flooded----------	0-7	15-28	---	6.1-7.3	0
	7-80	13-27	---	6.1-7.3	0
Kennebec, occasionally flooded	0-7	16-26	---	5.6-7.3	0
	7-16	16-27	---	5.6-7.3	0
	16-35	16-27	---	6.1-7.3	0
	35-48	20-27	---	6.1-7.3	0
	48-80	20-25	---	6.1-7.3	0
24C2:					
Shelby, moderately eroded----------	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20
24D2:					
Shelby, moderately eroded----------	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
24E:					
Shelby	0-7	20-29	---	5.1-7.3	0
	7-11	20-29	---	5.1-7.3	0
	11-46	20-30	---	5.1-7.3	0
	46-60	17-27	---	7.4-8.4	5-25
	60-80	17-27	---	6.6-8.4	0-20
24E2:					
Shelby, moderately eroded	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20
24F:					
Shelby	0-7	20-29	---	5.1-7.3	0
	7-11	20-29	---	5.1-7.3	0
	11-46	20-30	---	5.1-7.3	0
	46-60	17-27	---	7.4-8.4	5-25
	60-80	17-27	---	6.6-8.4	0-20
43:					
Bremer, rarely flooded	0-8	23-29	---	5.6-7.3	0
	8-19	23-29	---	5.6-7.3	0
	19-42	27-34	---	5.6-7.3	0
	42-50	23-30	---	5.6-7.3	0
	50-60	20-30	---	5.6-7.8	0-5
45B:					
Zook	0-7	26-36	---	5.6-7.8	0-5
	7-20	26-36	---	5.6-7.8	0-5
	20-38	26-35	---	5.6-7.8	0-5
	38-61	28-35	---	5.6-7.3	0
	61-80	14-33	---	5.6-7.3	0
Ely	0-8	19-29	---	5.6-7.3	0
	8-24	19-28	---	5.6-7.3	0
	24-58	22-29	---	5.6-7.3	0
	58-80	15-28	---	5.6-7.3	0
54:					
Zook, occasionally flooded	0-7	26-36	---	5.6-7.8	0-5
	7-20	26-36	---	5.6-7.8	0-5
	20-38	26-35	---	5.6-7.8	0-5
	38-61	28-35	---	5.6-7.3	0
	61-80	14-33	---	5.6-7.3	0
54+:					
Zook, occasionally flooded, overwash	0-7	17-22	---	5.6-7.8	0-5
	7-13	17-22	---	5.6-7.8	0-5
	13-50	26-35	---	5.6-7.8	0-5
	50-58	28-35	---	5.6-7.3	0
	58-80	14-33	---	5.6-7.3	0
76B:					
Ladoga	0-7	16-28	---	5.6-7.3	0
	7-14	13-27	---	5.6-6.5	0
	14-51	26-31	---	5.1-6.0	0
	51-60	17-24	---	5.6-6.5	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
76C:					
Ladoga	0-7	16-28	---	5.6-7.3	0
	7-14	13-27	---	5.6-6.5	0
	14-51	26-31	---	5.1-6.0	0
	51-60	17-24	---	5.6-6.5	0
76D:					
Ladoga	0-7	16-28	---	5.6-7.3	0
	7-14	13-27	---	5.6-6.5	0
	14-51	26-31	---	5.1-6.0	0
	51-60	17-24	---	5.6-6.5	0
76D2:					
Ladoga, moderately eroded	0-7	15-28	---	5.6-7.3	0
	7-49	26-31	---	5.1-6.0	0
	49-63	19-24	---	5.6-6.5	0
	63-80	17-24	---	5.6-6.5	0
86:					
Mt. Sterling, occasionally flooded	0-7	15-23	---	5.6-7.3	0
	7-26	15-24	---	5.6-7.3	0
	26-54	23-34	---	4.5-7.8	0-10
	54-80	23-36	---	4.5-7.8	0-10
Zook, occasionally flooded, overwash	0-7	17-22	---	5.6-7.8	0-5
	7-13	17-22	---	5.6-7.8	0-5
	13-50	26-35	---	5.6-7.8	0-5
	50-58	28-35	---	5.6-7.3	0
	58-80	14-33	---	5.6-7.3	0
88:					
Nevin, rarely flooded	0-8	22-25	---	5.6-7.3	0
	8-30	22-25	---	5.6-7.3	0
	30-46	24-28	---	5.6-7.3	0
	46-62	17-27	---	6.1-7.3	0
93D2:					
Shelby, moderately eroded	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20
Adair, moderately eroded	0-7	20-31	---	5.1-7.3	0
	7-17	28-43	---	5.1-6.5	0
	17-60	20-28	---	5.1-6.5	0
	60-76	20-28	---	7.4-8.4	5-25
	76-80	20-28	---	6.1-7.8	0-20
93E2:					
Shelby, moderately eroded	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
93E2:					
Adair, moderately eroded	0-7	20-31	---	5.1-7.3	0
	7-17	28-43	---	5.1-6.5	0
	17-60	20-28	---	5.1-6.5	0
	60-76	20-28	---	7.4-8.4	5-25
	76-80	20-28	---	6.1-7.8	0-20
172:					
Wabash, frequently ponded, occasionally flooded	0-6	32-45	---	5.1-7.3	0
	6-19	31-45	---	5.1-7.0	0
	19-60	30-44	---	5.1-7.0	0
179E:					
Gara	0-7	11-29	---	5.6-7.3	0
	7-12	15-28	---	5.6-7.3	0
	12-45	17-27	---	4.5-7.3	0
	45-80	17-27	---	6.6-8.4	0-20
179F:					
Gara	0-7	11-29	---	5.6-7.3	0
	7-12	15-28	---	5.6-7.3	0
	12-45	17-28	---	4.5-7.3	0
	45-80	17-27	---	6.6-8.4	0-20
179G:					
Gara	0-7	11-29	---	5.6-7.3	0
	7-12	15-28	---	5.6-7.3	0
	12-45	17-28	---	4.5-7.3	0
	45-80	17-27	---	6.6-8.4	0-20
192D2:					
Adair, moderately eroded	0-7	20-31	---	5.1-7.3	0
	7-17	28-43	---	5.1-6.5	0
	17-60	20-28	---	5.1-6.5	0
	60-76	20-28	---	7.4-8.4	5-25
	76-80	20-28	---	6.1-7.8	0-20
220:					
Nodaway, occasionally flooded	0-7	15-28	---	6.1-7.3	0
	7-80	13-27	---	6.1-7.3	0
222C2:					
Clarinda, moderately eroded	0-6	21-31	---	5.1-7.3	0
	6-80	26-42	---	5.6-8.4	0-15
222D:					
Clarinda	0-5	21-31	---	5.1-7.3	0
	5-11	21-31	---	5.1-7.3	0
	11-19	29-40	---	5.1-6.5	0
	19-67	26-42	---	5.1-8.4	0-15
222D2:					
Clarinda, moderately eroded	0-6	21-31	---	5.1-7.3	0
	6-80	26-42	---	5.6-8.4	0-15

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
222D3:					
Clarinda, severely eroded	0-4	31-41	---	5.1-7.3	0
	4-80	26-42	---	5.1-8.4	0-15
248:					
Wabash, occasionally ponded, occasionally flooded	0-7	28-32	---	5.1-7.3	0
	7-15	28-32	---	5.1-7.3	0
	15-36	31-45	---	5.1-7.3	0
	36-80	30-44	---	5.1-7.8	0-10
269:					
Humeston, occasionally flooded	0-8	20-25	---	5.6-7.3	0
	8-13	20-25	---	5.6-7.3	0
	13-22	17-21	---	5.1-7.3	0
	22-26	23-27	---	5.6-7.3	0
	26-50	27-36	---	5.6-7.3	0
	50-60	23-29	---	5.6-7.3	0
273B:					
Olmitz	0-7	20-23	---	5.6-7.3	0
	7-30	19-28	---	5.1-7.3	0
	30-60	22-28	---	5.1-7.3	0
273C:					
Olmitz	0-7	20-23	---	5.6-7.3	0
	7-30	19-28	---	5.1-7.3	0
	30-60	22-28	---	5.1-7.3	0
324C2:					
Dickman, moderately eroded	0-6	7.3-13	---	5.6-7.3	0
	6-19	4.3-12	---	5.1-6.5	0
	19-46	2.1-6.7	---	5.1-6.5	0
	46-56	4.3-11	---	5.1-6.5	0
	56-69	2.1-6.7	---	5.6-7.3	0
	69-80	7.4-16	---	6.6-8.2	0-10
324D2:					
Dickman, moderately eroded	0-6	7.3-13	---	5.6-7.3	0
	6-19	4.3-12	---	5.1-6.5	0
	19-46	2.1-6.7	---	5.1-6.5	0
	46-56	4.3-11	---	5.1-6.5	0
	56-69	2.1-6.7	---	5.6-7.3	0
	69-80	7.4-16	---	6.6-8.2	0-10
354.					
Aquolls, ponded					
368:					
Macksburg	0-6	25-28	---	5.6-7.3	0
	6-24	24-27	---	5.6-7.3	0
	24-42	28-33	---	5.1-7.3	0
	42-73	21-25	---	5.6-7.3	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
369:					
Winterset	0-7	23-28	---	5.6-7.3	0
	7-19	26-29	---	5.6-7.3	0
	19-58	27-33	---	5.1-7.3	0
	58-69	18-27	---	5.6-7.3	0
370:					
Sharpsburg	0-8	22-27	---	5.1-6.5	0
	8-17	24-27	---	5.1-6.5	0
	17-38	28-32	---	5.1-6.5	0
	38-60	18-26	---	6.1-7.3	0
370B:					
Sharpsburg	0-8	22-27	---	5.1-6.5	0
	8-17	24-27	---	5.1-6.5	0
	17-38	28-32	---	5.1-6.5	0
	38-60	18-26	---	6.1-7.3	0
371C2:					
Sharpsburg, moderately eroded	0-7	22-27	---	5.1-6.5	0
	7-31	24-31	---	5.1-6.5	0
	31-70	18-29	---	5.6-6.5	0
	70-80	18-26	---	6.1-7.3	0
Nira, moderately eroded	0-7	25-28	---	5.6-7.3	0
	7-12	22-29	---	5.6-7.3	0
	12-45	20-26	---	5.6-7.3	0
	45-80	17-23	---	6.1-7.3	0
371D2:					
Sharpsburg, moderately eroded	0-7	22-27	---	5.1-6.5	0
	7-31	24-31	---	5.1-6.5	0
	31-70	18-29	---	5.6-6.5	0
	70-80	18-26	---	6.1-7.3	0
Nira, moderately eroded	0-7	25-28	---	5.6-7.3	0
	7-12	22-29	---	5.6-7.3	0
	12-45	20-26	---	5.6-7.3	0
	45-80	17-23	---	6.1-7.3	0
421C2:					
Gara, moderately eroded	0-5	11-29	---	5.6-7.3	0
	5-43	20-28	---	4.5-7.3	0
	43-62	20-27	---	7.4-8.4	5-25
	62-80	17-27	---	6.6-8.4	0-20
Bucknell, moderately eroded	0-7	21-28	---	4.5-7.0	0
	7-34	---	20-33	4.5-6.0	0
	34-71	19-29	---	5.1-6.0	0
	71-80	20-29	---	5.6-7.8	0-15

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
421D2:					
Gara, moderately eroded	0-5	11-29	---	5.6-7.3	0
	5-43	20-28	---	4.5-7.3	0
	43-62	20-27	---	7.4-8.4	5-25
	62-80	17-27	---	6.6-8.4	0-20
Bucknell, moderately eroded	0-7	21-28	---	4.5-7.0	0
	7-34	---	20-33	4.5-6.0	0
	34-71	19-29	---	5.1-6.0	0
	71-80	20-29	---	5.6-7.8	0-15
421E2:					
Gara, moderately eroded	0-5	11-29	---	5.6-7.3	0
	5-43	20-28	---	4.5-7.3	0
	43-62	20-27	---	7.4-8.4	5-25
	62-80	17-27	---	6.6-8.4	0-20
Bucknell, moderately eroded	0-7	21-28	---	4.5-7.0	0
	7-34	---	20-33	4.5-6.0	0
	34-71	19-29	---	5.1-6.0	0
	71-80	20-29	---	5.6-7.8	0-15
435:					
Zook, occasionally flooded	0-7	26-36	---	5.6-7.8	0-5
	7-20	26-36	---	5.6-7.8	0-5
	20-38	26-35	---	5.6-7.8	0-5
	38-61	28-35	---	5.6-7.3	0
	61-80	14-33	---	5.6-7.3	0
Mt. Sterling, occasionally flooded	0-7	15-23	---	5.6-7.3	0
	7-26	15-24	---	5.6-7.3	0
	26-54	23-34	---	4.5-7.8	0-10
	54-80	23-36	---	4.5-7.8	0-10
469C2:					
Lamoni, moderately eroded	0-6	22-31	---	5.1-7.3	0
	6-23	23-40	---	5.1-7.3	0
	23-55	20-28	---	6.1-7.3	0
	55-80	20-28	---	6.6-8.4	0-20
Clarinda, moderately eroded	0-6	21-31	---	5.1-7.3	0
	6-80	26-42	---	5.6-8.4	0-15
Shelby, moderately eroded	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
469C3:					
Lamoni, severely eroded	0-7	22-31	---	5.1-7.3	0
	7-14	22-40	---	5.1-7.3	0
	14-48	20-28	---	6.1-7.3	0
	48-60	20-28	---	6.6-8.4	0-20
Clarinda, severely eroded	0-4	31-41	---	5.1-7.3	0
	4-80	26-42	---	5.1-8.4	0-15
Shelby, severely eroded	0-2	20-28	---	5.1-7.3	0
	2-48	20-30	---	5.1-7.3	0
	48-62	17-27	---	6.6-8.4	0-20
	62-80	17-27	---	6.6-8.4	0-20
470D2:					
Lamoni, moderately eroded	0-6	22-31	---	5.1-7.3	0
	6-23	23-40	---	5.1-7.3	0
	23-55	20-28	---	6.1-7.3	0
	55-80	20-28	---	6.6-8.4	0-20
Shelby, moderately eroded	0-7	20-29	---	5.1-7.3	0
	7-31	20-30	---	5.1-7.3	0
	31-48	17-27	---	7.4-8.4	5-25
	48-80	17-27	---	6.6-8.4	0-20
545B:					
Zook	0-7	26-36	---	5.6-7.8	0-5
	7-20	26-36	---	5.6-7.8	0-5
	20-38	26-35	---	5.6-7.8	0-5
	38-61	28-35	---	5.6-7.3	0
	61-80	14-33	---	5.6-7.3	0
Ely	0-8	19-29	---	5.6-7.3	0
	8-24	19-28	---	5.6-7.3	0
	24-58	22-29	---	5.6-7.3	0
	58-80	15-28	---	5.6-7.3	0
Gullied land.					
569C:					
Nira	0-7	25-28	---	5.6-7.3	0
	7-11	25-28	---	5.6-7.3	0
	11-20	22-29	---	5.6-7.3	0
	20-40	20-26	---	5.6-7.3	0
	40-80	17-23	---	6.1-7.3	0
Clearfield	0-7	26-30	---	5.6-7.3	0
	7-17	25-30	---	5.6-7.3	0
	17-54	22-31	---	5.6-7.3	0
	54-71	24-45	---	5.1-6.5	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
579E3:					
Bucknell, severely eroded	0-3	20-28	---	4.5-7.0	0
	3-12	19-29	---	5.1-6.0	0
	12-20	26-36	---	5.1-6.0	0
	20-68	19-29	---	5.1-6.0	0
	68-80	20-29	---	5.6-7.8	0-15
Hedrick, severely eroded	0-2	17-25	---	5.6-7.3	0
	2-22	22-29	---	5.1-6.5	0
	22-53	20-27	---	5.1-6.5	0
	53-74	17-26	---	6.1-8.4	0-5
	74-80	20-28	---	5.1-6.5	0
794C2:					
Armstrong, moderately eroded	0-5	22-28	---	5.6-7.3	0
	5-11	23-31	---	5.6-7.3	0
	11-18	24-43	---	4.5-6.5	0
	18-50	21-27	---	4.5-6.5	0
	50-80	19-26	---	5.6-7.8	0-15
Ladoga, moderately eroded	0-7	16-28	---	5.6-7.3	0
	7-49	26-31	---	5.1-6.0	0
	49-63	19-24	---	5.6-6.5	0
	63-80	17-24	---	5.6-6.5	0
822D2:					
Lamoni, moderately eroded	0-6	22-31	---	5.1-7.3	0
	6-23	23-40	---	5.1-7.3	0
	23-55	20-28	---	6.1-7.3	0
	55-80	20-28	---	6.6-8.4	0-20
870B:					
Sharpsburg, terrace	0-8	22-27	---	5.1-6.5	0
	8-17	24-27	---	5.1-6.5	0
	17-38	28-32	---	5.1-6.5	0
	38-60	18-26	---	6.1-7.3	0
870C2:					
Sharpsburg, terrace, moderately eroded	0-7	22-27	---	5.1-6.5	0
	7-31	24-31	---	5.1-6.5	0
	31-70	18-29	---	5.6-6.5	0
	70-80	18-26	---	6.1-7.3	0
870D2:					
Sharpsburg, terrace, moderately eroded	0-7	22-27	---	5.1-6.5	0
	7-31	24-31	---	5.1-6.5	0
	31-70	18-29	---	5.6-6.5	0
	70-80	18-26	---	6.1-7.3	0
876B:					
Ladoga, terrace	0-7	16-28	---	5.6-7.3	0
	7-14	13-27	---	5.6-6.5	0
	14-51	26-31	---	5.1-6.0	0
	51-60	17-24	---	5.6-6.5	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate
	In	meq/100 g	meq/100 g	pH	Pct
876C2:					
Ladoga, terrace, moderately eroded---	0-7	16-28	---	5.6-7.3	0
	7-49	26-31	---	5.1-6.0	0
	49-63	19-24	---	5.6-6.5	0
	63-80	17-24	---	5.6-6.5	0
876D2:					
Ladoga, terrace, moderately eroded---	0-7	16-28	---	5.6-7.3	0
	7-49	26-31	---	5.1-6.0	0
	49-63	19-24	---	5.6-6.5	0
	63-80	17-24	---	5.6-6.5	0
2368B:					
Macksburg----------	0-6	25-28	---	5.6-7.3	0
	6-24	24-28	---	5.6-7.3	0
	24-42	28-32	---	5.1-7.3	0
	42-73	21-25	---	5.6-7.3	0
Nira----------	0-7	25-28	---	5.6-7.3	0
	7-11	25-28	---	5.6-7.3	0
	11-20	22-29	---	5.6-7.3	0
	20-40	20-26	---	5.6-7.3	0
	40-80	17-23	---	6.1-7.3	0
5030.					
Pits, limestone quarries					
5040.					
Udorthents, loamy					
5041.					
Udorthents, reclaimed					
AW.					
Animal waste lagoon					
SL.					
Sewage lagoon					
W.					
Water					

Water Features

The table described in this section gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are *negligible, very low, low, medium, high,* and *very high*.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall

or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
7:										
Wiota, rarely flooded-----	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	Brief	Rare
			March	4.5-6.5	>6.0	---	---	None	Brief	Rare
			April	4.0-6.0	>6.0	---	---	None	Brief	Rare
			May	4.5-6.5	>6.0	---	---	None	Brief	Rare
			June	5.0-6.7	>6.0	---	---	None	Brief	Rare
			July	6.0-6.7	>6.0	---	---	None	Brief	Rare
			August	6.5-6.7	>6.0	---	---	None	Brief	Rare
			September	6.5-6.7	>6.0	---	---	None	Brief	Rare
			October	6.5-6.7	>6.0	---	---	None	Brief	Rare
			November	5.5-6.7	>6.0	---	---	None	Brief	Rare
			December	6.0-6.7	>6.0	---	---	None	---	None
7B:										
Wiota, rarely flooded-----	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	Brief	Rare
			March	4.5-6.5	>6.0	---	---	None	Brief	Rare
			April	4.0-6.0	>6.0	---	---	None	Brief	Rare
			May	4.5-6.5	>6.0	---	---	None	Brief	Rare
			June	5.0-6.7	>6.0	---	---	None	Brief	Rare
			July	6.0-6.7	>6.0	---	---	None	Brief	Rare
			August	6.5-6.7	>6.0	---	---	None	Brief	Rare
			September	6.5-6.7	>6.0	---	---	None	Brief	Rare
			October	6.5-6.7	>6.0	---	---	None	Brief	Rare
			November	5.5-6.7	>6.0	---	---	None	Brief	Rare
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
8B:										
Judson	B	Low								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
15B:										
Olmitz	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
Ely	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	---	None
			March	1.5-4.0	>6.0	---	---	None	---	None
			April	1.0-3.5	>6.0	---	---	None	---	None
			May	1.5-4.0	>6.0	---	---	None	---	None
			June	2.0-4.5	>6.0	---	---	None	---	None
			July	3.0-5.5	>6.0	---	---	None	---	None
			August	3.5-6.0	>6.0	---	---	None	---	None
			September	4.0-6.5	>6.0	---	---	None	---	None
			October	3.5-6.0	>6.0	---	---	None	---	None
			November	2.5-5.0	>6.0	---	---	None	---	None
			December	3.0-5.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
15B:										
Zook	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	---	None
			March	0.5-2.0	>6.0	---	---	None	---	None
			April	0.0-1.0	>6.0	---	---	None	---	None
			May	0.5-1.5	>6.0	---	---	None	---	None
			June	1.0-2.0	>6.0	---	---	None	---	None
			July	2.0-3.0	>6.0	---	---	None	---	None
			August	2.5-3.5	>6.0	---	---	None	---	None
			September	3.0-4.0	>6.0	---	---	None	---	None
			October	2.5-3.5	>6.0	---	---	None	---	None
			November	1.5-3.0	>6.0	---	---	None	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None
16:										
Nodaway, occasionally flooded	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			March	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
			May	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			June	5.0-6.7	>6.0	---	---	None	Brief	Occasional
			July	6.0-6.7	>6.0	---	---	None	Brief	Occasional
			August	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			September	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			October	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			November	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			December	6.0-6.7	>6.0	---	---	None	---	None
Kennebec, occasionally flooded	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			March	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
			May	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			June	5.0-6.7	>6.0	---	---	None	Brief	Occasional
			July	6.0-6.7	>6.0	---	---	None	Brief	Occasional
			August	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			September	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			October	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			November	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
24C2:										
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
24D2:										
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
24E:										
Shelby----------	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
24E2:										
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
24F:										
Shelby----------	C	High								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
43:										
Bremer, rarely flooded----	C	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Rare
			March	0.5-2.0	>6.0	---	---	None	Brief	Rare
			April	0.0-1.0	>6.0	---	---	None	Brief	Rare
			May	0.5-1.5	>6.0	---	---	None	Brief	Rare
			June	1.0-2.0	>6.0	---	---	None	Brief	Rare
			July	2.0-3.0	>6.0	---	---	None	Brief	Rare
			August	2.5-3.5	>6.0	---	---	None	Brief	Rare
			September	3.0-4.0	>6.0	---	---	None	Brief	Rare
			October	2.5-3.5	>6.0	---	---	None	Brief	Rare
			November	1.5-3.0	>6.0	---	---	None	Brief	Rare
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
45B:										
Zook	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	---	None
			March	0.5-2.0	>6.0	---	---	None	---	None
			April	0.0-1.0	>6.0	---	---	None	---	None
			May	0.5-1.5	>6.0	---	---	None	---	None
			June	1.0-2.0	>6.0	---	---	None	---	None
			July	2.0-3.0	>6.0	---	---	None	---	None
			August	2.5-3.5	>6.0	---	---	None	---	None
			September	3.0-4.0	>6.0	---	---	None	---	None
			October	2.5-3.5	>6.0	---	---	None	---	None
			November	1.5-3.0	>6.0	---	---	None	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None
Ely	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	---	None
			March	1.5-4.0	>6.0	---	---	None	---	None
			April	1.0-3.5	>6.0	---	---	None	---	None
			May	1.5-4.0	>6.0	---	---	None	---	None
			June	2.0-4.5	>6.0	---	---	None	---	None
			July	3.0-5.5	>6.0	---	---	None	---	None
			August	3.5-6.0	>6.0	---	---	None	---	None
			September	4.0-6.5	>6.0	---	---	None	---	None
			October	3.5-6.0	>6.0	---	---	None	---	None
			November	2.5-5.0	>6.0	---	---	None	---	None
			December	3.0-5.5	>6.0	---	---	None	---	None
54:										
Zook, occasionally flooded	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
54+:										
Zook, occasionally flooded, overwash	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None
76B:										
Ladoga	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
76C:										
Ladoga	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
76D:										
Ladoga	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
76D2:										
Ladoga, moderately eroded	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
86:										
Mt. Sterling, occasionally flooded	B	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
86:										
Zook, occasionally flooded, overwash--------	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None
88:										
Nevin, rarely flooded-----	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	Brief	Rare
			March	1.5-4.0	>6.0	---	---	None	Brief	Rare
			April	1.0-3.5	>6.0	---	---	None	Brief	Rare
			May	1.5-4.0	>6.0	---	---	None	Brief	Rare
			June	2.0-4.5	>6.0	---	---	None	Brief	Rare
			July	3.0-5.5	>6.0	---	---	None	Brief	Rare
			August	3.5-6.0	>6.0	---	---	None	Brief	Rare
			September	4.0-6.5	>6.0	---	---	None	Brief	Rare
			October	3.5-6.0	>6.0	---	---	None	Brief	Rare
			November	2.5-5.0	>6.0	---	---	None	Brief	Rare
			December	3.0-5.5	>6.0	---	---	None	---	None
93D2:										
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
93D2:										
Adair, moderately eroded--	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
93E2:										
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
Adair, moderately eroded--	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
172:										
Wabash, frequently ponded, occasionally flooded-----	D	Negligible								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			March	0.5-2.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			May	0.5-1.5	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			June	1.0-2.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			July	2.0-3.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			September	3.0-4.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			October	2.5-3.5	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent	Long	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None
179E:										
Gara-----------------------	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
179F:										
Gara-----------------------	C	High								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
179G:										
Gara	C	High								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
192D2:										
Adair, moderately eroded	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
220:										
Nodaway, occasionally flooded	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			March	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
			May	4.5-6.5	>6.0	---	---	None	Brief	Occasional
			June	5.0-6.7	>6.0	---	---	None	Brief	Occasional
			July	6.0-6.7	>6.0	---	---	None	Brief	Occasional
			August	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			September	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			October	6.5-6.7	>6.0	---	---	None	Brief	Occasional
			November	5.5-6.7	>6.0	---	---	None	Brief	Occasional
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
222C2:										
Clarinda, moderately eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None
222D:										
Clarinda	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
222D2:										
Clarinda, moderately eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None
222D3:										
Clarinda, severely eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
248:										
Wabash, occasionally ponded, occasionally flooded	D	Negligible								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			March	0.5-2.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			April	0.0-1.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			May	0.5-1.5	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			June	1.0-2.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			July	2.0-3.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			August	2.5-3.5	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			September	3.0-4.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			October	2.5-3.5	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			November	1.5-3.0	>6.0	0.0-1.0	Long	Occasional	Long	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None
269:										
Humeston, occasionally flooded	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
273B:										
Olmitz	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
273C:										
Olmitz	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
324C2:										
Dickman, moderately eroded	A	Low								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
324D2:										
Dickman, moderately eroded	A	Low								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
354:										
Aquolls, ponded	---	---								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			March	0.5-2.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			April	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			May	0.5-2.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			June	1.0-2.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			July	2.0-3.5	>6.0	0.0-1.0	Very long	Frequent	---	None
			August	2.5-3.5	>6.0	0.0-1.0	Very long	Frequent	---	None
			September	3.0-4.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			October	2.5-3.5	>6.0	0.0-1.0	Very long	Frequent	---	None
			November	1.5-3.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None
368:										
Macksburg	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	---	None
			March	1.5-4.0	>6.0	---	---	None	---	None
			April	1.0-3.5	>6.0	---	---	None	---	None
			May	1.5-4.0	>6.0	---	---	None	---	None
			June	2.0-4.5	>6.0	---	---	None	---	None
			July	3.0-5.5	>6.0	---	---	None	---	None
			August	3.5-6.0	>6.0	---	---	None	---	None
			September	4.0-6.5	>6.0	---	---	None	---	None
			October	3.5-6.0	>6.0	---	---	None	---	None
			November	2.5-5.0	>6.0	---	---	None	---	None
			December	3.0-5.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
369:										
Winterset	C	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	---	None
			March	0.5-2.0	>6.0	---	---	None	---	None
			April	0.0-1.0	>6.0	---	---	None	---	None
			May	0.5-1.5	>6.0	---	---	None	---	None
			June	1.0-2.0	>6.0	---	---	None	---	None
			July	2.0-3.0	>6.0	---	---	None	---	None
			August	2.5-3.5	>6.0	---	---	None	---	None
			September	3.0-4.0	>6.0	---	---	None	---	None
			October	2.5-3.5	>6.0	---	---	None	---	None
			November	1.5-3.0	>6.0	---	---	None	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None
370:										
Sharpsburg	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
370B:										
Sharpsburg	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
371C2:										
Sharpsburg, moderately eroded	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
Nira, moderately eroded	B	Medium								
			January	4.0-6.0	>6.0	---	---	None	---	None
			February	3.5-5.5	>6.0	---	---	None	---	None
			March	2.5-4.5	>6.0	---	---	None	---	None
			April	2.0-4.0	>6.0	---	---	None	---	None
			May	2.5-4.5	>6.0	---	---	None	---	None
			June	3.0-5.0	>6.0	---	---	None	---	None
			July	4.0-6.0	>6.0	---	---	None	---	None
			August	4.5-6.5	>6.0	---	---	None	---	None
			September	5.0-6.7	>6.0	---	---	None	---	None
			October	4.5-6.5	>6.0	---	---	None	---	None
			November	3.5-5.5	>6.0	---	---	None	---	None
			December	4.0-6.0	>6.0	---	---	None	---	None
371D2:										
Sharpsburg, moderately eroded	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
371D2:										
Nira, moderately eroded---	B	Medium								
			January	4.0-6.0	>6.0	---	---	None	---	None
			February	3.5-5.5	>6.0	---	---	None	---	None
			March	2.5-4.5	>6.0	---	---	None	---	None
			April	2.0-4.0	>6.0	---	---	None	---	None
			May	2.5-4.5	>6.0	---	---	None	---	None
			June	3.0-5.0	>6.0	---	---	None	---	None
			July	4.0-6.0	>6.0	---	---	None	---	None
			August	4.5-6.5	>6.0	---	---	None	---	None
			September	5.0-6.7	>6.0	---	---	None	---	None
			October	4.5-6.5	>6.0	---	---	None	---	None
			November	3.5-5.5	>6.0	---	---	None	---	None
			December	4.0-6.0	>6.0	---	---	None	---	None
421C2:										
Gara, moderately eroded---	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
Bucknell, moderately eroded-------------------	D	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
421D2:										
Gara, moderately eroded---	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
Bucknell, moderately eroded----------	D	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
421E2:										
Gara, moderately eroded---	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
421E2:										
Bucknell, moderately eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
435:										
Zook, occasionally flooded	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None
Mt. Sterling, occasionally flooded	B	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			March	0.5-2.0	>6.0	---	---	None	Brief	Occasional
			April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
			May	0.5-1.5	>6.0	---	---	None	Brief	Occasional
			June	1.0-2.0	>6.0	---	---	None	Brief	Occasional
			July	2.0-3.0	>6.0	---	---	None	Brief	Occasional
			August	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			September	3.0-4.0	>6.0	---	---	None	Brief	Occasional
			October	2.5-3.5	>6.0	---	---	None	Brief	Occasional
			November	1.5-3.0	>6.0	---	---	None	Brief	Occasional
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
469C2:										
Lamoni, moderately eroded	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
Clarinda, moderately eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
469C3:										
Lamoni, severely eroded---	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
Clarinda, severely eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	1.5-2.0	2.0-2.0	---	---	None	---	None
			March	0.0-1.0	2.0-2.0	---	---	None	---	None
			April	0.0-1.0	2.0-2.0	---	---	None	---	None
			May	0.5-1.5	2.0-2.0	---	---	None	---	None
			June	1.0-1.5	2.0-2.0	---	---	None	---	None
			July	1.5-2.0	2.0-2.0	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.0-2.0	---	---	None	---	None
			November	1.5-2.0	2.0-2.0	---	---	None	---	None
			December	1.5-2.0	2.0-2.0	---	---	None	---	None
Shelby, severely eroded---	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
470D2:										
Lamoni, moderately eroded	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
Shelby, moderately eroded	C	Medium								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	---	---	---	---	None	---	None
			April	---	---	---	---	None	---	None
			May	---	---	---	---	None	---	None
			June	---	---	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	---	---	---	---	None	---	None
			November	---	---	---	---	None	---	None
			December	---	---	---	---	None	---	None
545B:										
Zook----------	C/D	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	---	None
			March	0.5-2.0	>6.0	---	---	None	---	None
			April	0.0-1.0	>6.0	---	---	None	---	None
			May	0.5-1.5	>6.0	---	---	None	---	None
			June	1.0-2.0	>6.0	---	---	None	---	None
			July	2.0-3.0	>6.0	---	---	None	---	None
			August	2.5-3.5	>6.0	---	---	None	---	None
			September	3.0-4.0	>6.0	---	---	None	---	None
			October	2.5-3.5	>6.0	---	---	None	---	None
			November	1.5-3.0	>6.0	---	---	None	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
545B:										
Ely----------	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	---	None
			March	1.5-4.0	>6.0	---	---	None	---	None
			April	1.0-3.5	>6.0	---	---	None	---	None
			May	1.5-4.0	>6.0	---	---	None	---	None
			June	2.0-4.5	>6.0	---	---	None	---	None
			July	3.0-5.5	>6.0	---	---	None	---	None
			August	3.5-6.0	>6.0	---	---	None	---	None
			September	4.0-6.5	>6.0	---	---	None	---	None
			October	3.5-6.0	>6.0	---	---	None	---	None
			November	2.5-5.0	>6.0	---	---	None	---	None
			December	3.0-5.5	>6.0	---	---	None	---	None
Gullied land.										
569C:										
Nira----------	B	Medium								
			January	4.0-6.0	>6.0	---	---	None	---	None
			February	3.5-5.5	>6.0	---	---	None	---	None
			March	2.5-4.5	>6.0	---	---	None	---	None
			April	2.0-4.0	>6.0	---	---	None	---	None
			May	2.5-4.5	>6.0	---	---	None	---	None
			June	3.0-5.0	>6.0	---	---	None	---	None
			July	4.0-6.0	>6.0	---	---	None	---	None
			August	4.5-6.5	>6.0	---	---	None	---	None
			September	5.0-6.7	>6.0	---	---	None	---	None
			October	4.5-6.5	>6.0	---	---	None	---	None
			November	3.5-5.5	>6.0	---	---	None	---	None
			December	4.0-6.0	>6.0	---	---	None	---	None
Clearfield----------	C	Very high								
			January	2.0-3.5	>6.0	---	---	None	---	None
			February	1.5-3.0	>6.0	---	---	None	---	None
			March	0.5-2.0	>6.0	---	---	None	---	None
			April	0.0-1.0	>6.0	---	---	None	---	None
			May	0.5-1.5	>6.0	---	---	None	---	None
			June	1.0-2.0	>6.0	---	---	None	---	None
			July	2.0-3.0	>6.0	---	---	None	---	None
			August	2.5-3.5	>6.0	---	---	None	---	None
			September	3.0-4.0	>6.0	---	---	None	---	None
			October	2.5-3.5	>6.0	---	---	None	---	None
			November	1.5-3.0	>6.0	---	---	None	---	None
			December	2.0-3.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
579E3:										
Bucknell, severely eroded	D	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
Hedrick, severely eroded--	B	Medium								
			January	4.0-6.0	>6.0	---	---	None	---	None
			February	3.5-5.5	>6.0	---	---	None	---	None
			March	2.5-4.5	>6.0	---	---	None	---	None
			April	2.0-4.0	>6.0	---	---	None	---	None
			May	2.5-4.5	>6.0	---	---	None	---	None
			June	3.0-5.0	>6.0	---	---	None	---	None
			July	4.0-6.0	>6.0	---	---	None	---	None
			August	4.5-6.5	>6.0	---	---	None	---	None
			September	5.0-6.7	>6.0	---	---	None	---	None
			October	4.5-6.5	>6.0	---	---	None	---	None
			November	3.5-5.5	>6.0	---	---	None	---	None
			December	4.0-6.0	>6.0	---	---	None	---	None
794C2:										
Armstrong, moderately eroded----------	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
794C2:										
Ladoga, moderately eroded	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
822D2:										
Lamoni, moderately eroded	C	Very high								
			January	---	---	---	---	None	---	None
			February	---	---	---	---	None	---	None
			March	1.5-2.0	2.5-2.5	---	---	None	---	None
			April	1.0-1.3	2.5-2.5	---	---	None	---	None
			May	1.3-1.5	2.5-2.5	---	---	None	---	None
			June	1.5-2.0	2.5-2.5	---	---	None	---	None
			July	---	---	---	---	None	---	None
			August	---	---	---	---	None	---	None
			September	---	---	---	---	None	---	None
			October	1.0-1.5	2.5-2.5	---	---	None	---	None
			November	1.5-2.0	2.5-2.5	---	---	None	---	None
			December	1.5-2.0	2.5-2.5	---	---	None	---	None
870B:										
Sharpsburg, terrace-------	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
870C2:										
Sharpsburg, terrace, moderately eroded--------	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
870D2:										
Sharpsburg, terrace, moderately eroded--------	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
876B:										
Ladoga, terrace-----------	B	Low								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
876C2:										
Ladoga, terrace, moderately eroded--------	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
876D2:										
Ladoga, terrace, moderately eroded--------	B	Medium								
			January	6.0-6.7	>6.0	---	---	None	---	None
			February	5.5-6.7	>6.0	---	---	None	---	None
			March	4.5-6.5	>6.0	---	---	None	---	None
			April	4.0-6.0	>6.0	---	---	None	---	None
			May	4.5-6.5	>6.0	---	---	None	---	None
			June	5.0-6.7	>6.0	---	---	None	---	None
			July	6.0-6.7	>6.0	---	---	None	---	None
			August	6.5-6.7	>6.0	---	---	None	---	None
			September	6.5-6.7	>6.0	---	---	None	---	None
			October	6.5-6.7	>6.0	---	---	None	---	None
			November	5.5-6.7	>6.0	---	---	None	---	None
			December	6.0-6.7	>6.0	---	---	None	---	None
2368B:										
Macksburg----------	B	Very high								
			January	3.0-5.5	>6.0	---	---	None	---	None
			February	2.5-5.0	>6.0	---	---	None	---	None
			March	1.5-4.0	>6.0	---	---	None	---	None
			April	1.0-3.5	>6.0	---	---	None	---	None
			May	1.5-4.0	>6.0	---	---	None	---	None
			June	2.0-4.5	>6.0	---	---	None	---	None
			July	3.0-5.5	>6.0	---	---	None	---	None
			August	3.5-6.0	>6.0	---	---	None	---	None
			September	4.0-6.5	>6.0	---	---	None	---	None
			October	3.5-6.0	>6.0	---	---	None	---	None
			November	2.5-5.0	>6.0	---	---	None	---	None
			December	3.0-5.5	>6.0	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
2368B:										
Nira----------	B	Low								
			January	4.0-6.0	>6.0	---	---	None	---	None
			February	3.5-5.5	>6.0	---	---	None	---	None
			March	2.5-4.5	>6.0	---	---	None	---	None
			April	2.0-4.0	>6.0	---	---	None	---	None
			May	2.5-4.5	>6.0	---	---	None	---	None
			June	3.0-5.0	>6.0	---	---	None	---	None
			July	4.0-6.0	>6.0	---	---	None	---	None
			August	4.5-6.5	>6.0	---	---	None	---	None
			September	5.0-6.7	>6.0	---	---	None	---	None
			October	4.5-6.5	>6.0	---	---	None	---	None
			November	3.5-5.5	>6.0	---	---	None	---	None
			December	4.0-6.0	>6.0	---	---	None	---	None
5030.										
Pits, limestone quarries										
5040.										
Udorthents, loamy										
5041.										
Udorthents, reclaimed										
AW.										
Animal waste lagoon										
SL.										
Sewage lagoon										
W.										
Water										

Soil Features

The table described in this section gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for 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 to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
7:					
Wiota, rarely flooded--	---	---	High	Moderate	Moderate
7B:					
Wiota, rarely flooded--	---	---	High	Moderate	Moderate
8B:					
Judson----------	---	---	High	Moderate	Low
15B:					
Olmitz----------	---	---	Moderate	Moderate	Moderate
Ely----------	---	---	High	High	Moderate
Zook----------	---	---	High	High	Moderate
16:					
Nodaway, occasionally flooded----------	---	---	High	Moderate	Low
Kennebec, occasionally flooded----------	---	---	High	Moderate	Low
24C2:					
Shelby, moderately eroded----------	---	---	Moderate	Moderate	Moderate
24D2:					
Shelby, moderately eroded----------	---	---	Moderate	Moderate	Moderate
24E:					
Shelby----------	---	---	Moderate	Moderate	Moderate
24E2:					
Shelby, moderately eroded----------	---	---	Moderate	Moderate	Moderate
24F:					
Shelby----------	---	---	Moderate	Moderate	Moderate
43:					
Bremer, rarely flooded	---	---	High	Moderate	Moderate
45B:					
Zook----------	---	---	High	High	Moderate
Ely----------	---	---	High	High	Moderate
54:					
Zook, occasionally flooded----------	---	---	High	High	Moderate
54+:					
Zook, occasionally flooded, overwash-----	---	---	High	High	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
76B:					
Ladoga	---	---	Moderate	Moderate	Moderate
76C:					
Ladoga	---	---	Moderate	Moderate	Moderate
76D:					
Ladoga	---	---	Moderate	Moderate	Moderate
76D2:					
Ladoga, moderately eroded	---	---	Moderate	Moderate	Moderate
86:					
Mt. Sterling, occasionally flooded	---	---	High	High	Low
Zook, occasionally flooded, overwash	---	---	High	High	Moderate
88:					
Nevin, rarely flooded	---	---	High	High	Low
93D2:					
Shelby, moderately eroded	---	---	Moderate	Moderate	Moderate
Adair, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
93E2:					
Shelby, moderately eroded	---	---	Moderate	Moderate	Moderate
Adair, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
172:					
Wabash, frequently ponded, occasionally flooded	---	---	Moderate	High	Moderate
179E:					
Gara	---	---	Moderate	Moderate	Moderate
179F:					
Gara	---	---	Moderate	Moderate	Moderate
179G:					
Gara	---	---	Moderate	Moderate	Moderate
192D2:					
Adair, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
220:					
Nodaway, occasionally flooded	---	---	High	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
222C2:					
Clarinda, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
222D:					
Clarinda	Abrupt textural change	5-9	High	High	Moderate
222D2:					
Clarinda, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
222D3:					
Clarinda, severely eroded	Abrupt textural change	5-9	High	High	Moderate
248:					
Wabash, occasionally ponded, occasionally flooded	---	---	Moderate	High	Moderate
269:					
Humeston, occasionally flooded	---	---	High	High	Moderate
273B:					
Olmitz	---	---	Moderate	Moderate	Moderate
273C:					
Olmitz	---	---	Moderate	Moderate	Moderate
324C2:					
Dickman, moderately eroded	---	---	Moderate	Low	Moderate
324D2:					
Dickman, moderately eroded	---	---	Moderate	Low	Moderate
354.					
Aquolls, ponded					
368:					
Macksburg	---	---	High	High	Moderate
369:					
Winterset	---	---	High	High	Moderate
370:					
Sharpsburg	---	---	High	Moderate	Moderate
370B:					
Sharpsburg	---	---	High	Moderate	Moderate
371C2:					
Sharpsburg, moderately eroded	---	---	High	Moderate	Moderate
Nira, moderately eroded	---	---	High	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
371D2:					
Sharpsburg, moderately eroded	---	---	High	Moderate	Moderate
Nira, moderately eroded	---	---	High	Moderate	Moderate
421C2:					
Gara, moderately eroded	---	---	Moderate	Moderate	Moderate
Bucknell, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
421D2:					
Gara, moderately eroded	---	---	Moderate	Moderate	Moderate
Bucknell, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
421E2:					
Gara, moderately eroded	---	---	Moderate	Moderate	Moderate
Bucknell, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
435:					
Zook, occasionally flooded	---	---	High	High	Moderate
Mt. Sterling, occasionally flooded	---	---	High	High	Low
469C2:					
Lamoni, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
Clarinda, moderately eroded	Abrupt textural change	5-9	High	High	Moderate
Shelby, moderately eroded	---	---	Moderate	Moderate	Moderate
469C3:					
Lamoni, severely eroded	Abrupt textural change	5-9	Moderate	High	Moderate
Clarinda, severely eroded	Abrupt textural change	5-9	High	High	Moderate
Shelby, severely eroded	---	---	Moderate	Moderate	Moderate
470D2:					
Lamoni, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
Shelby, moderately eroded	---	---	Moderate	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
545B:					
Zook	---	---	High	High	Moderate
Ely	---	---	High	High	Moderate
Gullied land.					
569C:					
Nira	---	---	High	Moderate	Moderate
Clearfield	---	---	High	High	Low
579E3:					
Bucknell, severely eroded	Abrupt textural change	5-9	Moderate	High	Moderate
Hedrick, severely eroded	---	---	High	Moderate	Moderate
794C2:					
Armstrong, moderately eroded	---	---	High	High	Moderate
Ladoga, moderately eroded	---	---	Moderate	Moderate	Moderate
822D2:					
Lamoni, moderately eroded	Abrupt textural change	5-9	Moderate	High	Moderate
870B:					
Sharpsburg, terrace	---	---	High	Moderate	Moderate
870C2:					
Sharpsburg, terrace, moderately eroded	---	---	High	Moderate	Moderate
870D2:					
Sharpsburg, terrace, moderately eroded	---	---	High	Moderate	Moderate
876B:					
Ladoga, terrace	---	---	Moderate	Moderate	Moderate
876C2:					
Ladoga, terrace, moderately eroded	---	---	Moderate	Moderate	Moderate
876D2:					
Ladoga, terrace, moderately eroded	---	---	Moderate	Moderate	Moderate
2368B:					
Macksburg	---	---	High	High	Moderate
Nira	---	---	High	Moderate	Moderate
5030.					
Pits, limestone quarries					

Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
5040. Udorthents, loamy					
5041: Udorthents, reclaimed					
AW. Animal waste lagoon					
SL. Sewage lagoon					
W. Water					

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