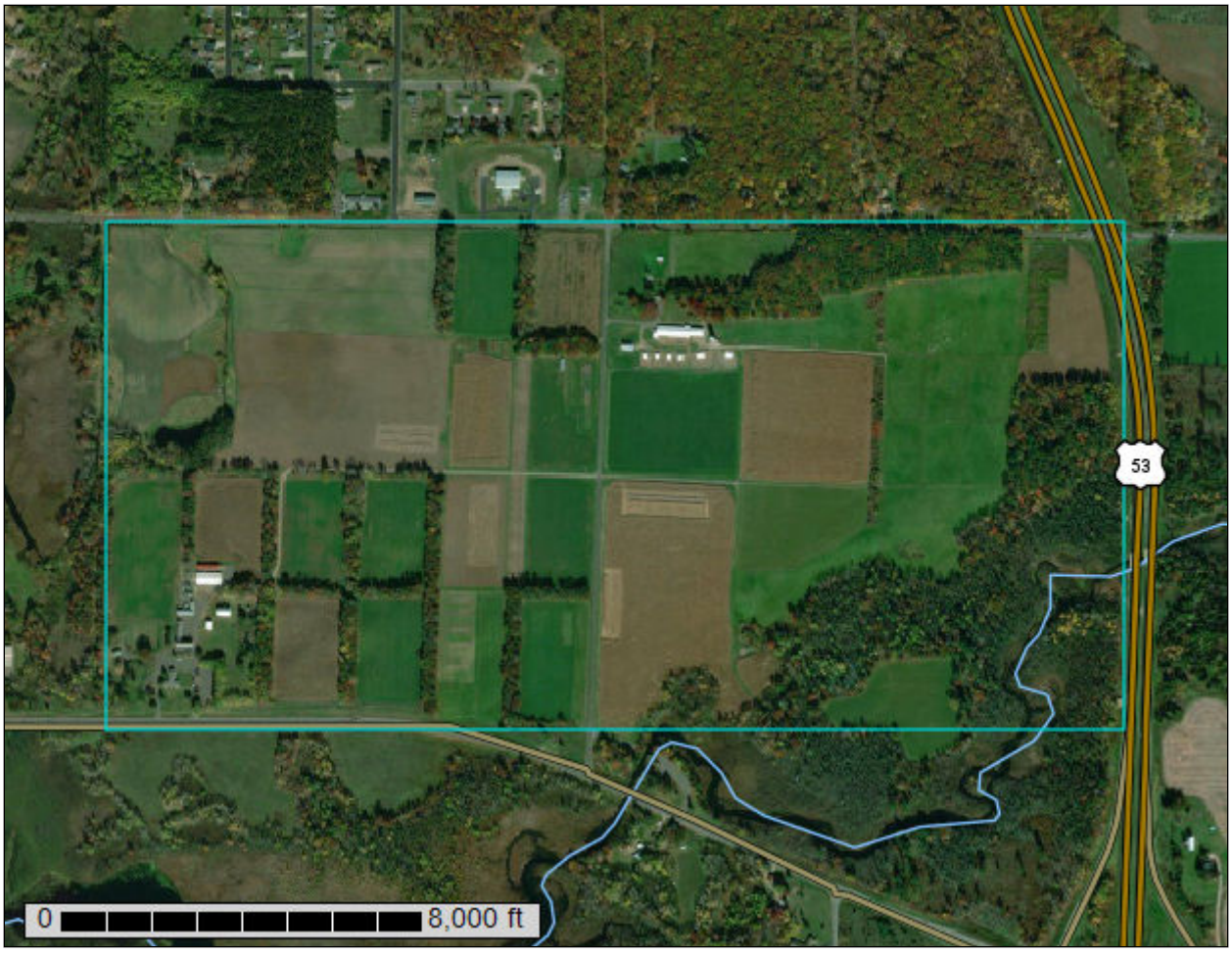
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product 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 participants

Custom Soil Resource Report for Washburn County, Wisconsin



October 3, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

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

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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

The National Cooperative Soil Survey is 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.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

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

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

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

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

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes	25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	14.1	4.3%
W	Water	2.0	0.6%
Totals for Area of Interest		**325.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named

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

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

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

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

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

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washburn County, Wisconsin

160A—Oesterle sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: gm4t
Elevation: 700 to 1,950 feet
Mean annual precipitation: 26 to 33 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Oesterle and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oesterle

Setting

Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy alluvium underlain by stratified sandy and gravelly outwash

Typical profile

Ap - 0 to 7 inches: sandy loam
E/B - 7 to 11 inches: sandy loam
Bt - 11 to 31 inches: sandy loam
2C - 31 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Minor Components

Scott lake

Percent of map unit: 5 percent

Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minocqua

Percent of map unit: 5 percent
Landform: Depressions, drainageways, stream terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

193A—Minocqua muck, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: gm4z
Elevation: 800 to 1,950 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 70 to 125 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Minocqua and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Minocqua

Setting

Landform: Depressions, drainageways, stream terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty and loamy alluvium underlain by sandy and gravelly outwash

Typical profile

Oa - 0 to 4 inches: muck
Eg - 4 to 15 inches: silt loam
2Bg - 15 to 28 inches: loam
3C - 28 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained

Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: Wet Loamy-Mantled Depressions (F094DY015WI)
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Minor Components

Cathro
Percent of map unit: 5 percent
Landform: Depressions on stream terraces, drainageways on stream terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Frequently flooded, organics (G090AY010WI)
Hydric soil rating: Yes

Oesterle
Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Low AWC, high water table (G090BY001WI)
Hydric soil rating: No

Worcester
Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet Loamy-Mantled Drainageways (F094DY014WI)
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Minocqua, briefly flooded
Percent of map unit: 2 percent
Landform: Depressions, drainageways, stream terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet Loamy-Mantled Depressions (F094DY015WI)
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

337A—Plover fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: gm58
Elevation: 800 to 1,950 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Plover and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plover

Setting

Landform: Lake plains, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Stratified loamy lacustrine deposits

Typical profile

Ap - 0 to 10 inches: fine sandy loam
E - 10 to 13 inches: fine sandy loam
B/E - 13 to 18 inches: fine sandy loam
Bt - 18 to 32 inches: fine sandy loam
C - 32 to 60 inches: stratified fine sand to silt

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Minor Components

Aftad

Percent of map unit: 5 percent
Landform: Lake plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Fenander

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Comstock

Percent of map unit: 3 percent
Landform: Lake plains, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Oesterle

Percent of map unit: 2 percent
Landform: Lake plains, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

368B—Mahtomedi-Cress complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: gm59
Elevation: 670 to 1,950 feet
Mean annual precipitation: 27 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 88 to 142 days
Farmland classification: Not prime farmland

Map Unit Composition

Mahtomedi and similar soils: 55 percent
Cress and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mahtomedi

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 5 inches: loamy sand
E - 5 to 8 inches: sand
bw1 - 8 to 15 inches: gravelly coarse sand
Bw2 - 15 to 30 inches: gravelly sand
C - 30 to 60 inches: gravelly sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Description of Cress

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin layer of loamy alluvium underlain by stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 15 inches: sandy loam
2Bw2 - 15 to 31 inches: loamy sand
2Bw3 - 31 to 36 inches: gravelly loamy sand
2C - 36 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Graycalm

Percent of map unit: 5 percent
Hydric soil rating: No

Grettum

Percent of map unit: 3 percent
Hydric soil rating: No

Haugen

Percent of map unit: 2 percent
Hydric soil rating: No

383C—Mahtomedi loamy sand, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: gm5k
Elevation: 670 to 1,600 feet
Mean annual precipitation: 27 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 88 to 142 days
Farmland classification: Not prime farmland

Map Unit Composition

Mahtomedi and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mahtomedi

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 5 inches: loamy sand
E - 5 to 8 inches: sand
Bw1 - 8 to 15 inches: gravelly coarse sand
Bw2 - 15 to 30 inches: gravelly sand
C - 30 to 60 inches: gravelly sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Graycalm

Percent of map unit: 10 percent
Hydric soil rating: No

Menahga

Percent of map unit: 10 percent
Hydric soil rating: No

Cress

Percent of map unit: 3 percent
Hydric soil rating: No

Lenroot

Percent of map unit: 2 percent
Hydric soil rating: No

407A—Seelyeville and Markey soils, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: gk3l
Elevation: 600 to 1,950 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Seelyeville and similar soils: 50 percent
Markey and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Seelyeville

Setting

Landform: Depressions, depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Herbaceous organic material more than 51 inches thick

Typical profile

Oa1 - 0 to 19 inches: muck
Oa2 - 19 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: Poor Fens (F094DY002WI)
Other vegetative classification: Frequently flooded, organics (G090AY010WI)
Hydric soil rating: Yes

Description of Markey

Setting

Landform: Depressions, depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Herbaceous organic material 16 to 51 inches thick overlying sandy deposits

Typical profile

Oa - 0 to 32 inches: muck
Cg - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 14.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Poor Fens (F094DY002WI)
Other vegetative classification: Frequently flooded, organics (G090AY010WI)
Hydric soil rating: Yes

Minor Components

Newson

Percent of map unit: 10 percent
Landform: Depressions, depressions, drainageways, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear, convex
Across-slope shape: Concave, linear, convex
Other vegetative classification: Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Dawson

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: Mucky Peat Bogs (F094DY004WI)
Other vegetative classification: Not Assigned (acid organic soils) (Naor), Frequently flooded, organics (G090AY010WI)
Hydric soil rating: Yes

439B—Graycalm-Menahga complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: gvjt
Elevation: 600 to 1,600 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 88 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Graycalm and similar soils: 55 percent
Menahga and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Graycalm

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 3 inches: loamy sand
Bw - 3 to 22 inches: sand
E - 22 to 35 inches: sand
E and Bt - 35 to 80 inches: stratified sand to loamy sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Description of Menahga

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: sand
Bw - 2 to 25 inches: sand
C - 25 to 80 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Mahtomedi

Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Cress

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Grettum

Percent of map unit: 3 percent

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Wurtsmith

Percent of map unit: 2 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

439C—Graycalm-Menahga complex, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: gvjv
Elevation: 600 to 1,160 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 88 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Graycalm and similar soils: 55 percent
Menahga and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Graycalm

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 3 inches: loamy sand
Bw - 3 to 22 inches: sand
E - 22 to 35 inches: sand
E and Bt - 35 to 80 inches: stratified sand to loamy sand

Properties and qualities

Slope: 6 to 12 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Description of Menahga

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: sand
Bw - 2 to 25 inches: sand
C - 25 to 80 inches: sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Mahtomedi

Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces

Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Grettum

Percent of map unit: 3 percent
Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Cress

Percent of map unit: 2 percent
Landform: Outwash plains
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

544F—Menahga and Mahtomedi soils, 30 to 45 percent slopes

Map Unit Setting

National map unit symbol: h27j
Elevation: 670 to 1,600 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 88 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Menahga and similar soils: 65 percent
Mahtomedi and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Menahga

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: sand
Bw - 2 to 25 inches: sand
C - 25 to 80 inches: sand

Properties and qualities

Slope: 30 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained with limitations (G090AY003WI)
Hydric soil rating: No

Description of Mahtomedi

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 5 inches: loamy sand
E - 5 to 8 inches: sand
Bw1 - 8 to 15 inches: gravelly coarse sand
Bw2 - 15 to 30 inches: gravelly sand
C - 30 to 60 inches: gravelly sand

Properties and qualities

Slope: 30 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained with limitations (G090AY003WI)
Hydric soil rating: No

Minor Components

Graycalm

Percent of map unit: 10 percent
Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained with limitations (G090AY003WI)
Hydric soil rating: No

Grettum

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

615B—Cress sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: h27r
Elevation: 800 to 1,950 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Cress and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cress

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy alluvium underlain by stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 15 inches: sandy loam
2Bw2 - 15 to 31 inches: loamy sand
2Bw3 - 31 to 36 inches: gravelly loamy sand
2C - 36 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Chetek

Percent of map unit: 12 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G091BY002WI)
Hydric soil rating: No

Menahga

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Slimlake

Percent of map unit: 3 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Mahtomedi

Percent of map unit: 3 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Rosholt

Percent of map unit: 2 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

726B—Sissabagama loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: h28c
Elevation: 900 to 1,200 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 110 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Sissabagama and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sissabagama

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Sandy deposits underlain by stratified sandy and loamy lacustrine deposits

Typical profile

Ap - 0 to 10 inches: loamy sand
Bw - 10 to 31 inches: sand
E&Bt - 31 to 45 inches: sand
2C - 45 to 80 inches: stratified very fine sand to silt

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Grettum

Percent of map unit: 10 percent
Hydric soil rating: No

Wurtsmith

Percent of map unit: 3 percent
Hydric soil rating: No

Perida

Percent of map unit: 2 percent
Hydric soil rating: No

1070C—Fremstadt, stony-Cress complex, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: t7gt
Elevation: 800 to 1,950 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fremstadt, stony, and similar soils: 40 percent
Cress and similar soils: 20 percent
Minor components: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fremstadt, Stony

Setting

Landform: Disintegration moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy till or sandy mudflow sediments

Typical profile

A - 0 to 5 inches: sandy loam
Bw - 5 to 33 inches: loamy sand
B/E1 - 33 to 37 inches: sandy loam
B/E2 - 37 to 45 inches: loamy sand
BC - 45 to 70 inches: loamy sand
C - 70 to 80 inches: loamy sand

Properties and qualities

Slope: 6 to 15 percent
Percent of area covered with surface fragments: 0.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Cress

Setting

Landform: Disintegration moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin layer of loamy alluvium underlain by stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 15 inches: sandy loam
2Bw2 - 15 to 31 inches: loamy sand
2Bw3 - 31 to 36 inches: gravelly loamy sand
2C - 36 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Haugen

Percent of map unit: 10 percent
Landform: Disintegration moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Spoonerhill, stony

Percent of map unit: 10 percent
Landform: Disintegration moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Fremstadt

Percent of map unit: 10 percent
Landform: Disintegration moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)

Hydric soil rating: No

Spoonerhill

Percent of map unit: 5 percent
Landform: Disintegration moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Mahtomedi

Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained with limitations (G090AY003WI)
Hydric soil rating: No

1080B—Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: t7gs
Elevation: 800 to 1,950 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Spoonerhill, stony, and similar soils: 30 percent
Spoonerhill and similar soils: 30 percent
Cress and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spoonerhill, Stony

Setting

Landform: Disintegration moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Thin mantle of loamy alluvium and sandy alluvium underlain by sandy till or sandy mudflow sediments

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 12 inches: gravelly sandy loam
2Bw2 - 12 to 16 inches: gravelly loamy sand
2E/B - 16 to 34 inches: loamy sand
2C1 - 34 to 46 inches: sand
2C2 - 46 to 80 inches: gravelly loamy sand

Properties and qualities

Slope: 2 to 6 percent
Percent of area covered with surface fragments: 0.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Description of Spoonerhill

Setting

Landform: Disintegration moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin mantle of loamy alluvium and sandy alluvium underlain by sandy till or sandy mudflow sediments

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 12 inches: gravelly sandy loam
2Bw2 - 12 to 16 inches: gravelly loamy sand
2E/B - 16 to 34 inches: loamy sand
2C1 - 34 to 46 inches: sand
2C2 - 46 to 80 inches: gravelly loamy sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: About 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Description of Cress

Setting

Landform: Disintegration moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin layer of loamy alluvium underlain by stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
Bw1 - 3 to 15 inches: sandy loam
2Bw2 - 15 to 31 inches: loamy sand
2Bw3 - 31 to 36 inches: gravelly loamy sand
2C - 36 to 60 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Fremstadt

Percent of map unit: 10 percent
Landform: Disintegration moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Grettum

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

3126A—Wurtsmith loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: s8yz
Elevation: 600 to 1,400 feet
Mean annual precipitation: 24 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Wurtsmith and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsmith

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

Ap - 0 to 9 inches: loamy sand
Bw - 9 to 37 inches: coarse sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Menahga

Percent of map unit: 5 percent
Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained with limitations (G090AY003WI)
Hydric soil rating: No

Friendship

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Slimlake

Percent of map unit: 3 percent
Landform: Outwash plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Meehan

Percent of map unit: 2 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, high water table (G090AY001WI)
Hydric soil rating: No

3448B—Grettum loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: s8z6
Elevation: 750 to 1,600 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Grettum and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grettum

Setting

Landform: Outwash plains, lake plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy outwash or sandy lacustrine deposits with lamellae

Typical profile

A - 0 to 3 inches: loamy sand
Bw - 3 to 32 inches: sand
Et - 32 to 75 inches: sand
C - 75 to 80 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Graycalm

Percent of map unit: 10 percent
Landform: Lake plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Menahga

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Cress

Percent of map unit: 3 percent
Landform: Lake plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Aftad

Percent of map unit: 1 percent
Landform: Lake plains, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Karlsborg

Percent of map unit: 1 percent
Landform: Outwash plains, lake plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Chemical Properties

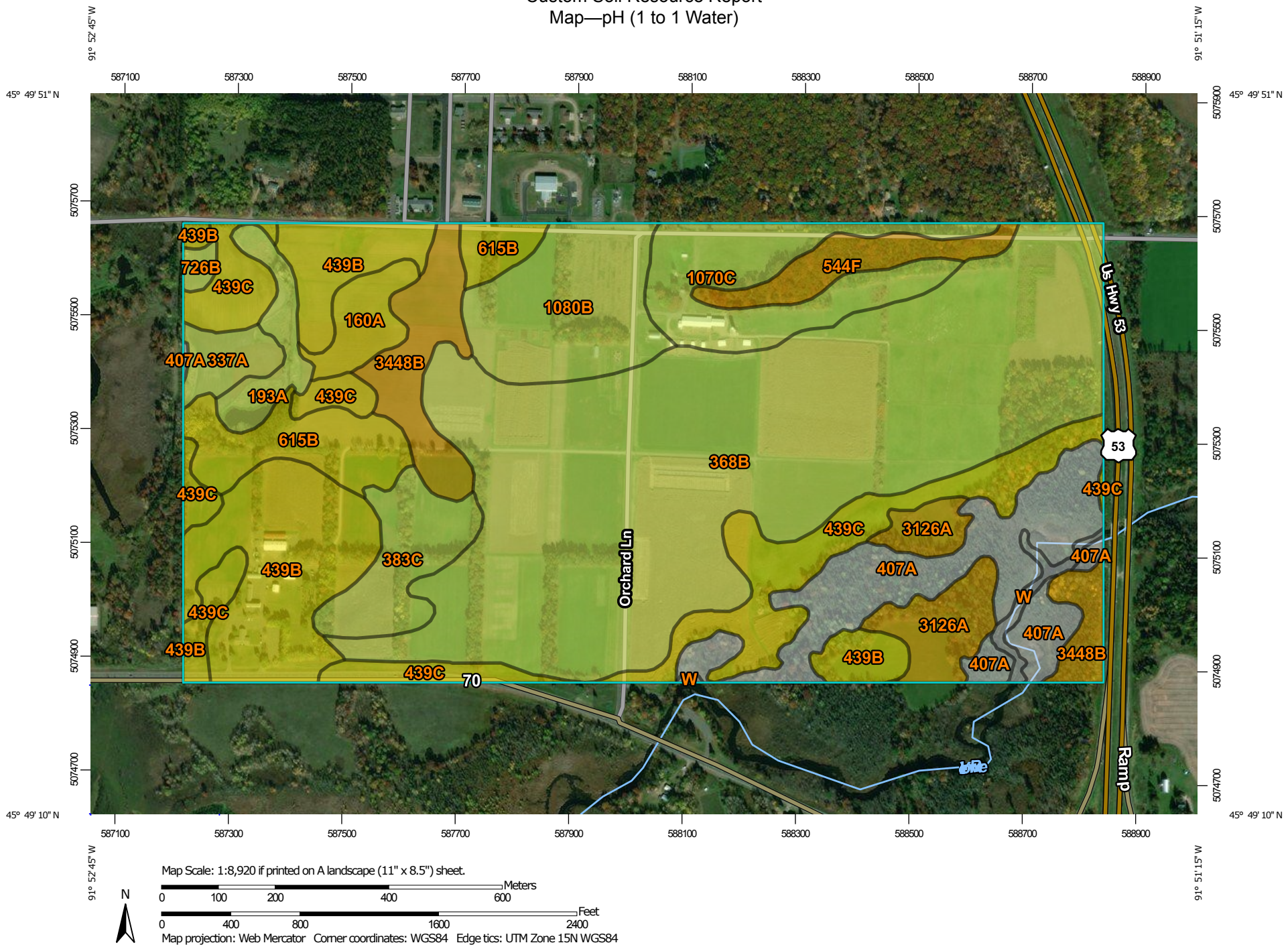
Soil Chemical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

pH (1 to 1 Water)

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion. In general, soils that are either highly alkaline or highly acid are likely to be very corrosive to steel. The most common soil laboratory measurement of pH is the 1:1 water method. A crushed soil sample is mixed with an equal amount of water, and a measurement is made of the suspension.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Map—pH (1 to 1 Water)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Lines

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Points

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—pH (1 to 1 Water)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	5.5	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	6.0	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	5.7	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	5.8	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	5.8	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes		25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	5.3	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	5.3	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	5.0	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	5.5	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	5.7	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	5.6	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	5.6	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	4.7	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	5.0	14.1	4.3%
W	Water		2.0	0.6%
Totals for Area of Interest			**325.2**	**100.0%**

Rating Options—pH (1 to 1 Water)

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 50

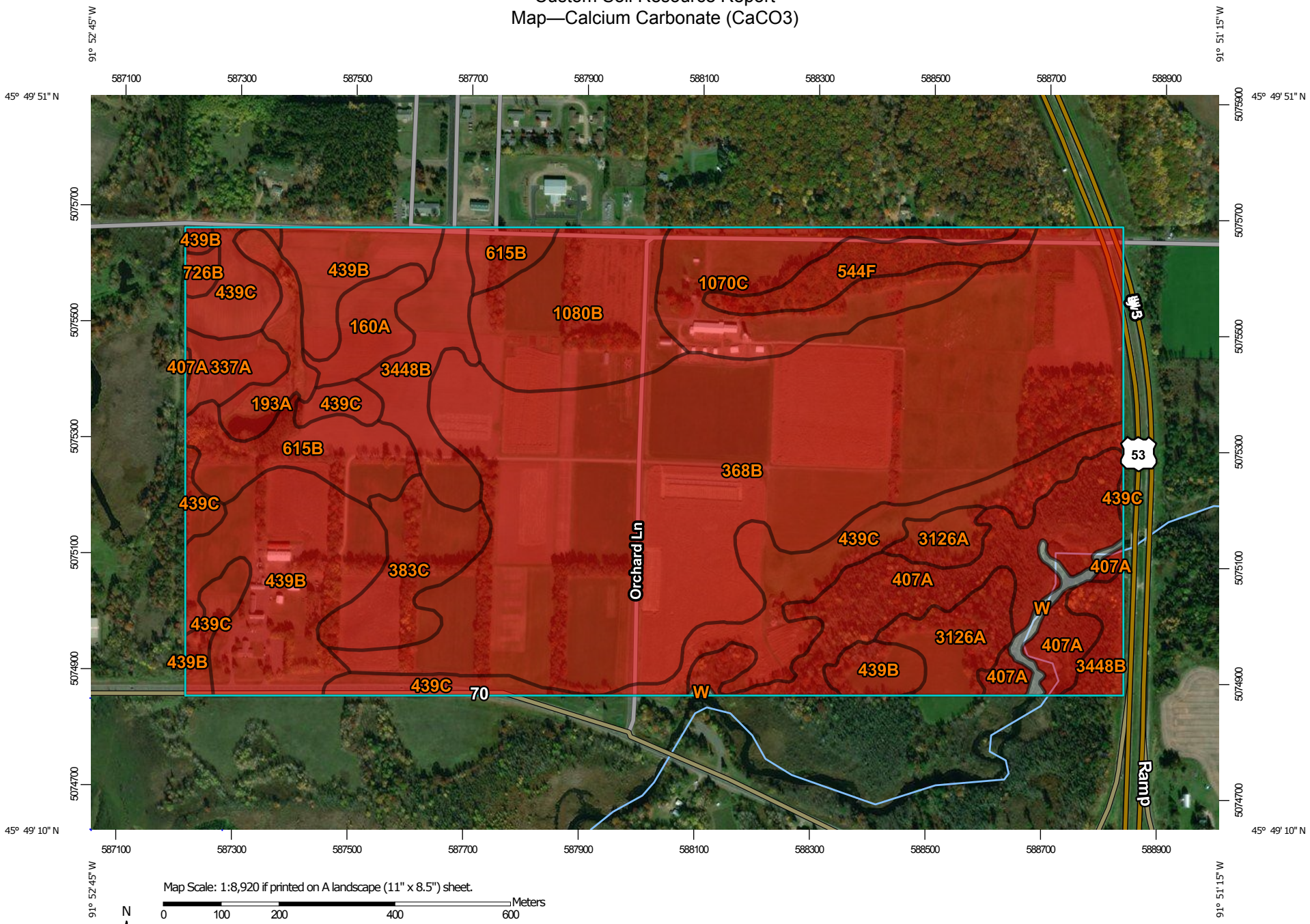
Units of Measure: Centimeters

Calcium Carbonate (CaCO3)

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.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Calcium Carbonate (CaCO3)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

= 0

Not rated or not available

Soil Rating Lines

= 0

Not rated or not available

Soil Rating Points

= 0

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Calcium Carbonate (CaCO3)

Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	0	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	0	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	0	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	0	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	0	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes	0	25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	0	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	0	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	0	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	0	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	0	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	0	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	0	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	0	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	0	14.1	4.3%
W	Water		2.0	0.6%
Totals for Area of Interest			**325.2**	**100.0%**

Rating Options—Calcium Carbonate (CaCO3)

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: Yes

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 50

Units of Measure: Centimeters

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

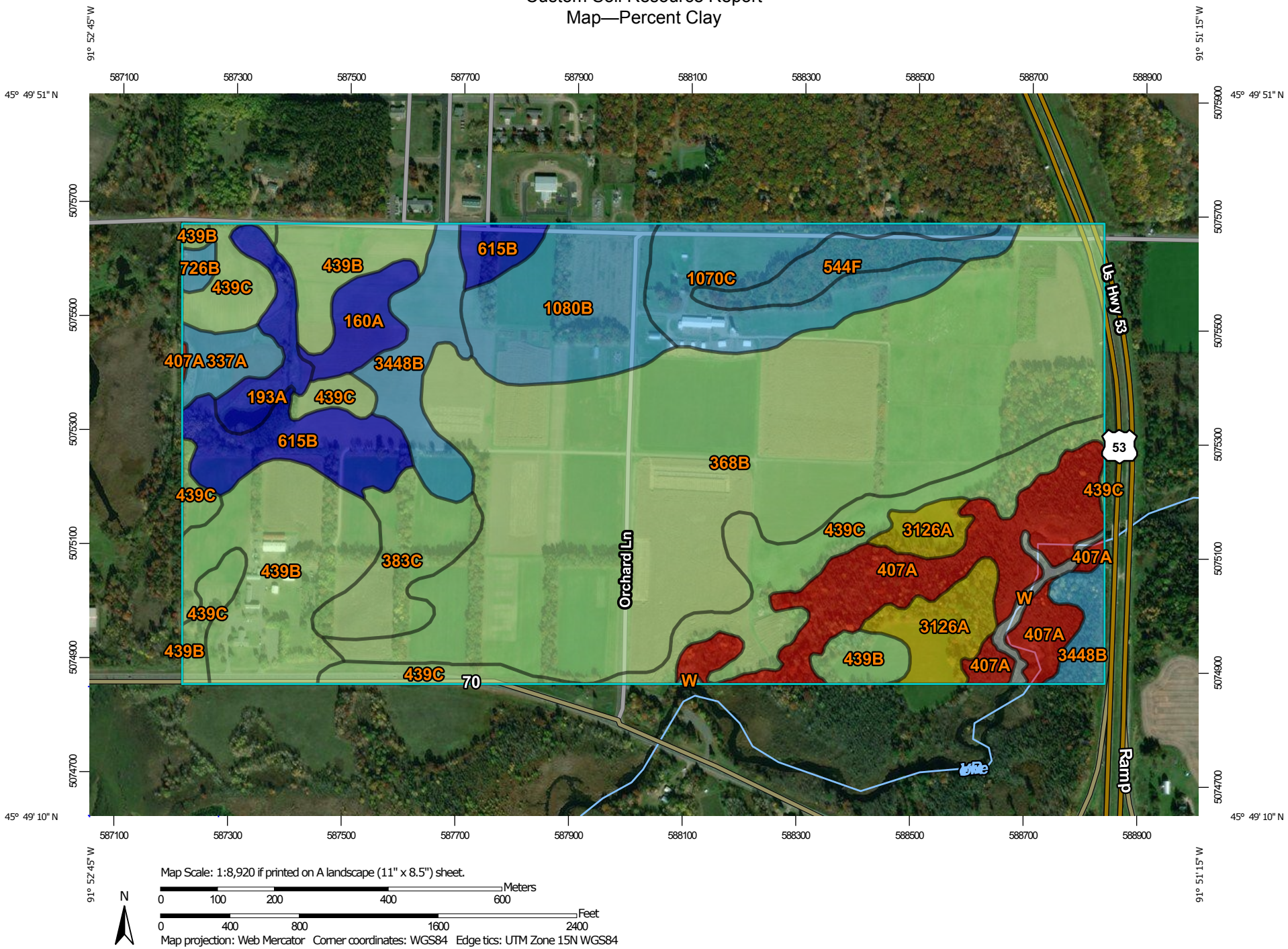
Percent Clay

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. 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, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Most of the material is in one of three groups of clay minerals or a mixture of these clay minerals. The groups are kaolinite, smectite, and hydrous mica, the best known member of which is illite.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Map—Percent Clay



Map Scale: 1:8,920 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- <= 0.0
- > 0.0 and <= 3.7
- > 3.7 and <= 5.9
- > 5.9 and <= 8.5
- > 8.5 and <= 11.7
- Not rated or not available

Soil Rating Lines

- <= 0.0
- > 0.0 and <= 3.7
- > 3.7 and <= 5.9
- > 5.9 and <= 8.5
- > 8.5 and <= 11.7
- Not rated or not available

Soil Rating Points

- <= 0.0
- > 0.0 and <= 3.7
- > 3.7 and <= 5.9
- > 5.9 and <= 8.5
- > 8.5 and <= 11.7
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Percent Clay

Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	11.7	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	10.4	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	8.5	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	5.9	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	5.9	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes	0.0	25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	5.2	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	5.2	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	6.9	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	9.7	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	7.0	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	7.0	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	8.1	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	3.7	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	7.0	14.1	4.3%
W	Water		2.0	0.6%
Totals for Area of Interest			**325.2**	**100.0%**

Rating Options—Percent Clay

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 50

Units of Measure: Centimeters

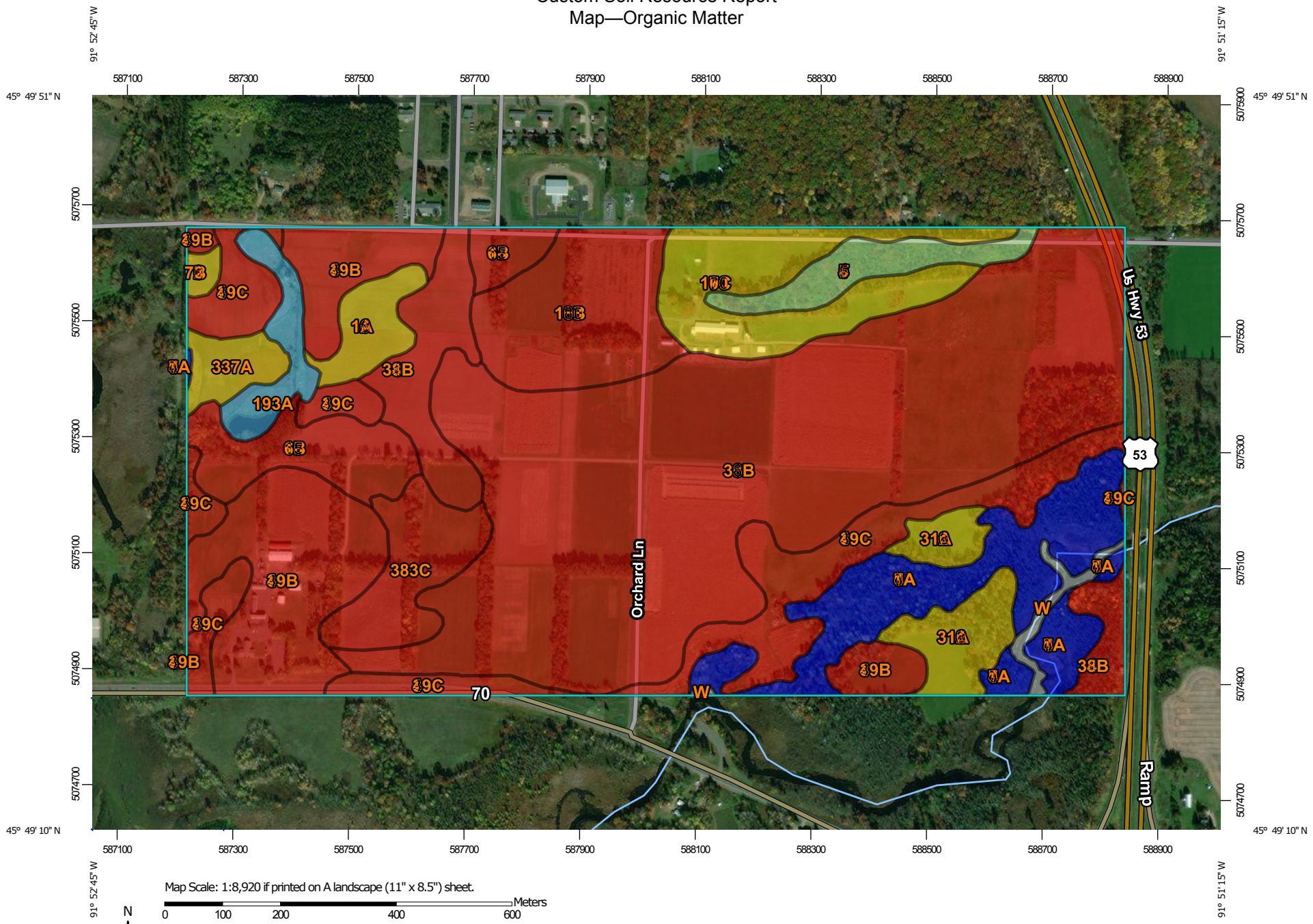
Organic Matter

Organic matter is the plant and animal residue in the soil at various stages of decomposition. 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. An irregular distribution of organic carbon with depth may indicate different episodes of soil deposition or soil formation. Soils that are very high in organic matter have poor engineering properties and subside upon drying.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Organic Matter



Map Scale: 1:8,920 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- <= 0.71
- > 0.71 and <= 1.75
- > 1.75 and <= 4.78
- > 4.78 and <= 9.62
- > 9.62 and <= 62.00
- Not rated or not available

Soil Rating Lines
- <= 0.71
- > 0.71 and <= 1.75
- > 1.75 and <= 4.78
- > 4.78 and <= 9.62
- > 9.62 and <= 62.00
- Not rated or not available

Soil Rating Points
- <= 0.71
- > 0.71 and <= 1.75
- > 1.75 and <= 4.78
- > 4.78 and <= 9.62
- > 9.62 and <= 62.00
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Organic Matter

Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	1.16	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	9.62	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	1.63	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	0.38	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	0.38	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes	62.00	25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	0.41	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	0.41	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	4.78	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	0.71	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	1.13	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	0.98	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	0.67	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	1.75	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	0.53	14.1	4.3%
W	Water		2.0	0.6%
Totals for Area of Interest			**325.2**	**100.0%**

Rating Options—Organic Matter

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 50

Units of Measure: Centimeters

Available Water Supply, 0 to 50 cm

Available water supply (AWS) is the total volume of water (in centimeters) that should be available to plants when the soil, inclusive of rock fragments, is at field capacity. It is commonly estimated as the amount of water held between field capacity and the wilting point, with corrections for salinity, rock fragments, and rooting depth. AWS is reported as a single value (in centimeters) of water for the specified depth of the soil. AWS is calculated as the available water capacity times the thickness of each soil horizon to a specified depth.

For each soil layer, available water capacity, used in the computation of AWS, is recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For the derivation of AWS, only the representative value for available water capacity is used.

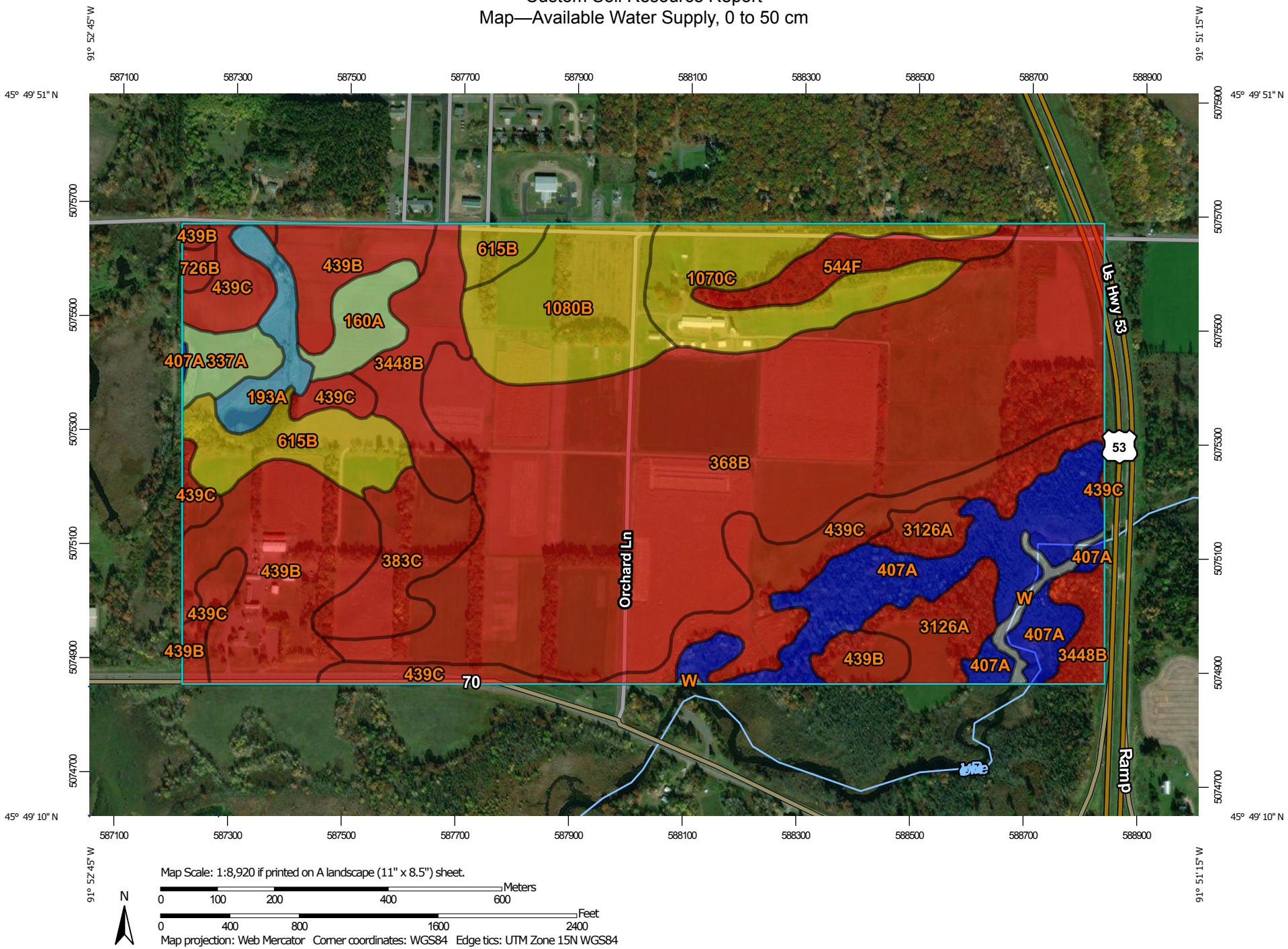
The available water supply for each map unit component is computed as described above and then aggregated to a single value for the map unit by the process described below.

A map unit typically consists of one or more "components." A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated (e.g., available water supply), the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the process is to derive a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for the map units can be generated. Aggregation is needed because map units rather than components are delineated on the soil maps.

The composition of each component in a map unit is recorded as a percentage. A composition of 60 indicates that the component typically makes up approximately 60 percent of the map unit.

For the available water supply, when a weighted average of all component values is computed, percent composition is the weighting factor.

Custom Soil Resource Report
Map—Available Water Supply, 0 to 50 cm



Map Scale: 1:8,920 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- <= 4.31
- > 4.31 and <= 5.67
- > 5.67 and <= 8.17
- > 8.17 and <= 9.88
- > 9.88 and <= 18.77
- Not rated or not available

Soil Rating Lines

- <= 4.31
- > 4.31 and <= 5.67
- > 5.67 and <= 8.17
- > 8.17 and <= 9.88
- > 9.88 and <= 18.77
- Not rated or not available

Soil Rating Points

- <= 4.31
- > 4.31 and <= 5.67
- > 5.67 and <= 8.17
- > 8.17 and <= 9.88
- > 9.88 and <= 18.77
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washburn County, Wisconsin
Survey Area Data: Version 16, Sep 28, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2012—Jul 8, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Available Water Supply, 0 to 50 cm

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
160A	Oesterle sandy loam, 0 to 2 percent slopes	6.83	5.3	1.6%
193A	Minocqua muck, 0 to 2 percent slopes	9.88	5.6	1.7%
337A	Plover fine sandy loam, 0 to 3 percent slopes	8.17	4.2	1.3%
368B	Mahtomedi-Cress complex, 2 to 6 percent slopes	4.06	122.9	37.8%
383C	Mahtomedi loamy sand, 6 to 12 percent slopes	2.85	10.7	3.3%
407A	Seelyeville and Markey soils, 0 to 1 percent slopes	18.77	25.2	7.7%
439B	Graycalm-Menahga complex, 0 to 6 percent slopes	4.31	34.2	10.5%
439C	Graycalm-Menahga complex, 6 to 12 percent slopes	4.30	31.3	9.6%
544F	Menahga and Mahtomedi soils, 30 to 45 percent slopes	4.21	7.2	2.2%
615B	Cress sandy loam, 0 to 6 percent slopes	5.67	13.8	4.2%
726B	Sissabagama loamy sand, 0 to 6 percent slopes	4.25	1.0	0.3%
1070C	Fremstadt, stony-Cress complex, 6 to 15 percent slopes	5.39	18.5	5.7%
1080B	Spoonerhill-Spoonerhill, stony-Cress complex, 1 to 6 percent slopes	5.08	19.2	5.9%
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	3.58	10.0	3.1%
3448B	Grettum loamy sand, 0 to 6 percent slopes	3.94	14.1	4.3%
W	Water		2.0	0.6%
Totals for Area of Interest			**325.2**	**100.0%**

Rating Options—Available Water Supply, 0 to 50 cm

Units of Measure: centimeters

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Higher

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