

Custom Soil Resource Report for Mercer County, North Dakota



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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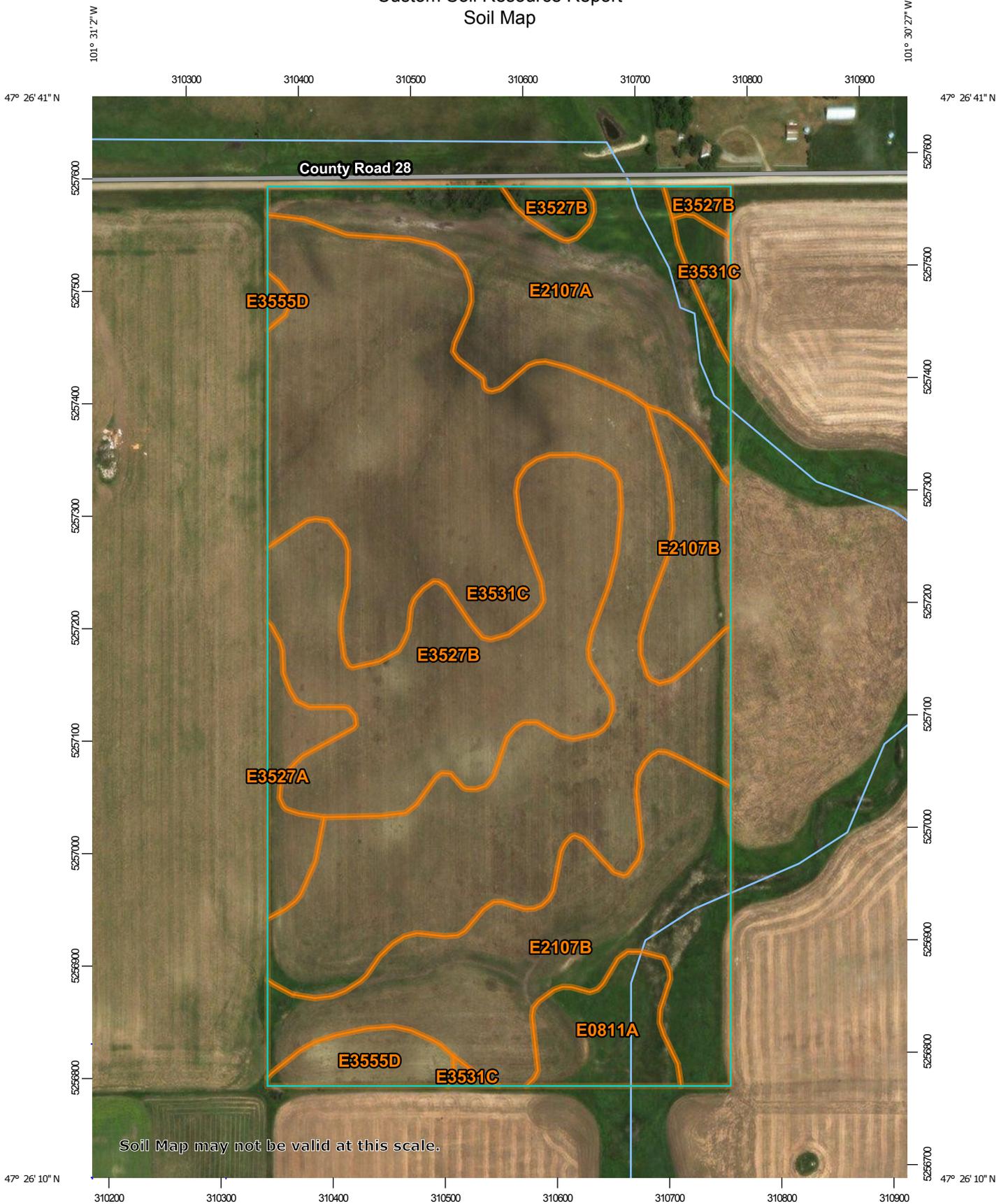
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Soil Map

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 Scale: 1:4,680 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters

0 200 400 800 1200 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

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 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Mercer County, North Dakota
 Survey Area Data: Version 24, Oct 2, 2017

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

Date(s) aerial images were photographed: Sep 6, 2014—Sep 10, 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
E0811A	Grail silty clay loam, 0 to 2 percent slopes	2.9	3.6%
E2107A	Arnegard loam, 0 to 2 percent slopes	10.9	13.3%
E2107B	Arnegard loam, 2 to 6 percent slopes	15.8	19.3%
E3527A	Williams-Bowbells loams, 0 to 3 percent slopes	2.0	2.5%
E3527B	Williams-Bowbells loams, 3 to 6 percent slopes	14.3	17.4%
E3531C	Williams loam, 6 to 9 percent slopes	34.3	41.8%
E3555D	Zahl-Williams loams, 9 to 15 percent slopes	1.8	2.2%
Totals for Area of Interest		82.0	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

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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.

Mercer County, North Dakota

E0811A—Grail silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzs4
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Grail and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grail

Setting

Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Clayey alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 5 inches: silty clay loam
A - 5 to 10 inches: silty clay loam
Bt - 10 to 24 inches: silty clay
Bk - 24 to 52 inches: silty clay loam
C - 52 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 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): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Forage suitability group: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 11 percent
Landform: Alluvial flats
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Belfield

Percent of map unit: 9 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Lawther

Percent of map unit: 5 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Grail

Percent of map unit: 5 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Farland

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Regent

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

E2107A—Arnegard loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vzt7
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Arnegard

Setting

Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 13 inches: loam
Bw1 - 13 to 28 inches: loam
Bw2 - 28 to 36 inches: loam
Bk - 36 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 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): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: B
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Shambo

Percent of map unit: 12 percent
Landform: Swales
Landform position (two-dimensional): Foothlope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Grail

Percent of map unit: 8 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Belfield

Percent of map unit: 5 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

E2107B—Arnegard loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzt8
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Arnegard and similar soils: 76 percent

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Minor components: 24 percent

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

Description of Arnegard

Setting

Landform: Swales

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam

A - 6 to 10 inches: loam

Bw1 - 10 to 22 inches: loam

Bw2 - 22 to 30 inches: loam

Bk - 30 to 51 inches: loam

C - 51 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 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): Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: Loamy (R054XY031ND)

Forage suitability group: Loam (G054XY100ND)

Hydric soil rating: No

Minor Components

Shambo

Percent of map unit: 14 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Loamy (R054XY031ND)

Hydric soil rating: No

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Grail

Percent of map unit: 8 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Belfield

Percent of map unit: 2 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

E3527A—Williams-Bowbells loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: cdpp
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Williams and similar soils: 48 percent
Bowbells and similar soils: 37 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Williams

Setting

Landform: Rises
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 10 inches: clay loam
Bt2 - 10 to 15 inches: clay loam
Btk - 15 to 24 inches: clay loam

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Bk - 24 to 36 inches: clay loam

C - 36 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent

Percent of area covered with surface fragments: 0.0 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): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent

Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2c

Hydrologic Soil Group: C

Ecological site: Loamy (R054XY031ND)

Forage suitability group: Loam (G054XY100ND)

Hydric soil rating: No

Description of Bowbells

Setting

Landform: Swales

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam

Bt1 - 6 to 14 inches: clay loam

Bt2 - 14 to 23 inches: clay loam

Bk - 23 to 36 inches: loam

C - 36 to 60 inches: loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 42 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 30 percent

Gypsum, maximum in profile: 1 percent

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Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2c

Hydrologic Soil Group: C

Ecological site: Loamy Overflow (R054XY023ND)

Forage suitability group: Overflow (G054XY500ND)

Hydric soil rating: No

Minor Components

Max

Percent of map unit: 6 percent

Landform: Rises

Landform position (two-dimensional): Backslope, summit

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Loamy (R054XY031ND)

Hydric soil rating: No

Temvik

Percent of map unit: 5 percent

Landform: Rises

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Loamy (R054XY031ND)

Hydric soil rating: No

Reeder

Percent of map unit: 2 percent

Landform: Pediments

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Loamy (R054XY031ND)

Hydric soil rating: No

Tonka

Percent of map unit: 2 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Wet Meadow (R054XY037ND)

Hydric soil rating: Yes

E3527B—Williams-Bowbells loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: cdpq

Elevation: 1,650 to 3,600 feet

Mean annual precipitation: 13 to 18 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 120 to 135 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Williams and similar soils: 60 percent

Bowbells and similar soils: 25 percent

Minor components: 15 percent

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

Description of Williams

Setting

Landform: Rises

Landform position (two-dimensional): Backslope, summit

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam

Bt1 - 6 to 10 inches: clay loam

Bt2 - 10 to 15 inches: clay loam

Btk - 15 to 24 inches: clay loam

Bk - 24 to 36 inches: clay loam

C - 36 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 6 percent

Percent of area covered with surface fragments: 0.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent

Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

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Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Loam (G054XY100ND)
Hydric soil rating: No

Description of Bowbells

Setting

Landform: Swales
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 14 inches: clay loam
Bt2 - 14 to 23 inches: clay loam
Bk - 23 to 36 inches: loam
C - 36 to 60 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy Overflow (R054XY023ND)
Forage suitability group: Overflow (G054XY500ND)
Hydric soil rating: No

Minor Components

Zahl

Percent of map unit: 5 percent
Landform: Rises
Landform position (two-dimensional): Shoulder, summit

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Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Thin Loamy (R054XY038ND)
Hydric soil rating: No

Max

Percent of map unit: 4 percent
Landform: Rises
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Reeder

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Vebar

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Tonka

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Wet Meadow (R054XY037ND)
Hydric soil rating: Yes

E3531C—Williams loam, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: d33z
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Williams, gently sloping, and similar soils: 60 percent

Williams, nearly level, and similar soils: 12 percent

Minor components: 28 percent

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

Description of Williams, Gently Sloping

Setting

Landform: Knolls

Landform position (two-dimensional): Backslope, summit

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam

Bt1 - 6 to 10 inches: clay loam

Bt2 - 10 to 15 inches: clay loam

Btk - 15 to 24 inches: clay loam

Bk - 24 to 36 inches: clay loam

C - 36 to 60 inches: clay loam

Properties and qualities

Slope: 6 to 9 percent

Percent of area covered with surface fragments: 0.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent

Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: Loamy (R054XY031ND)

Forage suitability group: Loam (G054XY100ND)

Hydric soil rating: No

Description of Williams, Nearly Level

Setting

Landform: Rises

Landform position (two-dimensional): Backslope, summit

Down-slope shape: Linear

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 10 inches: clay loam
Bt2 - 10 to 15 inches: clay loam
Btk - 15 to 24 inches: clay loam
Bk - 24 to 36 inches: clay loam
C - 36 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 6 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Bowbells

Percent of map unit: 8 percent
Landform: Swales
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Niobell

Percent of map unit: 8 percent
Landform: Rises
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Zahl

Percent of map unit: 8 percent

Custom Soil Resource Report

Landform: Knolls
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Thin Loamy (R054XY038ND)
Hydric soil rating: No

Moreau

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Noonan

Percent of map unit: 2 percent
Landform: Knolls
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Hydric soil rating: No

E3555D—Zahl-Williams loams, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: cdpX
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 13 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Zahl and similar soils: 45 percent
Williams and similar soils: 22 percent
Minor components: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zahl

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy till

Custom Soil Resource Report

Typical profile

A - 0 to 5 inches: loam
Bk - 5 to 20 inches: clay loam
C - 20 to 60 inches: clay loam

Properties and qualities

Slope: 9 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
Forage suitability group: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Williams

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

A - 0 to 6 inches: loam
Bt1 - 6 to 10 inches: clay loam
Bt2 - 10 to 15 inches: clay loam
Btk - 15 to 24 inches: clay loam
Bk - 24 to 36 inches: clay loam
C - 36 to 60 inches: clay loam

Properties and qualities

Slope: 9 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Max

Percent of map unit: 14 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Bowbells

Percent of map unit: 10 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Reeder

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Loamy (R054XY031ND)
Hydric soil rating: No

Chama

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Limy Residual (R054XY046ND)
Hydric soil rating: No

Custom Soil Resource Report

Wabek, gravelly

Percent of map unit: 2 percent

Landform: Ridges

Landform position (two-dimensional): Shoulder, summit

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Very Shallow (R054XY035ND)

Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations 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 interpretation.

Vegetative Productivity

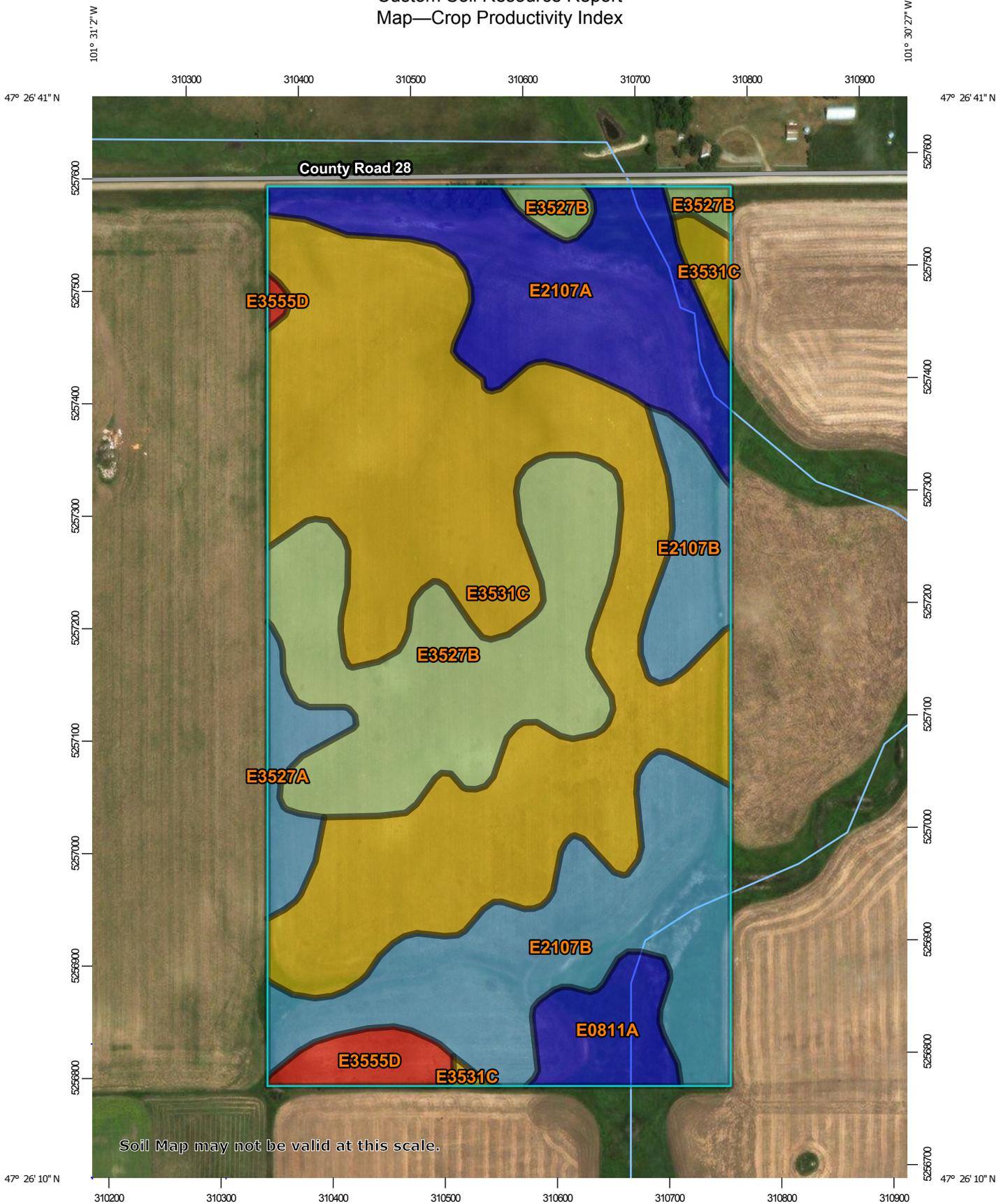
Vegetative productivity includes estimates of potential vegetative production for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture and rangeland. In the underlying database, some states maintain crop yield data by individual map unit component. Other states maintain the data at the map unit level. Attributes are included for both, although only one or the other is likely to contain data for any given geographic area. For other land uses, productivity data is shown only at the map unit component level. Examples include potential crop yields under irrigated and nonirrigated conditions, forest productivity, forest site index, and total rangeland production under of normal, favorable and unfavorable conditions.

Crop Productivity Index

Crop productivity index ratings provide a relative ranking of soils based on their potential for intensive crop production. An index can be used to rate the potential yield of one soil against that of another over a period of time. Ratings range from 0 to 100. The higher numbers indicate higher production potential. The rating is not crop specific. Minnesota inquiries must use the 'Map Unit Cropland Productivity Report (MN)' soils report from the Soil Reports tab under 'Vegetative Productivity'.

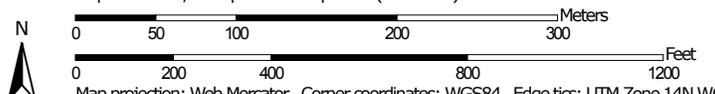
When the soils are rated, the following assumptions are made: a) adequate management, b) natural weather conditions (no irrigation), c) artificial drainage where required, d) no frequent flooding on the lower lying soils, and e) no land leveling or terracing. Even though predicted average yields will change with time, the productivity indices are expected to remain relatively constant in relation to one another over time.

Custom Soil Resource Report
Map—Crop Productivity Index



Soil Map may not be valid at this scale.

Map Scale: 1:4,680 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  <= 44
-  > 44 and <= 70
-  > 70 and <= 84
-  > 84 and <= 93
-  > 93 and <= 97
-  Not rated or not available

Soil Rating Lines

-  <= 44
-  > 44 and <= 70
-  > 70 and <= 84
-  > 84 and <= 93
-  > 93 and <= 97
-  Not rated or not available

Soil Rating Points

-  <= 44
-  > 44 and <= 70
-  > 70 and <= 84
-  > 84 and <= 93
-  > 93 and <= 97
-  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 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Mercer County, North Dakota
 Survey Area Data: Version 24, Oct 2, 2017

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

Date(s) aerial images were photographed: Sep 6, 2014—Sep 10, 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—Crop Productivity Index

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
E0811A	Grail silty clay loam, 0 to 2 percent slopes	95	2.9	3.6%
E2107A	Arnegard loam, 0 to 2 percent slopes	97	10.9	13.3%
E2107B	Arnegard loam, 2 to 6 percent slopes	93	15.8	19.3%
E3527A	Williams-Bowbells loams, 0 to 3 percent slopes	92	2.0	2.5%
E3527B	Williams-Bowbells loams, 3 to 6 percent slopes	84	14.3	17.4%
E3531C	Williams loam, 6 to 9 percent slopes	70	34.3	41.8%
E3555D	Zahl-Williams loams, 9 to 15 percent slopes	44	1.8	2.2%
Totals for Area of Interest			82.0	100.0%

Rating Options—Crop Productivity Index

Aggregation Method: Weighted Average

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: Yes