United States Department of Agriculture

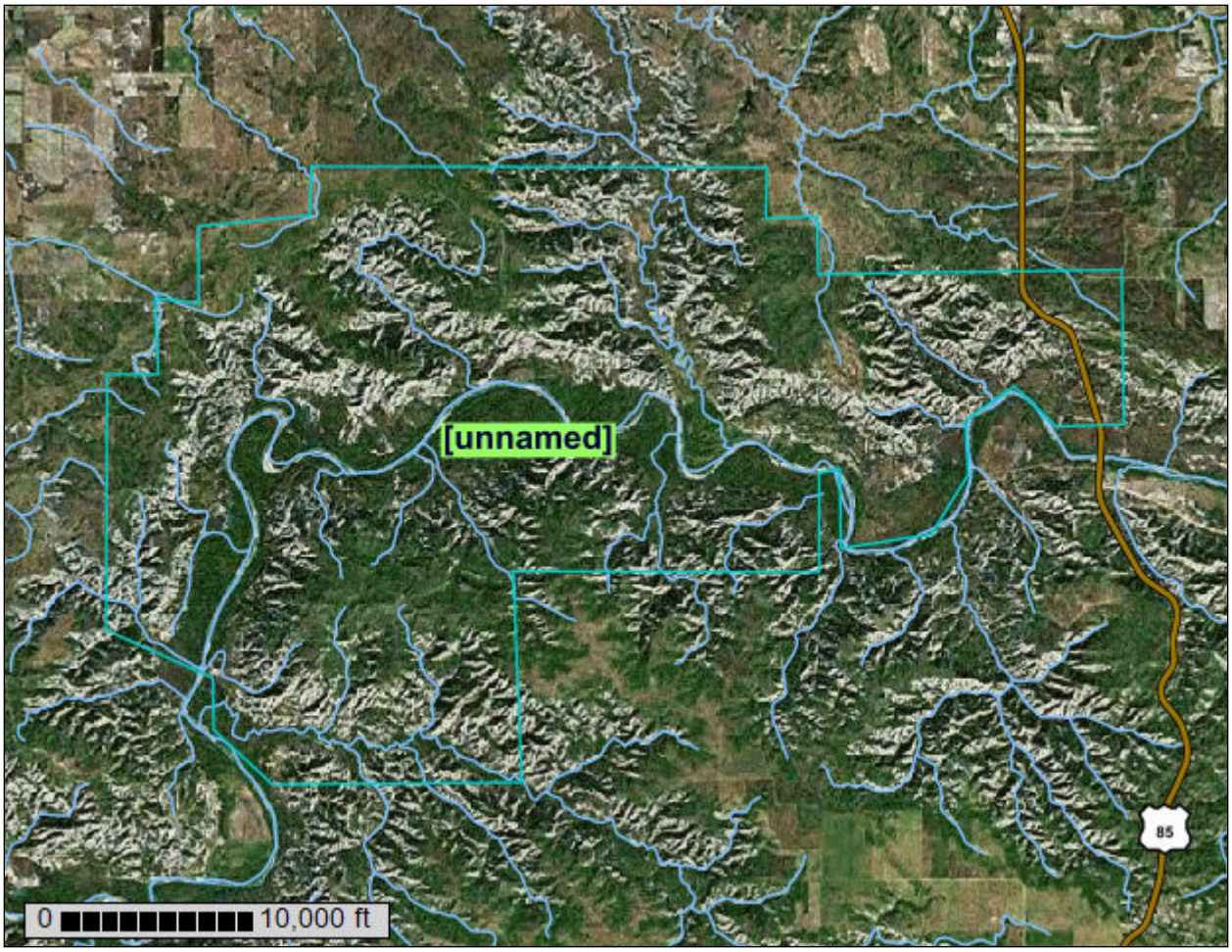
NRCS

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

McKenzie County, North Dakota



September 17, 2022

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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.

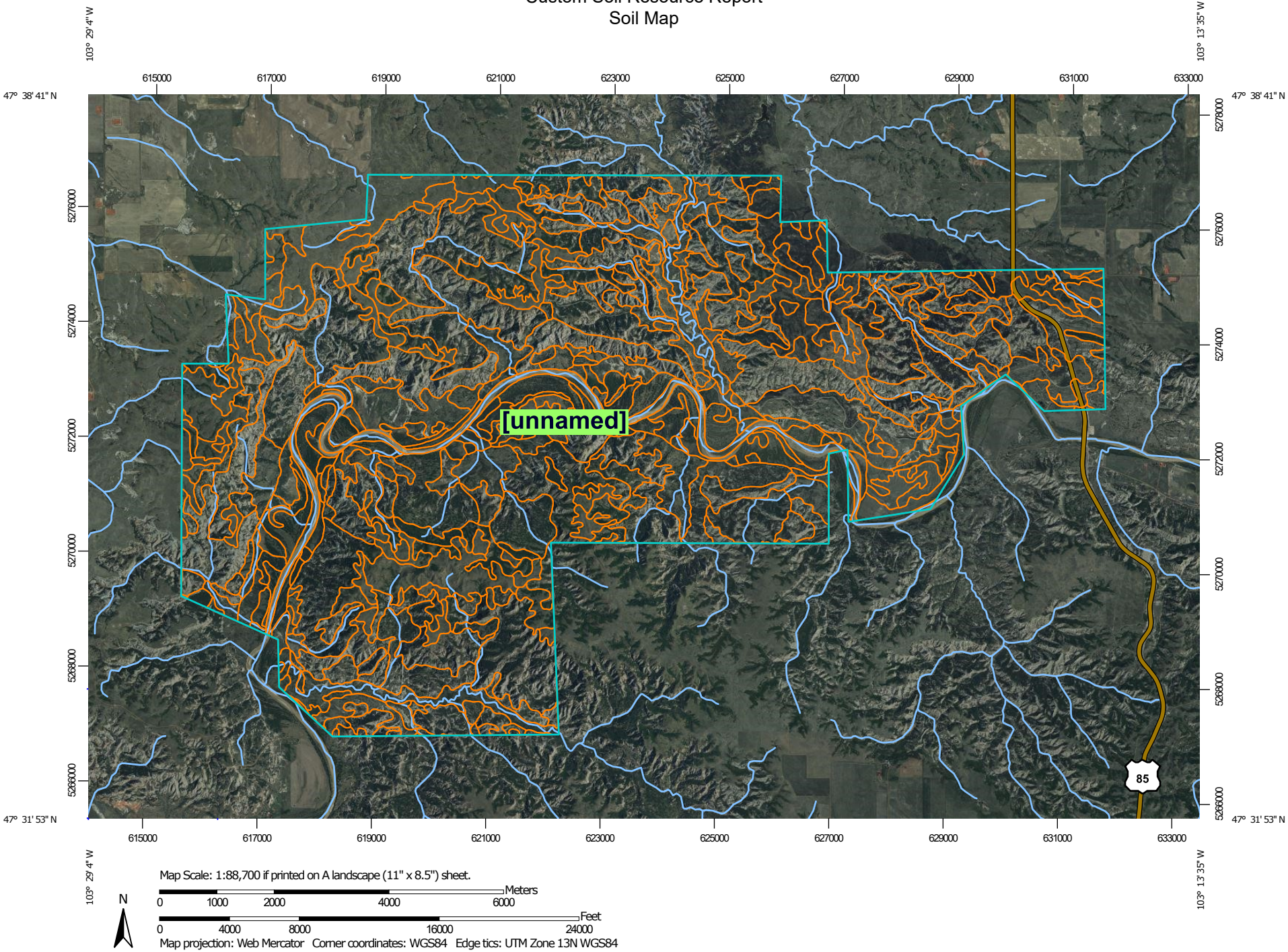
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 1:24,000.

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: McKenzie County, North Dakota
Survey Area Data: Version 24, Sep 9, 2021

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

Date(s) aerial images were photographed: May 29, 2021—Jun 14, 2021

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
E0515B	Rhoades-Daglum complex, 0 to 6 percent slopes	27.9	0.1%
E0559B	Dogtooth-Janesburg complex, 0 to 6 percent slopes	44.1	0.2%
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	302.1	1.2%
E1333C	Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes	19.9	0.1%
E1355D	Vebar-Flasher-Tally complex, 9 to 15 percent slopes	64.5	0.3%
E1403D	Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes	1.7	0.0%
E1423F	Flasher-Vebar-Parshall complex, 9 to 35 percent slopes	17.3	0.1%
E1805B	Lihen-Parshall complex, 0 to 6 percent slopes	0.9	0.0%
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	225.6	0.9%
E2725F	Arikara-Shambo-Cabba loams, 9 to 70 percent slopes	55.3	0.2%
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	51.3	0.2%
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	544.8	2.2%
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	66.3	0.3%
E3107F	Cabba-Badland complex, 6 to 70 percent slopes	36.7	0.1%
E3161F	Cherry-Cabba silt loams, 9 to 45 percent slopes	56.4	0.2%
E3541B	Williams-Zahl loams, 3 to 6 percent slopes	6.9	0.0%
E3609F	Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes	252.4	1.0%
E3641D	Zahl-Cabba-Williams complex, 9 to 15 percent slopes	11.1	0.0%
E4561F	Manning-Schaller-Wabek complex, 6 to 35 percent slopes	42.2	0.2%
E4729A	Heil silty clay loam, 0 to 1 percent slopes	5.4	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
L0454B	Maltese-Gerda complex, 0 to 6 percent slopes	292.0	1.2%
L1355D	Rhame-Chinook fine sandy loams, 9 to 15 percent slopes	122.0	0.5%
L1425F	Rhame-Fleak complex, 9 to 50 percent slopes	1,349.6	5.5%
L1661F	Rhame-Arikara-Fleak complex, 9 to 70 percent slopes	31.1	0.1%
L2145A	Kremlin loam, 0 to 2 percent slopes	6.5	0.0%
L2307F	Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes	11.2	0.0%
L2311E	Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes	691.2	2.8%
L2335D	Rhame-Kremlin-Archin complex, 6 to 15 percent slopes	45.0	0.2%
L2621F	Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped	2,218.1	9.0%
L2633F	Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes	983.3	4.0%
L2803B	Boxwell-Kremlin loams, 3 to 6 percent slopes	229.5	0.9%
L2807D	Boxwell-Kremlin loams, 9 to 15 percent slopes	880.4	3.6%
L3007F	Kirby-Badland-Patent complex, 9 to 70 percent slopes	104.2	0.4%
L3013F	Kirby-Scairt complex, 9 to 70 percent slopes	201.9	0.8%
L3101F	Badland-Cabbart complex, 6 to 70 percent slopes	3,270.7	13.3%
L3107F	Cabbart-Badland complex, 6 to 70 percent slopes	1,582.7	6.4%
L3161F	Lonna-Cabbart silt loams, 6 to 35 percent slopes	181.9	0.7%
L3185F	Patent-Badland-Cabbart complex, 6 to 50 percent slopes	213.1	0.9%
L3191F	Badland-Arikara-Cabbart complex, 15 to 70 percent slopes	4,762.9	19.4%
L3197F	Badland, 9 to 150 percent slopes	693.1	2.8%
L3199F	Arikara-Cabbart loams, 15 to 70 percent slopes	152.9	0.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
L3235C	Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes	38.0	0.2%
L3241B	Patent loam, 0 to 6 percent slopes, occasionally flooded	227.8	0.9%
L3247C	Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes	882.3	3.6%
L3251B	Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes	9.4	0.0%
L4111A	Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded	67.2	0.3%
L4113A	Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded	315.0	1.3%
L4121A	Havre silt loam, 0 to 2 percent slopes, occasionally flooded	632.4	2.6%
L4133A	Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded	290.0	1.2%
L4155A	Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	226.3	0.9%
L4187A	Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded	533.4	2.2%
L4209B	Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded	875.5	3.6%
L4567F	Tinsley-Chanta complex, 6 to 35 percent slopes	13.5	0.1%
L4999	Water	594.6	2.4%
Totals for Area of Interest		**24,563.4**	**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.

McKenzie County, North Dakota

E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4gb
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Rhoades and similar soils: 55 percent
Daglum and similar soils: 33 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhoades

Setting

Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from shale and siltstone

Typical profile

E - 0 to 3 inches: loam
Btn - 3 to 8 inches: clay loam
Btknyz - 8 to 14 inches: clay loam
Bkyz - 14 to 46 inches: clay loam
C - 46 to 79 inches: clay

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 1 to 5 inches to natric
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R054XY033ND - Thin Claypan

Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Daglum

Setting

Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from shale and siltstone

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Btn - 5 to 18 inches: silty clay loam
Btkny - 18 to 32 inches: clay loam
BCk - 32 to 47 inches: clay loam
C - 47 to 79 inches: clay

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 2 to 10 inches to natric
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R054XY021ND - Claypan
Forage suitability group: Claypan (G054XY800ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Belfield

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Savage

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Rhoades, severely eroded

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY033ND - Thin Claypan
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Barkof

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2r4gh
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Dogtooth and similar soils: 55 percent
Janesburg and similar soils: 33 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dogtooth

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from shale and siltstone

Typical profile

E - 0 to 2 inches: loam
Btn - 2 to 10 inches: clay loam
Btnk - 10 to 15 inches: clay loam
Bkyz - 15 to 28 inches: silty clay
Cr - 28 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 2 to 4 inches to natric; 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R054XY033ND - Thin Claypan
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

A - 0 to 7 inches: silt loam
E - 7 to 9 inches: silt loam

Btn - 9 to 16 inches: silty clay loam
Btnk - 16 to 25 inches: silty clay
BCkyz - 25 to 32 inches: silty clay
Cr - 32 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 3 to 13 inches to natric; 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R054XY021ND - Claypan
Forage suitability group: Claypan (G054XY800ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Minor Components

Dogtooth, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY033ND - Thin Claypan
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Savage

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Wayden

Percent of map unit: 2 percent

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY028ND - Shallow Clayey
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Barkof

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1vzry
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Dogtooth and similar soils: 35 percent
Janesburg and similar soils: 25 percent
Cabba and similar soils: 22 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dogtooth

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from shale and siltstone

Typical profile

E - 0 to 2 inches: loam

Btn - 2 to 8 inches: clay loam
Btnk - 8 to 13 inches: clay loam
Bkyz - 13 to 21 inches: silty clay
Cr - 21 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 25 percent
Depth to restrictive feature: 2 to 4 inches to natric; 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R054XY033ND - Thin Claypan
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Janesburg

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

A - 0 to 6 inches: silty clay loam
E - 6 to 8 inches: silt loam
Btn - 8 to 14 inches: silty clay loam
Btnk - 14 to 21 inches: silty clay
BCkyz - 21 to 26 inches: silty clay
Cr - 26 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 25 percent
Depth to restrictive feature: 3 to 13 inches to natric; 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R054XY021ND - Claypan
Forage suitability group: Claypan (G054XY800ND)
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Description of Cabba

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from mudstone

Typical profile

A - 0 to 3 inches: loam
Bk - 3 to 8 inches: silt loam
C - 8 to 12 inches: silt loam
Cr - 12 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Barkof

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Harriet, occasionally flooded

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY024ND - Saline Lowland
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Wayden, severely eroded

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R054XY035ND - Very Shallow
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2r6td
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Vebar and similar soils: 50 percent

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

Description of Vebar

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 11 inches: fine sandy loam
Bw2 - 11 to 17 inches: fine sandy loam
Bk - 17 to 29 inches: fine sandy loam
Cr - 29 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R054XY026ND - Sandy
Forage suitability group: Very Droughty Loam (G054XY130ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Description of Cohagen

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

Ap - 0 to 6 inches: fine sandy loam
C - 6 to 17 inches: fine sandy loam

Cr - 17 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY043ND - Shallow Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Tally

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: R054XY026ND - Sandy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Beisigl

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY045ND - Limy Sands
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Arnegard

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: Concave

Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Amor

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vzss
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Vebar and similar soils: 40 percent
Flasher and similar soils: 30 percent
Tally and similar soils: 18 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vebar

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 11 inches: fine sandy loam
Bw2 - 11 to 17 inches: fine sandy loam
Bk - 17 to 29 inches: fine sandy loam
Cr - 29 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R054XY026ND - Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Flasher

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 5 inches: loamy fine sand
AC - 5 to 10 inches: loamy fine sand
C - 10 to 15 inches: loamy fine sand
Cr - 15 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY043ND - Shallow Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Tally

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone

Typical profile

A - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 12 inches: fine sandy loam
Bw2 - 12 to 18 inches: fine sandy loam
Bk - 18 to 33 inches: fine sandy loam
C - 33 to 70 inches: fine sandy loam
Cr - 70 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 60 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R054XY026ND - Sandy
Forage suitability group: Droughty Loam (G054XY120ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Parshall

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: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Amor

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Telfer

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY025ND - Sands
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vzst
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Beisigl and similar soils: 40 percent
Flasher and similar soils: 26 percent
Telfer and similar soils: 15 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beisigl

Setting

Landform: Hills, ridges

Landform position (two-dimensional): Backslope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Sandy residuum weathered from sandstone

Typical profile

A - 0 to 5 inches: loamy fine sand
Bk - 5 to 27 inches: loamy fine sand
Cr - 27 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.01 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R054XY045ND - Limy Sands
Forage suitability group: Sand (G054XY300ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Description of Flasher

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Sandy residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: loamy fine sand
AC - 6 to 10 inches: loamy fine sand
Cr - 10 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very 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 content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY043ND - Shallow Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Telfer

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loamy fine sand
C - 6 to 60 inches: fine sand

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R054XY025ND - Sands
Forage suitability group: Sand (G054XY300ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Minor Components

Vebar

Percent of map unit: 12 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Parshall

Percent of map unit: 5 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Cohagen

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY043ND - Shallow Sandy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1vzsv
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Flasher and similar soils: 36 percent
Vebar and similar soils: 22 percent
Parshall and similar soils: 15 percent
Minor components: 27 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Flasher

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 3 inches: loamy fine sand
AC - 3 to 9 inches: loamy fine sand
C - 9 to 14 inches: loamy fine sand
Cr - 14 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY043ND - Shallow Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Vebar

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 10 inches: fine sandy loam
Bw2 - 10 to 13 inches: fine sandy loam
Bk - 13 to 26 inches: fine sandy loam
Cr - 26 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R054XY026ND - Sandy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Parshall

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Slope alluvium derived from sandstone

Typical profile

A - 0 to 9 inches: fine sandy loam
Bw1 - 9 to 25 inches: fine sandy loam
Bw2 - 25 to 35 inches: fine sandy loam
Bk - 35 to 42 inches: fine sandy loam
C - 42 to 79 inches: fine sandy loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R054XY026ND - Sandy
Forage suitability group: Loam (G054XY100ND)
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Beisigl

Percent of map unit: 11 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY045ND - Limy Sands
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Telfer

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY025ND - Sands
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Amor

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Rock outcrop, sandstone

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY999ND - Non-site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E1805B—Lihen-Parshall complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzt1
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Lihen and similar soils: 60 percent
Parshall and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lihen

Setting

Landform: Alluvial flats, alluvial fans
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 9 inches: loamy fine sand
A - 9 to 24 inches: loamy sand
Bk - 24 to 32 inches: sand
C - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A

Ecological site: R054XY025ND - Sands
Forage suitability group: Sand (G054XY300ND)
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Description of Parshall

Setting

Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: fine sandy loam
A - 7 to 12 inches: fine sandy loam
Bw - 12 to 29 inches: fine sandy loam
Bk - 29 to 48 inches: fine sandy loam
BCk - 48 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R054XY023ND - Loamy Overflow
Forage suitability group: Overflow (G054XY500ND)
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Minor Components

Tally

Percent of map unit: 10 percent
Landform: Terraces, alluvial flats, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Shambo

Percent of map unit: 5 percent
Landform: Alluvial flats, alluvial fans
Down-slope shape: Linear

Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Beisigl

Percent of map unit: 3 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY045ND - Limy Sands
Other vegetative classification: Sand (G054XY300ND)
Hydric soil rating: No

Ekalaka

Percent of map unit: 2 percent
Landform: Alluvial flats, alluvial fans
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R054XY027ND - Sandy Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes

Map Unit Setting

National map unit symbol: 1vzts
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Cabba and similar soils: 41 percent
Chama and similar soils: 27 percent
Shambo and similar soils: 15 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabba

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bk - 3 to 8 inches: silt loam
C - 8 to 12 inches: silt loam
Cr - 12 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (1.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Chama

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

A - 0 to 4 inches: loam
Bw - 4 to 7 inches: loam
Bk - 7 to 18 inches: silt loam
BCk - 18 to 28 inches: silt loam
Cr - 28 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Shambo

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loam
Bw1 - 6 to 11 inches: loam
Bw2 - 11 to 24 inches: loam
Bk - 24 to 38 inches: loam
BCk - 38 to 44 inches: loam
C - 44 to 71 inches: loam
Cr - 71 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R054XY031ND - Loamy
Forage suitability group: Loam (G054XY100ND)

Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Minor Components

Amor
Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Arnegard
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Rock outcrop
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY999ND - Non-site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes

Map Unit Setting
National map unit symbol: 1vztv
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Arikara and similar soils: 33 percent
Cabba and similar soils: 18 percent
Shambo, steep, and similar soils: 17 percent
Minor components: 32 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arikara

Setting

Landform: Ridges, ridges, ridges
Landform position (two-dimensional): Toeslope, footslope, backslope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Loamy colluvium derived from mudstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: loam
Bw - 2 to 14 inches: loam
Bk - 14 to 39 inches: loam
C - 39 to 60 inches: loam

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: More than 80 inches
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 content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bk - 3 to 15 inches: loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Shambo, Steep

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 9 inches: loam
Bw1 - 9 to 13 inches: loam
Bw2 - 13 to 29 inches: loam
Bk - 29 to 48 inches: loam
C - 48 to 60 inches: loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
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 content: 20 percent
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R054XY031ND - Loamy
Forage suitability group: Steep Loam (G054XY109ND)
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Minor Components

Lambert

Percent of map unit: 14 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY047ND - Badlands Fan
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Shambo, strongly sloping

Percent of map unit: 8 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Tally

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Daglum

Percent of map unit: 3 percent
Landform: Hills, ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Badland

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope

Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R054XY999ND - Non-site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1vztx
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Chama and similar soils: 43 percent
Cabba and similar soils: 28 percent
Sen and similar soils: 18 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chama

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

Ap - 0 to 4 inches: silt loam
Bw - 4 to 8 inches: silt loam
Bk - 8 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Sen

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

Ap - 0 to 6 inches: silt loam
Bw - 6 to 17 inches: silt loam
Bk - 17 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R054XY031ND - Loamy
Forage suitability group: Droughty Loam (G054XY120ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Golva

Percent of map unit: 3 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Grail

Percent of map unit: 3 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vzty
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Cabba and similar soils: 42 percent
Chama and similar soils: 26 percent
Sen and similar soils: 16 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Chama

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

A - 0 to 4 inches: silt loam
Bw - 4 to 8 inches: silt loam
Bk - 8 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent

Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Sen

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

A - 0 to 6 inches: silt loam
Bw - 6 to 17 inches: silt loam
Bk - 17 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R054XY031ND - Loamy
Forage suitability group: Droughty Loam (G054XY120ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Vebar

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Golva

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Grassna

Percent of map unit: 3 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Maschetah

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzv3
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Chama and similar soils: 44 percent
Sen and similar soils: 25 percent
Cabba and similar soils: 15 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chama

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

Ap - 0 to 4 inches: silt loam
Bw - 4 to 8 inches: silt loam
Bk - 8 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Sen

Setting

Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty residuum weathered from siltstone

Typical profile

Ap - 0 to 6 inches: silt loam
Bw - 6 to 17 inches: silt loam
Bk - 17 to 34 inches: silt loam
Cr - 34 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R054XY031ND - Loamy
Forage suitability group: Droughty Loam (G054XY120ND)
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Description of Cabba

Setting

Landform: Rises
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Golva

Percent of map unit: 12 percent
Landform: Alluvial fans, alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Maschetah

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual

Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

E3107F—Cabba-Badland complex, 6 to 70 percent slopes

Map Unit Setting

National map unit symbol: 1vzvf
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Cabba and similar soils: 46 percent
Badland: 36 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bk - 3 to 15 inches: loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Badland

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Sedimentary rock

Typical profile

A - 0 to 2 inches: silt loam
Cr - 2 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 5 inches to paralithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R054XY999ND - Non-site
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Flasher

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R054XY043ND - Shallow Sandy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Cherry

Percent of map unit: 4 percent
Landform: Alluvial fans

Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Chama

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Amor

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Arikara

Percent of map unit: 2 percent
Landform: Ridges, ridges, ridges
Landform position (two-dimensional): Backslope, toeslope, footslope
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes

Map Unit Setting

National map unit symbol: d33t
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Cabba and similar soils: 30 percent

Cherry and similar soils: 26 percent
Cherry and similar soils: 18 percent
Minor components: 26 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 45 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Cherry

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

A - 0 to 3 inches: silt loam
Bw - 3 to 33 inches: silty clay loam
C - 33 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
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 content: 15 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Cherry

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

A - 0 to 3 inches: silt loam
Bw - 3 to 33 inches: silty clay loam
C - 33 to 60 inches: silty clay loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
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 content: 15 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual

Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Minor Components

Chama
Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Amor
Percent of map unit: 6 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Steep Loam (G054XY109ND)
Hydric soil rating: No

Lambert
Percent of map unit: 5 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY047ND - Badlands Fan
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Janesburg
Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Badland
Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R054XY999ND - Non-site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E3541B—Williams-Zahl loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: d33y
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Williams and similar soils: 50 percent
Zahl and similar soils: 27 percent
Minor components: 23 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
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
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 content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 10.5 inches)

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

Description of Zahl

Setting
Landform: Rises
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy till

Typical profile
Ap - 0 to 5 inches: loam
Bk - 5 to 20 inches: clay loam
C - 20 to 60 inches: clay loam

Properties and qualities
Slope: 3 to 6 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R054XY038ND - Thin Loamy
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Minor Components

Max
Percent of map unit: 8 percent

Landform: Rises
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Bowbells
Percent of map unit: 8 percent
Landform: Swales
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Dooley
Percent of map unit: 3 percent
Landform: Rises
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Loam (G054XY100ND)
Hydric soil rating: No

Niobell
Percent of map unit: 2 percent
Landform: Rises
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Amor
Percent of map unit: 2 percent
Landform: Pediments
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes

Map Unit Setting
National map unit symbol: d341

Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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: 30 percent
Cabba and similar soils: 24 percent
Maschetah, strongly sloping, and similar soils: 12 percent
Maschetah, gently sloping, and similar soils: 10 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zahl

Setting

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

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 60 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very 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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R054XY038ND - Thin Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Maschetah, Strongly Sloping

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium derived from sedimentary rock

Typical profile

A - 0 to 7 inches: silt loam
Bk - 7 to 48 inches: silt loam
C - 48 to 90 inches: silty clay loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
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 content: 40 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Description of Maschetah, Gently Sloping

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
Bk - 7 to 48 inches: silt loam
C - 48 to 90 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
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 content: 40 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R054XY046ND - Limy Residual
Forage suitability group: Limy Upland (G054XY400ND)
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Minor Components

Williams

Percent of map unit: 8 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Straw, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY023ND - Loamy Overflow
Other vegetative classification: Overflow (G054XY500ND)
Hydric soil rating: No

Chama

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Amor

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Wabek

Percent of map unit: 2 percent
Landform: Escarpments on terraces
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY035ND - Very Shallow
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: d330
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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: 32 percent
Cabba and similar soils: 26 percent
Williams and similar soils: 20 percent
Minor components: 22 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

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
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

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

Description of Cabba

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
Bk - 3 to 15 inches: silt loam
Cr - 15 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R054XY030ND - Shallow Loamy
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
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
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
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 content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

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

Minor Components

Reeder

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Chama

Percent of map unit: 7 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY046ND - Limy Residual
Other vegetative classification: Limy Upland (G054XY400ND)
Hydric soil rating: No

Janesburg

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R054XY021ND - Claypan
Other vegetative classification: Claypan (G054XY800ND)
Hydric soil rating: No

Savage

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Vebar

Percent of map unit: 2 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2r4ff
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Manning and similar soils: 30 percent
Schaller and similar soils: 25 percent
Wabek and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manning

Setting

Landform: Escarpments on stream terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw - 5 to 18 inches: fine sandy loam
Bk - 18 to 25 inches: fine sandy loam
2C - 25 to 60 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R054XY026ND - Sandy
Forage suitability group: Very Droughty Loam (G054XY130ND)
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Description of Schaller

Setting

Landform: Escarpments on stream terraces
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 9 inches: sandy loam
Bk - 9 to 15 inches: fine sandy loam
C - 15 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 6 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R054XY025ND - Sands
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Description of Wabek

Setting

Landform: Escarpments on terraces
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium

Typical profile

A - 0 to 5 inches: loam
Bk - 5 to 10 inches: gravelly coarse sandy loam
C - 10 to 60 inches: very gravelly coarse sand

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively 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 content: 15 percent
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R054XY035ND - Very Shallow
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Minor Components

Stady

Percent of map unit: 11 percent

Landform: Escarpments on stream terraces
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY031ND - Loamy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Tally, gravelly substratum
Percent of map unit: 6 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Lehr
Percent of map unit: 5 percent
Landform: Escarpments on terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY026ND - Sandy
Other vegetative classification: Very Droughty Loam (G054XY130ND)
Hydric soil rating: No

Cabba
Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R054XY030ND - Shallow Loamy
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

E4729A—Heil silty clay loam, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 2r4fq
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 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

Heil and similar soils: 84 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heil

Setting

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

Typical profile

E - 0 to 3 inches: silty clay loam
Btn - 3 to 24 inches: silty clay
Bg - 24 to 38 inches: silty clay
Byg - 38 to 52 inches: silty clay
Cg - 52 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 1 to 4 inches to natric
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R054XY022ND - Closed Depression
Forage suitability group: Not suited (G054XY000ND)
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Minor Components

Heil

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY022ND - Closed Depression
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Dimmick

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY036ND - Wet Land
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: Yes

Rhoades

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY033ND - Thin Claypan
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Belfield

Percent of map unit: 3 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R054XY020ND - Clayey
Other vegetative classification: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Regan, occasionally flooded

Percent of map unit: 2 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R054XY024ND - Saline Lowland
Other vegetative classification: Saline (G054XY895ND)
Hydric soil rating: Yes

L0454B—Maltese-Gerda complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2qk3p
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Maltese and similar soils: 45 percent
Gerda and similar soils: 35 percent
Minor components: 20 percent

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

Description of Maltese

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from shale and siltstone

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Btn - 5 to 17 inches: silty clay loam
Btkn - 17 to 26 inches: silty clay loam
Btkny - 26 to 36 inches: silty clay loam
BCy - 36 to 43 inches: silty clay loam
C - 43 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 2 to 10 inches to natric
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: R058CY073ND - Claypan
Forage suitability group: Claypan (G058CY800ND)
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Description of Gerda

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Slope alluvium derived from shale and siltstone

Typical profile

E - 0 to 2 inches: loam
Btn - 2 to 7 inches: silty clay loam
Btkny - 7 to 19 inches: silty clay loam
Bky - 19 to 44 inches: silty clay loam
C - 44 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 0 to 3 inches to natric
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Ethridge

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Abor

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2qxhl
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhame and similar soils: 40 percent
Chinook and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhame

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 12 inches: fine sandy loam
Bw2 - 12 to 18 inches: fine sandy loam
Bk - 18 to 28 inches: fine sandy loam
C - 28 to 35 inches: fine sandy loam
Cr - 35 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY077ND - Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Chinook

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone

Typical profile

A - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 14 inches: fine sandy loam
Bw2 - 14 to 24 inches: fine sandy loam
Bk - 24 to 38 inches: fine sandy loam
C - 38 to 79 inches: fine sandy loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R058CY077ND - Sandy

Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Minor Components

Blacksheep
Percent of map unit: 12 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY088ND - Shallow Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Tusler
Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY095ND - Limy Sands
Other vegetative classification: Sand (G058CY300ND)
Hydric soil rating: No

Arnegard, overflow
Percent of map unit: 6 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY074ND - Loamy Overflow
Other vegetative classification: Overflow (G058CY500ND)
Hydric soil rating: No

Burgraff
Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

L1425F—Rhame-Fleak complex, 9 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2qz6s
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhame and similar soils: 37 percent
Fleak and similar soils: 34 percent
Minor components: 29 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhame

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 9 inches: fine sandy loam
Bw2 - 9 to 16 inches: fine sandy loam
BCk - 16 to 23 inches: fine sandy loam
C - 23 to 31 inches: fine sandy loam
Cr - 31 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY077ND - Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Fleak

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous sandstone

Typical profile

A - 0 to 5 inches: loamy fine sand
C - 5 to 14 inches: loamy fine sand
Cr - 14 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 50 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY088ND - Shallow Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Chinook

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Tusler

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY095ND - Limy Sands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Rock outcrop, sandstone

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2qxhw
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhame and similar soils: 32 percent
Arikara, low precipitation, and similar soils: 25 percent
Fleak and similar soils: 21 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhame

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 10 inches: fine sandy loam
Bw2 - 10 to 16 inches: fine sandy loam
BCk - 16 to 23 inches: fine sandy loam
C - 23 to 31 inches: fine sandy loam
Cr - 31 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 35 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY077ND - Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Arikara, Low Precipitation

Setting

Landform: Slumps, hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope, side slope, head slope
Down-slope shape: Linear, concave
Across-slope shape: Convex, linear
Parent material: Colluvium derived from sandstone and siltstone over residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loam
Bt - 6 to 12 inches: clay loam
Btk - 12 to 22 inches: clay loam
Bk - 22 to 39 inches: loam
C - 39 to 61 inches: loam
2Cr - 61 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 50 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Fleak

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous sandstone

Typical profile

A - 0 to 5 inches: loamy fine sand
C - 5 to 14 inches: loamy fine sand
Cr - 14 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY088ND - Shallow Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Tusler

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY095ND - Limy Sands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Chinook

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Arnegard, frequently flooded
Percent of map unit: 4 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY074ND - Loamy Overflow
Other vegetative classification: Overflow (G058CY500ND)
Hydric soil rating: No

Maltese
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

L2145A—Kremlin loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 2qxj9
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

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

Description of Kremlin

Setting
Landform: Hillslopes

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam
Bw1 - 6 to 12 inches: loam
Bw2 - 12 to 21 inches: loam
Bk - 21 to 38 inches: loam
C - 38 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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 content: 15 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Chinook

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Belfield, low precipitation

Percent of map unit: 3 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear

Across-slope shape: Concave
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Haydraw

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Ethridge

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2qxjh
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhame and similar soils: 40 percent

Bullock and similar soils: 22 percent
Kremlin and similar soils: 15 percent
Minor components: 23 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhame

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

A - 0 to 8 inches: fine sandy loam
Bw - 8 to 19 inches: fine sandy loam
C - 19 to 34 inches: fine sandy loam
Cr - 34 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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 content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY077ND - Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Bullock

Setting

Landform: Pediments
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Loamy residuum weathered from sandstone and shale

Typical profile

E - 0 to 4 inches: fine sandy loam
Btn - 4 to 10 inches: sandy clay loam

Bkyz - 10 to 15 inches: loam
BCyz - 15 to 23 inches: fine sandy loam
Cr - 23 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 10 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Kremlin

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

A - 0 to 11 inches: loam
Bw - 11 to 19 inches: loam
Bk - 19 to 60 inches: loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
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 content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Steep Loam (G058CY109ND)
Other vegetative classification: Steep Loam (G058CY109ND)
Hydric soil rating: No

Minor Components

Maltese

Percent of map unit: 12 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Kirby, channery loam

Percent of map unit: 4 percent
Landform: Knobs, ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY083ND - Very Shallow
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Fleak

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY088ND - Shallow Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Badland

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2q2mt
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Scairt and similar soils: 30 percent
Maltese and similar soils: 20 percent
Boxwell and similar soils: 15 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scairt

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey residuum weathered from shale and siltstone

Typical profile

E - 0 to 2 inches: silt loam
Btn - 2 to 6 inches: silty clay
Btnz - 6 to 13 inches: silty clay loam
Bkz - 13 to 22 inches: silty clay loam
BCy - 22 to 28 inches: silty clay loam
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 6 to 15 percent

Depth to restrictive feature: 1 to 4 inches to natric; 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Maltese

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Silty and clayey alluvium

Typical profile

A - 0 to 7 inches: silt loam
E - 7 to 10 inches: silt loam
Btn - 10 to 16 inches: silty clay
Btkn - 16 to 20 inches: silty clay
Btkny - 20 to 33 inches: silty clay loam
BCy - 33 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 25 percent
Depth to restrictive feature: 8 to 15 inches to natric
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0

Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R058CY073ND - Claypan
Forage suitability group: Claypan (G058CY800ND)
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Description of Boxwell

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from mudstone

Typical profile

A - 0 to 5 inches: loam
Bw - 5 to 14 inches: loam
Bk - 14 to 28 inches: loam
Cr - 28 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R058CY080ND - Loamy
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Minor Components

Gerda

Percent of map unit: 12 percent
Landform: Ridges, hills

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Burgraff

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Rhame

Percent of map unit: 2 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2qxkf
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Rhame and similar soils: 40 percent
Kremlin and similar soils: 25 percent
Archin and similar soils: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhame

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

A - 0 to 8 inches: fine sandy loam
Bw - 8 to 19 inches: fine sandy loam
C - 19 to 34 inches: fine sandy loam
Cr - 34 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.01 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY077ND - Sandy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Kremlin

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

A - 0 to 11 inches: loam
Bw - 11 to 19 inches: loam
Bk - 19 to 60 inches: loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Description of Archin

Setting

Landform: Alluvial fans, alluvial flats
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 4 inches: fine sandy loam

E - 4 to 6 inches: loam
Btn - 6 to 17 inches: loam
Bkyz - 17 to 28 inches: loam
C - 28 to 60 inches: loam

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R058CY073ND - Claypan
Forage suitability group: Claypan (G058CY800ND)
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Minor Components

Blacksheep

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY088ND - Shallow Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Ethridge

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Bullock

Percent of map unit: 3 percent
Landform: Pediments
Landform position (two-dimensional): Toeslope, footslope
Down-slope shape: Concave, linear

Across-slope shape: Linear, concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Heil, low precipitation
Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R054XY022ND - Closed Depression
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Tusler
Percent of map unit: 2 percent
Landform: Rises
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY095ND - Limy Sands
Other vegetative classification: Sand (G058CY300ND)
Hydric soil rating: No

L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped

Map Unit Setting
National map unit symbol: d361
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition
Cabbart and similar soils: 29 percent
Kremlin and similar soils: 19 percent
Boxwell and similar soils: 17 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabbart

Setting
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest

Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Loamy residuum weathered from siltstone and mudstone

Typical profile

A - 0 to 3 inches: loam
Bk - 3 to 18 inches: loam
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 40 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
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 content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Kremlin

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

A - 0 to 11 inches: loam
Bw - 11 to 19 inches: loam
Bk - 19 to 60 inches: loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
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 content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Description of Boxwell

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from mudstone

Typical profile

A - 0 to 5 inches: loam
Bw - 5 to 14 inches: loam
Bk - 14 to 28 inches: loam
Cr - 28 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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 content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R058CY080ND - Loamy
Forage suitability group: Steep Loam (G058CY109ND)
Other vegetative classification: Steep Loam (G058CY109ND)
Hydric soil rating: No

Minor Components

Lonna

Percent of map unit: 12 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Scairt

Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Arikara, hardwood

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, backslope, toeslope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Badland

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Fleak

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY088ND - Shallow Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Peta, low precipitation

Percent of map unit: 2 percent
Landform: Depressions, swales
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R058CY092ND - Wet Meadow
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q1xp
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Boxwell and similar soils: 36 percent
Cabbart and similar soils: 29 percent
Arikara, low precipitation, and similar soils: 16 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boxwell

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from mudstone

Typical profile

A - 0 to 5 inches: loam
Bw1 - 5 to 8 inches: loam
Bw2 - 8 to 14 inches: loam
Bk - 14 to 24 inches: loam
Cr - 24 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 50 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R058CY080ND - Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 4 inches: silt loam
BC - 4 to 11 inches: silt loam
C - 11 to 18 inches: silt loam
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Arikara, Low Precipitation

Setting

Landform: Slumps, hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope, side slope, head slope
Down-slope shape: Linear, concave
Across-slope shape: Convex, linear
Parent material: Colluvium derived from sandstone and siltstone over residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loam
Bt - 6 to 12 inches: clay loam
Btk - 12 to 22 inches: clay loam
Bk - 22 to 39 inches: loam
C - 39 to 61 inches: loam
2Cr - 61 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 50 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Lonna

Percent of map unit: 6 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope

Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Arnegard, frequently flooded
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: Concave
Ecological site: R058CY074ND - Loamy Overflow
Other vegetative classification: Overflow (G058CY500ND)
Hydric soil rating: No

Rhame
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Maltese
Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes

Map Unit Setting
National map unit symbol: 2qxkx
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Boxwell and similar soils: 63 percent
Kremlin and similar soils: 25 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boxwell

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: loam
Bw - 6 to 14 inches: loam
Bk - 14 to 29 inches: loam
Cr - 29 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R058CY080ND - Loamy
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Description of Kremlin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: loam
Bw1 - 6 to 12 inches: loam
Bw2 - 12 to 21 inches: loam
Bk - 21 to 38 inches: loam
C - 38 to 79 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
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 content: 15 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Arnegard, overflow

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: Concave
Ecological site: R058CY074ND - Loamy Overflow
Other vegetative classification: Overflow (G058CY500ND)
Hydric soil rating: No

Burgraff

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Rhame

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Very Droughty Loam (G058CY130ND)
Hydric soil rating: No

L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2q1xs
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Boxwell and similar soils: 46 percent
Kremlin and similar soils: 32 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boxwell

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from mudstone

Typical profile

A - 0 to 5 inches: loam
Bw1 - 5 to 8 inches: loam
Bw2 - 8 to 13 inches: loam
Bk - 13 to 24 inches: loam
Cr - 24 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R058CY080ND - Loamy
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Description of Kremlin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from mudstone

Typical profile

A - 0 to 7 inches: loam
Bw1 - 7 to 12 inches: loam
Bw2 - 12 to 18 inches: loam
Bk - 18 to 35 inches: loam
C - 35 to 71 inches: loam
Cr - 71 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 60 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Cabbart

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Burgraff

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Rhame

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q2mw
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Kirby, channery loam, and similar soils: 38 percent
Badland: 25 percent
Patent, badland fan, and similar soils: 20 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kirby, Channery Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery residuum weathered from porcellanite

Typical profile

A - 0 to 5 inches: channery loam
Bk - 5 to 14 inches: extremely channery loam
2C - 14 to 79 inches: channers

Properties and qualities

Slope: 9 to 70 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Medium
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
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R058CY083ND - Very Shallow
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Patent, Badland Fan

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium derived from shale and siltstone and/or porcellanite

Typical profile

A - 0 to 3 inches: loam
AC - 3 to 7 inches: loam

C - 7 to 79 inches: loam

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
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 content: 30 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Minor Components

Cabbart

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Lonna

Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Maltese

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

L3013F—Kirby-Scairt complex, 9 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q2mx
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Kirby, channery loam, and similar soils: 50 percent
Scairt and similar soils: 15 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kirby, Channery Loam

Setting

Landform: Knobs, ridges
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery residuum weathered from porcellanite

Typical profile

A - 0 to 4 inches: channery loam
Bk - 4 to 12 inches: very channery loam
2C - 12 to 60 inches: channers

Properties and qualities

Slope: 9 to 70 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R058CY083ND - Very Shallow
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Scairt

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey residuum weathered from shale and siltstone

Typical profile

E - 0 to 2 inches: silt loam
Btn - 2 to 6 inches: silty clay
Btnz - 6 to 13 inches: silty clay loam
Bkz - 13 to 22 inches: silty clay loam
BCy - 22 to 28 inches: silty clay loam
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 1 to 4 inches to natric; 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Cabbart

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 8 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Searing, low precipitation

Percent of map unit: 7 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Maltese

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Badland

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3101F—Badland-Cabbart complex, 6 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q1xb
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Badland: 60 percent
Cabbart and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Cabbart

Setting
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile
A - 0 to 2 inches: loam
BC - 2 to 10 inches: loam
C - 10 to 14 inches: silt loam
Cr - 14 to 79 inches: bedrock

Properties and qualities
Slope: 6 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Arikara, low precipitation
Percent of map unit: 3 percent
Landform: Hillslopes

Landform position (two-dimensional): Footslope, toeslope, backslope
Landform position (three-dimensional): Base slope, side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Patent, badland fan
Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Boxwell
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Rock outcrop, porcelainite
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

L3107F—Cabbart-Badland complex, 6 to 70 percent slopes

Map Unit Setting
National map unit symbol: 2q2n0
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days

Farmland classification: Not prime farmland

Map Unit Composition

Cabbart and similar soils: 50 percent
Badland: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 2 inches: loam
BC - 2 to 10 inches: loam
C - 10 to 14 inches: silt loam
Cr - 14 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex

Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Patent, badland fan

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Kirby, channery loam

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex

Ecological site: R058CY083ND - Very Shallow
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Gerda

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2q384
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Lonna and similar soils: 43 percent
Cabbart and similar soils: 32 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lonna

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear

Across-slope shape: Convex, linear
Parent material: Slope alluvium derived from siltstone

Typical profile

A - 0 to 3 inches: silt loam
Bw - 3 to 11 inches: silt loam
Bk - 11 to 34 inches: silty clay loam
C - 34 to 79 inches: silt loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
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
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R058CY079ND - Limy Residual
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Nose slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 4 inches: silt loam
BC - 4 to 11 inches: silt loam
C - 11 to 18 inches: silt loam
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 6 to 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Cambeth

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Gerda

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Badland

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Arikara, low precipitation

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope, toeslope
Landform position (three-dimensional): Head slope, side slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2q385
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Patent, badland fan, and similar soils: 35 percent
Badland: 20 percent
Cabbart and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Patent, Badland Fan

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium derived from sandstone and siltstone

Typical profile

A - 0 to 4 inches: loam
AC - 4 to 13 inches: loam
C - 13 to 79 inches: loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
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 content: 30 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)

Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 2 inches: loam
BC - 2 to 10 inches: loam
C - 10 to 14 inches: silt loam
Cr - 14 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Lonna

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Gerda

Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Patent, frequently flooded, flat bottom draw

Percent of map unit: 3 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY102ND - Flat-Bottom Wooded Draw
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Kirby, channery loam

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY083ND - Very Shallow
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Arikara, low precipitation

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope, toeslope
Landform position (three-dimensional): Head slope, side slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q1x9
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Badland: 30 percent
Arikara, low precipitation, and similar soils: 27 percent
Cabbart and similar soils: 17 percent
Minor components: 26 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands

Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Arikara, Low Precipitation

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Colluvium derived from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: loam
Bw - 2 to 14 inches: loam
Bk - 14 to 39 inches: loam
C - 39 to 61 inches: loam
2Cr - 61 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 4 inches: silt loam
BC - 4 to 11 inches: silt loam
C - 11 to 18 inches: silt loam
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Patent, badland fan

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Lonna

Percent of map unit: 6 percent
Landform: Alluvial fans, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Patent, frequently flooded, flat bottom draw

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY102ND - Flat-Bottom Wooded Draw
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

L3197F—Badland, 9 to 150 percent slopes

Map Unit Setting

National map unit symbol: 2qxld
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Badland: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shale and siltstone

Typical profile

C - 0 to 2 inches: silt loam
Cr - 2 to 79 inches: bedrock

Properties and qualities

Slope: 9 to 150 percent
Depth to restrictive feature: 0 to 3 inches to paralithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Ecological site: R058CY103ND - Badlands
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Patent, badland fan

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Rock outcrop, porcelainite

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R058CY999ND - Non-Site

Other vegetative classification: Not suited (G054XY000ND)
Hydric soil rating: No

L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes

Map Unit Setting

National map unit symbol: 2q1wy
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Arikara, low precipitation, and similar soils: 62 percent
Cabbart and similar soils: 19 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arikara, Low Precipitation

Setting

Landform: Hillslopes, slumps
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope, head slope, side slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, convex
Parent material: Colluvium derived from sandstone and siltstone over residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loam
Bt - 6 to 12 inches: clay loam
Btk - 12 to 22 inches: clay loam
Bk - 22 to 39 inches: loam
C - 39 to 61 inches: loam
2Cr - 61 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY101ND - Steep-Sided Wooded Draw
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous siltstone

Typical profile

A - 0 to 4 inches: loam
BC - 4 to 11 inches: loam
C - 11 to 18 inches: silt loam
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R058CY086ND - Shallow Loamy
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Lonna

Percent of map unit: 8 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Badland

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY103ND - Badlands
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Patent, frequently flooded, flat bottom draw

Percent of map unit: 3 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY102ND - Flat-Bottom Wooded Draw
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Rhame

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2q388
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Patent, occasionally flooded, and similar soils: 35 percent
Patent, gullied, occasionally flooded, and similar soils: 20 percent
Glendive, frequently flooded, and similar soils: 15 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Patent, Occasionally Flooded

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy alluvium

Typical profile

AC - 0 to 7 inches: loam
C - 7 to 60 inches: loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Description of Patent, Gullied, Occasionally Flooded

Setting

Landform: Channels, alluvial fans
Down-slope shape: Linear
Across-slope shape: Concave, convex
Parent material: Calcareous fine-loamy alluvium derived from sandstone and siltstone

Typical profile

AC - 0 to 1 inches: loam
C - 1 to 60 inches: loam

Properties and qualities

Slope: 0 to 99 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very 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: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Glendive, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Stratified loamy calcareous alluvium

Typical profile

A - 0 to 5 inches: fine sandy loam

C1 - 5 to 16 inches: loam
C2 - 16 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: R058CY074ND - Loamy Overflow
Forage suitability group: Overflow (G058CY500ND)
Other vegetative classification: Overflow (G058CY500ND)
Hydric soil rating: No

Minor Components

Lonna

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Hanly, occasionally flooded

Percent of map unit: 8 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Very Droughty Loam (G058CY130ND)
Hydric soil rating: No

Sham, occasionally flooded

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)

Hydric soil rating: No

Havre, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY091ND - Loamy Terrace
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Gerda

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qz6p
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Patent, Occasionally Flooded

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy alluvium

Typical profile

AC - 0 to 7 inches: loam
C - 7 to 60 inches: loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Minor Components

Sham, occasionally flooded

Percent of map unit: 8 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Benz

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Lonna

Percent of map unit: 5 percent
Landform: Alluvial fans

Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: R058CY079ND - Limy Residual
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2q2n3
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Patent, occasionally flooded, and similar soils: 40 percent
Vanda and similar soils: 25 percent
Gerda, severely eroded, and similar soils: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Patent, Occasionally Flooded

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy alluvium

Typical profile

AC - 0 to 7 inches: loam
C - 7 to 60 inches: loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY070ND - Badlands Fan
Forage suitability group: Limy Upland (G058CY400ND)
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Description of Vanda

Setting

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

Typical profile

A - 0 to 4 inches: silty clay
Byz - 4 to 60 inches: clay

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Gerda, Severely Eroded

Setting

Landform: Alluvial flats, alluvial fans
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey alluvium derived from shale and siltstone

Typical profile

E - 0 to 0 inches: loam
Btn - 0 to 6 inches: silty clay
Btkny - 6 to 13 inches: silty clay
Bkyz - 13 to 44 inches: silty clay loam
C - 44 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Very low (about 0.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Patent, gullied, occasionally flooded

Percent of map unit: 8 percent
Landform: Channels, alluvial fans
Down-slope shape: Linear
Across-slope shape: Concave, convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Benz

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY081ND - Thin Claypan
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Ethridge

Percent of map unit: 3 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Sham, occasionally flooded

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

Chinook

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2qz6r
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days

Farmland classification: Not prime farmland

Map Unit Composition

Kremlin and similar soils: 25 percent
Ethridge and similar soils: 22 percent
Gerda and similar soils: 20 percent
Minor components: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kremlin

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

Ap - 0 to 11 inches: loam
Bw - 11 to 19 inches: loam
Bk - 19 to 60 inches: loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
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 content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Description of Ethridge

Setting

Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 3 inches: silt loam

Bt - 3 to 10 inches: silty clay loam
Btk - 10 to 23 inches: silty clay loam
Bk - 23 to 38 inches: silty clay loam
Bky - 38 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R058CY072ND - Clayey
Forage suitability group: Clayey Subsoil (G058CY210ND)
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Description of Gerda

Setting

Landform: Alluvial flats, alluvial fans
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

E - 0 to 2 inches: loam
Btn - 2 to 11 inches: silty clay
Btkny - 11 to 19 inches: silty clay
Bky - 19 to 29 inches: silty clay loam
Bk - 29 to 44 inches: silty clay
C - 44 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 0 to 3 inches to natric
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent

Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (5.0 to 15.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water supply, 0 to 60 inches: Very low (about 0.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R058CY081ND - Thin Claypan
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Minor Components

Maltese

Percent of map unit: 18 percent
Landform: Alluvial flats, alluvial fans
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY073ND - Claypan
Other vegetative classification: Claypan (G058CY800ND)
Hydric soil rating: No

Boxwell

Percent of map unit: 10 percent
Landform: Pediments
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Patent, occasionally flooded

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qxjk
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Wolf Point, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium

Typical profile

A1 - 0 to 1 inches: silty clay loam
A2 - 1 to 10 inches: clay
C - 10 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: R058CY096ND - Clayey Terrace
Forage suitability group: Clayey Subsoil (G058CY210ND)
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Minor Components

Havre, occasionally flooded
Percent of map unit: 6 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY091ND - Loamy Terrace
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Fluvaquents, channeled, frequently flooded
Percent of map unit: 5 percent
Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Ethridge
Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Glendive, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2q38c
Elevation: 1,840 to 3,430 feet

Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wolf point, wooded, occasionally flooded, and similar soils: 78 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wolf Point, Wooded, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium

Typical profile

A1 - 0 to 1 inches: silty clay loam
A2 - 1 to 10 inches: clay
C - 10 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: R058CY096ND - Clayey Terrace
Forage suitability group: Clayey Subsoil (G058CY210ND)
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

Minor Components

Havre, wooded, occasionally flooded

Percent of map unit: 11 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY091ND - Loamy Terrace
Other vegetative classification: Not suited (G058CY000ND)

Hydric soil rating: No

Fluvaquents, channeled, frequently flooded

Percent of map unit: 5 percent
Landform: Channels on flood plains
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Glendive, wooded, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Ethridge

Percent of map unit: 2 percent
Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY072ND - Clayey
Other vegetative classification: Clayey Subsoil (G058CY210ND)
Hydric soil rating: No

L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2q38d
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Havre, occasionally flooded, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Havre, Occasionally Flooded

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
C1 - 7 to 18 inches: stratified fine sandy loam to silty clay loam
C2 - 18 to 32 inches: stratified fine sandy loam to silty clay loam
Ab - 32 to 36 inches: loam
C3 - 36 to 79 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R058CY091ND - Loamy Terrace
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Glendive, occasionally flooded

Percent of map unit: 10 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Fluvaquents, channeled, frequently flooded

Percent of map unit: 5 percent
Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Lallie, occasionally flooded

Percent of map unit: 3 percent
Landform: Oxbows

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY092ND - Wet Meadow
Other vegetative classification: Wet (G058CY900ND)
Hydric soil rating: Yes

L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2q38h
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Havre, rarely flooded, mollic, and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Havre, Rarely Flooded, Mollic

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: loam
C1 - 7 to 18 inches: stratified fine sandy loam to silty clay loam
C2 - 18 to 32 inches: stratified fine sandy loam to silty clay loam
Ab - 32 to 36 inches: loam
C3 - 36 to 79 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent

Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R058CY091ND - Loamy Terrace
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Fluvaquents, channeled, frequently flooded

Percent of map unit: 5 percent
Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Glendive, rarely flooded

Percent of map unit: 5 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Lallie, rarely flooded

Percent of map unit: 2 percent
Landform: Oxbows
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY092ND - Wet Meadow
Other vegetative classification: Wet (G058CY900ND)
Hydric soil rating: Yes

Patent, badland fan

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)
Hydric soil rating: No

L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2qz7c
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Glendive, channeled, frequently flooded, and similar soils: 40 percent
Fluvaquents, channeled, frequently flooded, and similar soils: 30 percent
Havre, channeled, frequently flooded, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glendive, Channeled, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 5 inches: fine sandy loam
C1 - 5 to 24 inches: stratified fine sandy loam to loam to silt loam
C2 - 24 to 43 inches: stratified fine sandy loam to loam to silt loam
Cg - 43 to 79 inches: stratified sand to fine sand to loamy sand to loamy fine sand to sandy loam to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very 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 30 to 60 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: R058CY089ND - Sandy Terrace
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Description of Fluvaquents, Channeled, Frequently Flooded

Setting

Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from sedimentary rock

Typical profile

Ag - 0 to 5 inches: fine sandy loam
Cg - 5 to 79 inches: stratified loamy sand to loamy fine sand to sandy loam to fine sandy loam to loam to silt loam to sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 8.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: R058CY999ND - Non-Site
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

Description of Havre, Channeled, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loam
C1 - 6 to 22 inches: stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam
Ab - 22 to 25 inches: loam
C2 - 25 to 45 inches: stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam
Cg - 45 to 79 inches: stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very 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: About 30 to 60 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C
Ecological site: R058CY091ND - Loamy Terrace
Forage suitability group: Loam (G058CY100ND)
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Minor Components

Hanly, channeled, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY092ND - Wet Meadow
Other vegetative classification: Wet (G058CY900ND)
Hydric soil rating: Yes

Patent, occasionally flooded

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R058CY070ND - Badlands Fan
Other vegetative classification: Limy Upland (G058CY400ND)

Hydric soil rating: No

Dogiecreek, frequently flooded

Percent of map unit: 2 percent
Landform: Drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY090ND - Saline Lowland
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qxjm
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Glendive, Occasionally Flooded

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: fine sandy loam
C1 - 7 to 15 inches: stratified fine sandy loam to loam to silt loam
C2 - 15 to 46 inches: stratified fine sandy loam to loam to silt loam
C3 - 46 to 79 inches: stratified sand to fine sand to loamy sand to loamy fine sand to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Runoff class: Very 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 42 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 8.0
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R058CY089ND - Sandy Terrace
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Minor Components

Hanly, occasionally flooded

Percent of map unit: 12 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Sand (G058CY300ND)
Hydric soil rating: No

Havre, occasionally flooded

Percent of map unit: 8 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY091ND - Loamy Terrace
Other vegetative classification: Loam (G058CY100ND)
Hydric soil rating: No

Fluvaquents, channeled, frequently flooded

Percent of map unit: 5 percent
Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qxjp
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hanly, Occasionally Flooded

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 4 inches: fine sandy loam
C1 - 4 to 44 inches: stratified fine sand to loamy sand to loamy fine sand to sandy loam to fine sandy loam to loam
C2 - 44 to 79 inches: stratified fine sand to loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very 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 30 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 9 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Ecological site: R058CY089ND - Sandy Terrace
Forage suitability group: Sand (G058CY300ND)
Other vegetative classification: Sand (G058CY300ND)
Hydric soil rating: No

Minor Components

Minnewaukan, frequently flooded
Percent of map unit: 10 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY092ND - Wet Meadow
Other vegetative classification: Wet (G058CY900ND)
Hydric soil rating: Yes

Glendive, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY089ND - Sandy Terrace
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Fluvaquents, channeled, frequently flooded
Percent of map unit: 5 percent
Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R058CY999ND - Non-Site
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: Yes

L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes

Map Unit Setting
National map unit symbol: 2q38n
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition
Tinsley and similar soils: 53 percent
Chanta and similar soils: 17 percent
Minor components: 30 percent

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

Description of Tinsley

Setting

Landform: Escarpments on paleoterraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly alluvium

Typical profile

A - 0 to 4 inches: gravelly sandy loam
AC - 4 to 11 inches: gravelly coarse sandy loam
C - 11 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 6 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R058CY083ND - Very Shallow
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Description of Chanta

Setting

Landform: Escarpments on paleoterraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy over sandy or sandy-skeletal alluvium

Typical profile

A - 0 to 6 inches: loam
Bw1 - 6 to 22 inches: loam
Bw2 - 22 to 26 inches: sandy loam
2C - 26 to 60 inches: cobbly sand

Properties and qualities

Slope: 6 to 15 percent

Depth to restrictive feature: More than 80 inches
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 content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R058CY080ND - Loamy
Forage suitability group: Droughty Loam (G058CY120ND)
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Minor Components

Cozberg

Percent of map unit: 7 percent
Landform: Escarpments on paleoterraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Chinook

Percent of map unit: 7 percent
Landform: Hills, ridges
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Droughty Loam (G058CY120ND)
Hydric soil rating: No

Cabbart

Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R058CY086ND - Shallow Loamy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Rhame

Percent of map unit: 6 percent
Landform: Ridges, hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R058CY077ND - Sandy
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Kremlin

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058CY080ND - Loamy
Other vegetative classification: Steep Loam (G058CY109ND)
Hydric soil rating: No

L4999—Water

Map Unit Setting

National map unit symbol: 2qxkb
Elevation: 1,840 to 3,430 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 102 to 112 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Ecological site: R058CY999ND - Non-Site
Forage suitability group: Not suited (G058CY000ND)
Other vegetative classification: Not suited (G058CY000ND)
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

Conservation Planning

This report provides those soil attributes for the conservation plan for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. It provides the soil description along with the slope, runoff, T Factor, WEI, WEG, Erosion class, Drainage class, Land Capability Classification, and the engineering Hydrologic Group and the erosion factors Kf, the representative percentage of fragments, sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic surface layer. Further information on these factors can be found in the National Soil Survey Handbook section 618 found at the url http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054223#00 .

Soil properties and interpretations for conservation planning. The surface mineral horizon properties are displayed. Organic surface horizons are not displayed.

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes																	
Rhoades	55	3.0	200	Medium	2	48	6	None - deposition	Moderately well drained	6s	D	0 - 3	.37	—	40	36	24
Daglum	33	3.0	200	Medium	2	48	6	None - deposition	Moderately well drained	4s	D	0 - 2	.37	—	17	60	23
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes																	
Dogtooth	55	3.0	200	Medium	2	48	6	None - deposition	Well drained	6s	D	0 - 1	.43	—	42	36	22
Janesburg	33	3.0	200	Medium	2	48	6	None - deposition	Well drained	4s	D	0 - 7	.43	—	15	61	24
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes																	
Dogtooth	35	17.0	59	High	2	48	6	None - deposition	Well drained	7s	D	0 - 1	.43	—	42	36	22
Janesburg	25	16.0	59	High	2	48	6	None - deposition	Well drained	6s	D	0 - 5	.37	—	15	55	30
Cabba	22	22.0	49	Very high	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.37	3	35	45	20

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes																	
Vebar	50	8.0	131	Low	3	86	3	None - deposition	Well drained	4e	B	0 - 5	.15	4	68	18	14
Cohagen	25	8.0	160	Medium	2	86	3	None - deposition	Well drained	6e	D	0 - 5	.20	3	68	18	14
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes																	
Vebar	40	12.0	98	Low	3	86	3	None - deposition	Well drained	6e	B	0 - 5	.15	4	68	18	14
Flasher	30	12.0	98	Medium	2	134	2	None - deposition	Somewhat excessively drained	6e	D	0 - 5	.24	5	83	9	7
Tally	18	12.0	98	Low	5	86	3	None - deposition	Well drained	6e	A	0 - 5	.17	3	65	21	14
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes																	
Beisigl	40	11.0	—	Low	3	134	2	—	Somewhat excessively drained	6e	A	0 - 5	.15	6	86	6	7
Flasher	26	11.0	—	Very low	2	134	2	—	Somewhat excessively drained	6e	D	0 - 5	.20	10	86	6	7
Telfer	15	8.0	—	Very low	5	134	2	—	Somewhat excessively drained	6e	A	0 - 5	.20	—	78	16	5

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes																	
Flasher	36	25.0	49	High	2	134	2	None - deposition	Somewhat excessively drained	7e	D	0 - 3	.24	5	83	9	7
Vebar	22	17.0	59	Low	3	86	3	None - deposition	Well drained	6e	B	0 - 5	.15	4	68	18	14
Parshall	15	12.0	98	Low	5	86	3	None - deposition	Well drained	6e	A	0 - 9	.15	1	62	24	14
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes																	
Lihen	60	3.0	—	Negligible	5	134	2	—	Somewhat excessively drained	4e	A	0 - 9	.17	—	78	16	5
Parshall	20	3.0	—	Very low	4	86	3	—	Well drained	3e	A	0 - 7	.17	—	69	16	14
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes																	
Cabba	41	33.0	49	High	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.37	7	35	46	19
Chama	27	22.0	49	Medium	3	86	4L	None - deposition	Well drained	7e	C	0 - 3	.32	2	31	47	22
Shambo	15	12.0	98	Medium	5	48	6	None - deposition	Well drained	4e	B	0 - 5	.24	—	43	35	22

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes																	
Arikara	33	43.0	—	High	5	48	6	—	Well drained	7e	B	1 - 2	.24	—	38	36	25
Cabba	18	40.0	—	High	2	86	4L	—	Well drained	7e	D	0 - 3	.28	9	42	37	20
Shambo, steep	17	25.0	—	High	5	48	6	—	Well drained	7e	B	0 - 9	.20	—	39	36	24
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes																	
Chama	43	8.0	—	Medium	3	86	4L	—	Well drained	4e	C	0 - 3	.37	—	11	66	22
Cabba	28	8.0	—	Medium	2	86	4L	—	Well drained	6e	D	0 - 3	.37	9	26	52	22
Sen	18	8.0	—	Medium	3	48	6	—	Well drained	3e	C	0 - 5	.37	—	11	66	22
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes																	
Cabba	42	12.0	—	Medium	2	86	4L	—	Well drained	6e	D	0 - 3	.37	9	26	52	22
Chama	26	12.0	—	Medium	3	86	4L	—	Well drained	6e	C	0 - 3	.37	—	11	66	22
Sen	16	12.0	—	Medium	3	48	6	—	Well drained	4e	C	0 - 5	.32	—	11	66	22
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes																	
Chama	44	5.0	—	Medium	3	86	4L	—	Well drained	3e	C	0 - 3	.37	—	11	66	22
Sen	25	5.0	—	Medium	3	48	6	—	Well drained	2e	C	0 - 5	.37	—	11	66	22
Cabba	15	4.0	—	Low	2	86	4L	—	Well drained	6s	D	0 - 3	.37	9	26	52	22
E3107F—Cabba-Badland complex, 6 to 70 percent slopes																	
Cabba	46	38.0	—	High	2	86	4L	—	Well drained	7e	D	0 - 3	.28	9	42	37	20
Badland	36	80.0	—	Very high	—	86	4L	—	—	8e	—	0 - 1	.37	9	26	52	22

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes																	
Cabba	30	27.0	—	High	2	86	4L	—	Well drained	7e	D	0 - 3	.37	9	26	52	22
Cherry	26	20.0	—	High	5	86	4L	—	Well drained	6e	C	0 - 3	.49	—	9	67	23
Cherry	18	12.0	—	Medium	5	86	4L	—	Well drained	4e	C	0 - 3	.49	—	9	67	23
E3541B—Williams-Zahl loams, 3 to 6 percent slopes																	
Williams	50	5.0	—	Medium	5	48	6	—	Well drained	2e	C	0 - 5	.24	8	41	36	22
Zahl	27	5.0	—	High	5	86	4L	—	Well drained	3e	C	0 - 5	.32	8	41	36	22
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes																	
Zahl	30	35.0	—	Very high	5	86	4L	—	Well drained	7e	C	0 - 5	.28	8	41	36	22
Cabba	24	38.0	—	High	2	86	4L	—	Well drained	7e	D	0 - 3	.37	9	26	52	22
Maschetah, strongly sloping	12	11.0	—	High	5	86	4L	—	Well drained	6e	C	0 - 7	.37	—	11	66	22
Maschetah, gently sloping	10	4.0	—	Medium	5	86	4L	—	Well drained	3e	C	0 - 7	.37	—	11	66	22
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes																	
Zahl	32	12.0	—	High	5	86	4L	—	Well drained	6e	C	0 - 5	.28	8	41	36	22
Cabba	26	12.0	—	Medium	2	86	4L	—	Well drained	6e	D	0 - 3	.37	9	26	52	22
Williams	20	12.0	—	Medium	5	48	6	—	Well drained	4e	C	0 - 5	.20	8	41	36	22

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes																	
Manning	30	11.0	—	Low	3	86	3	—	Somewhat excessively drained	6e	A	0 - 5	.15	4	69	16	14
Schaller	25	14.0	—	Low	2	86	3	—	Excessively drained	4e	A	0 - 9	.17	4	66	19	14
Wabek	20	22.0	—	Low	2	48	6	—	Excessively drained	7s	B	0 - 5	.28	7	42	37	20
E4729A—Heil silty clay loam, 0 to 1 percent slopes																	
Heil	84	0.0	—	Negligible	2	48	6	—	Poorly drained	6s	D	0 - 3	.32	—	16	48	35
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes																	
Maltese	45	3.0	200	Medium	2	48	6	None - deposition	Moderately well drained	4s	C	0 - 2	.43	—	18	60	22
Gerda	35	3.0	200	Medium	2	48	6	None - deposition	Moderately well drained	6s	D	0 - 1	.43	—	36	40	24
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes																	
Rhame	40	12.0	68	Low	3	86	3	None - deposition	Well drained	6e	B	0 - 5	.10	2	68	18	14
Chinook	30	12.0	98	Low	5	86	3	None - deposition	Well drained	6e	A	0 - 5	.15	1	65	21	14

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes																	
Rhame	37	22.0	49	Medium	3	86	3	None - deposition	Well drained	7e	B	0 - 5	.10	4	68	18	14
Fleak	34	30.0	49	High	2	134	2	None - deposition	Excessively drained	7e	D	0 - 4	.20	5	83	10	7
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes																	
Rhame	32	22.0	49	Medium	3	86	3	None - deposition	Well drained	7e	B	0 - 5	.10	4	68	18	14
Arikara, low precipitation	25	33.0	49	High	5	48	6	None - deposition	Well drained	7e	B	1 - 5	.24	—	27	47	26
Fleak	21	43.0	49	High	2	134	2	None - deposition	Excessively drained	7e	D	0 - 4	.20	5	83	10	7
L2145A—Kremlin loam, 0 to 2 percent slopes																	
Kremlin	85	1.0	200	Low	5	48	6	None - deposition	Well drained	2c	B	0 - 5	.32	—	38	40	22
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes																	
Rhame	40	25.0	—	High	3	86	3	—	Well drained	7e	B	0 - 7	.17	—	70	16	13
Bullock	22	17.0	—	Very high	2	86	3	—	Well drained	7s	D	0 - 3	.43	—	65	26	8
Kremlin	15	20.0	—	High	5	48	6	—	Well drained	6e	B	0 - 11	.24	5	39	36	24

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes																	
Scairt	30	11.0	—	Very high	2	48	6	—	Well drained	6s	D	0 - 1	.43	—	26	52	22
Maltese	20	15.0	—	Very high	2	48	6	—	Well drained	6s	C	0 - 7	.32	—	26	52	22
Boxwell	15	11.0	—	Medium	3	48	6	—	Well drained	4e	C	0 - 5	.24	1	39	36	24
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes																	
Rhame	40	11.0	—	Low	3	86	3	—	Well drained	6e	B	0 - 7	.15	—	69	16	14
Kremlin	25	11.0	—	Medium	5	48	6	—	Well drained	4e	B	0 - 11	.24	5	39	36	24
Archin	15	8.0	—	Very high	2	86	3	—	Well drained	6s	C	0 - 3	.32	—	63	26	10
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped																	
Cabbart	29	25.0	—	High	2	86	4L	—	Well drained	7e	D	0 - 3	.28	7	39	36	24
Kremlin	19	12.0	—	Medium	5	48	6	—	Well drained	4e	B	0 - 11	.24	5	39	36	24
Boxwell	17	20.0	—	High	3	48	6	—	Well drained	6e	C	0 - 5	.24	1	39	36	24
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes																	
Boxwell	36	30.0	98	High	3	48	6	None - deposition	Well drained	7e	C	0 - 4	.28	0	40	38	22
Cabbart	29	43.0	49	Very high	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.37	2	28	52	20
Arikara, low precipitation	16	33.0	49	High	5	48	6	None - deposition	Well drained	7e	B	1 - 5	.24	—	27	47	26

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes																	
Boxwell	63	5.0	160	Medium	3	48	6	None - deposition	Well drained	2e	C	0 - 5	.32	2	40	38	22
Kremlin	25	4.0	180	Low	5	48	6	None - deposition	Well drained	2e	B	0 - 5	.32	—	38	40	22
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes																	
Boxwell	46	12.0	98	Medium	3	48	6	None - deposition	Well drained	4e	C	0 - 4	.28	2	40	38	22
Kremlin	32	12.0	98	Medium	5	48	6	None - deposition	Well drained	4e	B	0 - 7	.32	—	33	45	22
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes																	
Kirby, channery loam	38	45.0	49	Medium	1	38	7	None - deposition	Excessively drained	7s	A	0 - 5	.24	30	44	36	20
Badland	25	80.0	49	Very high	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
Patent, badland fan	20	17.0	59	Medium	5	86	4L	None - deposition	Well drained	7e	B	0 - 3	.37	2	36	43	21
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes																	
Kirby, channery loam	50	45.0	—	High	1	48	6	—	Excessively drained	7s	A	0 - 3	.28	25	44	40	15
Scairt	15	17.0	—	High	2	48	6	—	Well drained	7s	D	0 - 1	.43	—	26	52	22

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes																	
Badland	60	80.0	49	High	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
Cabbart	30	40.0	49	High	2	86	4L	None - deposition	Well drained	7e	D	0 - 1	.32	5	38	42	20
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes																	
Cabbart	50	40.0	49	High	2	86	4L	None - deposition	Well drained	7e	D	0 - 1	.32	5	38	42	20
Badland	25	80.0	49	High	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes																	
Lonna	43	11.0	111	Medium	5	86	4L	None - deposition	Well drained	4e	B	0 - 3	.32	—	19	58	23
Cabbart	32	20.0	49	High	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.37	2	28	52	20
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes																	
Patent, badland fan	35	11.0	111	Medium	5	86	4L	None - deposition	Well drained	6e	B	0 - 3	.37	0	36	43	21
Badland	20	80.0	49	High	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
Cabbart	20	28.0	49	High	2	86	4L	None - deposition	Well drained	7e	D	0 - 1	.32	5	38	42	20

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes																	
Badland	30	80.0	49	Very high	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
Arikara, low precipitation	27	43.0	49	High	5	48	6	None - deposition	Well drained	7e	B	1 - 2	.20	—	27	47	26
Cabbart	17	43.0	49	Very high	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.37	2	28	52	20
L3197F—Badland, 9 to 150 percent slopes																	
Badland	88	80.0	49	High	1	86	4L	Class 4	—	8e	—	0 - 1	.55	5	28	50	22
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes																	
Arikara, low precipitation	62	33.0	49	High	5	48	6	None - deposition	Well drained	7e	B	1 - 5	.24	—	27	47	26
Cabbart	19	43.0	49	Very high	2	86	4L	None - deposition	Well drained	7e	D	0 - 3	.32	2	38	42	20
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes																	
Patent, occasionally flooded	35	6.0	—	Medium	5	86	4L	—	Well drained	6e	B	0 - 7	.24	—	39	36	24
Patent, gullied, occasionally flooded	20	50.0	—	Very high	1	86	4L	Class 4	Well drained	7e	B	0 - 1	.24	—	39	36	24
Glendive, frequently flooded	15	3.0	—	Very low	5	86	3	—	Well drained	6w	A	0 - 5	.17	—	69	16	14

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded																	
Patent, occasionally flooded	80	3.0	—	Low	5	86	4L	—	Well drained	4e	B	0 - 7	.24	—	39	36	24
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes																	
Patent, occasionally flooded	40	6.0	—	Medium	5	86	4L	—	Well drained	6e	B	0 - 7	.24	—	39	36	24
Vanda	25	6.0	—	Very high	5	86	4	—	Well drained	6e	D	0 - 3	.24	—	5	44	50
Gerda, severely eroded	15	3.0	—	Very high	2	48	6	—	Well drained	6s	D	0 - 0	.37	—	41	36	22
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes																	
Kremlin	25	3.0	—	Low	5	48	6	—	Well drained	2e	B	0 - 11	.28	5	39	36	24
Ethridge	22	3.0	—	Medium	5	48	6	—	Well drained	2e	C	0 - 3	.43	2	24	53	22
Gerda	20	3.0	—	High	2	48	6	—	Well drained	6s	D	0 - 1	.37	—	41	36	22
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded																	
Wolf Point, occasionally flooded	85	1.0	—	Medium	5	86	4L	—	Well drained	2s	C	0 - 1	.32	—	16	48	35

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded																	
Wolf Point, wooded, occasionally flooded	78	1.0	—	Medium	5	86	4L	—	Well drained	2s	C	0 - 1	.32	—	16	48	35
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded																	
Havre, occasionally flooded	82	1.0	200	Low	5	86	4L	None - deposition	Well drained	2e	C	0 - 7	.43	—	25	55	20
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded																	
Havre, rarely flooded, mollic	86	1.0	200	Low	5	86	4L	None - deposition	Well drained	2e	C	0 - 7	.28	—	36	40	24
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded																	
Glendive, channeled, frequently flooded	40	1.0	200	Very low	4	86	3	None - deposition	Moderately well drained	6w	A	0 - 5	.17	—	64	22	14
Fluvaquents, channeled, frequently flooded	30	1.0	200	Negligible	5	86	3	None - deposition	Very poorly drained	6w	A/D	0 - 5	.20	5	68	22	10
Havre, channeled, frequently flooded	20	1.0	200	Very low	5	86	4L	None - deposition	Moderately well drained	6w	C	0 - 5	.28	—	38	42	20

Conservation Planning–McKenzie County, North Dakota																	
Map symbol and soil name	Pct. of map unit	Slope RV	USLE Slope Length ft.	Runoff	T Factor	WEI	WEG	Erosion	Drainage	NIRR LCC	Hydrologic Group	Surface					
												Depths in.	Kf Factor	Frag-ments RV	Sand RV	Silt RV	Clay RV
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded																	
Glendive, occasionally flooded	75	1.0	200	Very low	4	86	3	None - deposition	Moderately well drained	3e	A	0 - 7	.20	—	64	22	14
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded																	
Hanly, occasionally flooded	80	3.0	200	Very low	5	86	3	None - deposition	Moderately well drained	3e	A	0 - 3	.17	0	64	22	14
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes																	
Tinsley	53	21.0	—	Medium	2	56	5	—	Excessively drained	7s	A	0 - 3	.20	25	66	23	10
Chanta	17	11.0	—	Medium	3	48	6	—	Well drained	6e	B	0 - 5	.24	9	39	36	24

RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

Report—RUSLE2 Related Attributes

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes								
Rhoades	55	200	D	.37	2	40.0	36.0	24.0
Daglum	33	200	D	.37	2	17.0	60.0	23.0
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes								
Dogtooth	55	200	D	.43	2	42.0	36.0	22.0
Janesburg	33	200	D	.43	2	15.0	61.0	24.0
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes								
Dogtooth	35	59	D	.43	2	42.0	36.0	22.0
Janesburg	25	59	D	.37	2	15.0	55.0	30.0
Cabba	22	49	D	.37	2	35.0	45.0	20.0
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes								
Vebar	50	131	B	.15	3	68.0	18.0	14.0
Cohagen	25	161	D	.20	2	68.0	18.0	14.0
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes								
Vebar	40	98	B	.15	3	68.0	18.0	14.0
Flasher	30	98	D	.24	2	83.9	9.1	7.0
Tally	18	98	A	.17	5	65.0	21.0	14.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes								
Beisigl	40	—	A	.15	3	86.4	6.6	7.0
Flasher	26	—	D	.20	2	86.4	6.6	7.0
Telfer	15	—	A	.20	5	78.6	16.4	5.0
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes								
Flasher	36	49	D	.24	2	83.9	9.1	7.0
Vebar	22	59	B	.15	3	68.0	18.0	14.0
Parshall	15	98	A	.15	5	62.0	24.0	14.0
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes								
Lihen	60	—	A	.17	5	78.6	16.4	5.0
Parshall	20	—	A	.17	4	69.6	16.4	14.0
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes								
Cabba	41	49	D	.37	2	35.0	46.0	19.0
Chama	27	49	C	.32	3	31.0	47.0	22.0
Shambo	15	98	B	.24	5	43.0	35.0	22.0
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes								
Arikara	33	—	B	.24	5	38.5	36.5	25.0
Cabba	18	—	D	.28	2	42.1	37.9	20.0
Shambo, steep	17	—	B	.20	5	39.1	36.9	24.0
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes								
Chama	43	—	C	.37	3	11.2	66.8	22.0
Cabba	28	—	D	.37	2	26.0	52.0	22.0
Sen	18	—	C	.37	3	11.2	66.8	22.0
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes								
Cabba	42	—	D	.37	2	26.0	52.0	22.0
Chama	26	—	C	.37	3	11.2	66.8	22.0
Sen	16	—	C	.32	3	11.2	66.8	22.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes								
Chama	44	—	C	.37	3	11.2	66.8	22.0
Sen	25	—	C	.37	3	11.2	66.8	22.0
Cabba	15	—	D	.37	2	26.0	52.0	22.0
E3107F—Cabba-Badland complex, 6 to 70 percent slopes								
Cabba	46	—	D	.28	2	42.1	37.9	20.0
Badland	36	—	—	.37	—	26.0	52.0	22.0
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes								
Cabba	30	—	D	.37	2	26.0	52.0	22.0
Cherry	26	—	C	.49	5	9.5	67.5	23.0
Cherry	18	—	C	.49	5	9.5	67.5	23.0
E3541B—Williams-Zahl loams, 3 to 6 percent slopes								
Williams	50	—	C	.24	5	41.1	36.9	22.0
Zahl	27	—	C	.32	5	41.1	36.9	22.0
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes								
Zahl	30	—	C	.28	5	41.1	36.9	22.0
Cabba	24	—	D	.37	2	26.0	52.0	22.0
Maschetah, strongly sloping	12	—	C	.37	5	11.2	66.8	22.0
Maschetah, gently sloping	10	—	C	.37	5	11.2	66.8	22.0
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes								
Zahl	32	—	C	.28	5	41.1	36.9	22.0
Cabba	26	—	D	.37	2	26.0	52.0	22.0
Williams	20	—	C	.20	5	41.1	36.9	22.0
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes								
Manning	30	—	A	.15	3	69.6	16.4	14.0
Schaller	25	—	A	.17	2	66.6	19.4	14.0
Wabek	20	—	B	.28	2	42.1	37.9	20.0
E4729A—Heil silty clay loam, 0 to 1 percent slopes								
Heil	84	—	D	.32	2	16.9	48.1	35.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes								
Maltese	45	200	C	.43	2	18.0	60.0	22.0
Gerda	35	200	D	.43	2	36.0	40.0	24.0
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes								
Rhame	40	69	B	.10	3	68.0	18.0	14.0
Chinook	30	98	A	.15	5	65.0	21.0	14.0
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes								
Rhame	37	49	B	.10	3	68.0	18.0	14.0
Fleak	34	49	D	.20	2	83.0	10.0	7.0
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes								
Rhame	32	49	B	.10	3	68.0	18.0	14.0
Arikara, low precipitation	25	49	B	.24	5	27.0	47.0	26.0
Fleak	21	49	D	.20	2	83.0	10.0	7.0
L2145A—Kremlin loam, 0 to 2 percent slopes								
Kremlin	85	200	B	.32	5	38.0	40.0	22.0
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes								
Rhame	40	—	B	.17	3	70.5	16.5	13.0
Bullock	22	—	D	.43	2	65.2	26.8	8.0
Kremlin	15	—	B	.24	5	39.8	36.2	24.0
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes								
Scairt	30	—	D	.43	2	26.0	52.0	22.0
Maltese	20	—	C	.32	2	26.0	52.0	22.0
Boxwell	15	—	C	.24	3	39.1	36.9	24.0
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes								
Rhame	40	—	B	.15	3	69.6	16.4	14.0
Kremlin	25	—	B	.24	5	39.1	36.9	24.0
Archin	15	—	C	.32	2	63.5	26.5	10.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped								
Cabbart	29	—	D	.28	2	39.1	36.9	24.0
Kremlin	19	—	B	.24	5	39.1	36.9	24.0
Boxwell	17	—	C	.24	3	39.1	36.9	24.0
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes								
Boxwell	36	98	C	.28	3	40.0	38.0	22.0
Cabbart	29	49	D	.37	2	28.0	52.0	20.0
Arikara, low precipitation	16	49	B	.24	5	27.0	47.0	26.0
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes								
Boxwell	63	161	C	.32	3	40.0	38.0	22.0
Kremlin	25	180	B	.32	5	38.0	40.0	22.0
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes								
Boxwell	46	98	C	.28	3	40.0	38.0	22.0
Kremlin	32	98	B	.32	5	33.0	45.0	22.0
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes								
Kirby, channery loam	38	49	A	.24	1	44.0	36.0	20.0
Badland	25	49	—	.55	1	28.0	50.0	22.0
Patent, badland fan	20	59	B	.37	5	36.0	43.0	21.0
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes								
Kirby, channery loam	50	—	A	.28	1	44.3	40.7	15.0
Scairt	15	—	D	.43	2	26.0	52.0	22.0
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes								
Badland	60	49	—	.55	1	28.0	50.0	22.0
Cabbart	30	49	D	.32	2	38.0	42.0	20.0
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes								
Cabbart	50	49	D	.32	2	38.0	42.0	20.0
Badland	25	49	—	.55	1	28.0	50.0	22.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes								
Lonna	43	112	B	.32	5	19.0	58.0	23.0
Cabbart	32	49	D	.37	2	28.0	52.0	20.0
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes								
Patent, badland fan	35	112	B	.37	5	36.0	43.0	21.0
Badland	20	49	—	.55	1	28.0	50.0	22.0
Cabbart	20	49	D	.32	2	38.0	42.0	20.0
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes								
Badland	30	49	—	.55	1	28.0	50.0	22.0
Arikara, low precipitation	27	49	B	.20	5	27.0	47.0	26.0
Cabbart	17	49	D	.37	2	28.0	52.0	20.0
L3197F—Badland, 9 to 150 percent slopes								
Badland	88	49	—	.55	1	28.0	50.0	22.0
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes								
Arikara, low precipitation	62	49	B	.24	5	27.0	47.0	26.0
Cabbart	19	49	D	.32	2	38.0	42.0	20.0
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes								
Patent, occasionally flooded	35	—	B	.24	5	39.1	36.9	24.0
Patent, gullied, occasionally flooded	20	—	B	.24	1	39.1	36.9	24.0
Glendive, frequently flooded	15	—	A	.17	5	69.6	16.4	14.0
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded								
Patent, occasionally flooded	80	—	B	.24	5	39.1	36.9	24.0
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes								
Patent, occasionally flooded	40	—	B	.24	5	39.1	36.9	24.0
Vanda	25	—	D	.24	5	5.3	44.7	50.0
Gerda, severely eroded	15	—	D	.37	2	41.1	36.9	22.0

RUSLE2 Related Attributes–McKenzie County, North Dakota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes								
Kremlin	25	—	B	.28	5	39.1	36.9	24.0
Ethridge	22	—	C	.43	5	24.5	53.5	22.0
Gerda	20	—	D	.37	2	41.1	36.9	22.0
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded								
Wolf Point, occasionally flooded	85	—	C	.32	5	16.9	48.1	35.0
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded								
Wolf Point, wooded, occasionally flooded	78	—	C	.32	5	16.9	48.1	35.0
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded								
Havre, occasionally flooded	82	200	C	.43	5	25.0	55.0	20.0
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded								
Havre, rarely flooded, mollic	86	200	C	.28	5	36.0	40.0	24.0
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded								
Glendive, channeled, frequently flooded	40	200	A	.17	4	64.0	22.0	14.0
Fluvaquents, channeled, frequently flooded	30	200	A/D	.20	5	68.0	22.0	10.0
Havre, channeled, frequently flooded	20	200	C	.28	5	38.0	42.0	20.0
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded								
Glendive, occasionally flooded	75	200	A	.20	4	64.0	22.0	14.0
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded								
Hanly, occasionally flooded	80	200	A	.17	5	64.0	22.0	14.0
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes								
Tinsley	53	—	A	.20	2	66.9	23.1	10.0
Chanta	17	—	B	.24	3	39.1	36.9	24.0

Soil Health

Soil health, also referred to as soil quality, is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. This folder contains the tabular reports that provide the information specific to the education and importance of managing soils so they are sustainable for future generations.

Soil Health - Aggregate Stability (West US)

Definition of What is Estimated

Aggregate stability is defined as the stability of macroaggregates (1-2 mm in size) against flowing water and is expressed as percent stable aggregates of the less than 2mm fraction. It is estimated from the organic matter content, total clay, and sodium adsorption ratio. Aggregate stability values are provided for horizons within the upper 6 inches, but not for sandy and organic surface layers.

Significance

Soil aggregate stability is an important soil property affecting soil health and crop production. It is important for stabilizing soil structure, increasing water infiltration, and reducing erosion.

Soil aggregates are the smallest unit of soil structure. They are composed of decaying particulate organic matter, clay particles, microbial products, and fine roots. Aggregates are generally divided into macroaggregates (greater than 250 µm) and microaggregates (less than 250 µm). The size, strength, and stability of aggregates depend upon the stabilizing agents involved. They can be classified as temporary, transient, or persistent. Improved aggregate stability leads to increased water infiltration and storage in the profile, reduced erosion, and soil structure that is resistant to compaction. Increases in soil organic carbon improves aggregation and aggregate stability, which protect carbon compounds enmeshed in the aggregates from decomposition, leading to carbon sequestration.

Factors Affecting Soil Aggregation and Aggregate Stability

Inherent Factors - Microaggregation is generally considered to be an inherent property of the soil. Persistent binding agents include highly decomposed, high molecular weight organic materials (e.g., humic compounds), polymers, and polyvalent cations (e.g., calcium, aluminum, iron) that have a heterogeneous, non-specific structure. These agents are associated with microaggregation as well as soil organic carbon (SOC) sequestration. These persistent compounds are found in the interior of aggregates, forming organo-mineral complexes via the polyvalent cations. These agents are long-lasting, and the degree of aggregation formed by them is considered part of the inherent soil properties. Generally, management does not impact soil microaggregation. Soils naturally high in clay and polyvalent cations are likely to form more microaggregates.

Dynamic Factors - Transient binding agents consist mainly of complex carbohydrates, or polysaccharides, and organic mucilages. As plant residues and compounds extruded by plant roots decompose, bacteria release mucilages that are complex carbon-rich carbohydrates. These carbohydrates serve as binding agents, or “glues,” to which clay particles can be adsorbed and bound together. The

polysaccharides are non-humic compounds of high molecular weight and comprise about 20 to 25% of the soil humus. They are critical for binding microaggregates together, via polymer and polyvalent cation bridges, to form larger macroaggregates. Although binding with clay particles does provide some protection against decomposition, these binding agents generally decompose within a few weeks and need to be continually renewed through actively growing plants, decaying residues, or organic amendments.

Temporary binding agents consist of plant roots, especially fine roots and root hairs, fungal hyphae, and bacterial and algal cells. These agents develop along with plant roots, forming a network that entangles mineral particles, through adsorption, to form macroaggregates. As roots cease to grow, the amount of these temporary agents is reduced. Planting cover crops or perennial plants maintains living roots longer in the soil, thus maintaining and strengthening the aggregates. Tillage reduces the amount of roots and the microbial biomass, especially in the surface horizon.

Consequences of Weak Aggregates

The first step in erosion is the breakdown of surface aggregates. Aggregates at the soil surface are weakened if the binding agents degrade at rates exceeding replenishment rates. These aggregates can be broken apart by outside forces, of which raindrops, wind, and tillage are among the most important. Changes in soil chemistry, such as increased sodicity of the soil, can also contribute to aggregate breakdown. As aggregates are broken down, the component particles clog the surface pores and surface sealing and crusting follow. This process results in reduced water infiltration, ponding, increased runoff and erosion, and sediment transport on and off site. Its occurrence can be minimized by strengthening aggregates.

Additionally, reducing the size and strength of the aggregates throughout the profile weakens soil structure so that it is more easily compacted by field operations, especially if the soil is too wet. Poor structure can lead to ponding after rainstorms, which can result in increased evaporation and less water in the profile that might otherwise have been available for crop growth.

Maintaining and increasing aggregation and aggregate strength can be accomplished through the implementation of soil health management systems. These systems may include reduced tillage operations (or preferably no tillage operations) and the incorporation of cover crops or a cash crop (such as winter wheat) into the rotation. Having crops and cover crops with varied rooting structures improves soil structure, as does maintaining living roots in the soil as long as possible. Studies have shown that plants will push into the rhizosphere, via the root system, about 20% of the carbon dioxide is fixed through photosynthesis. Those carbon compounds can support the soil microbial population, which is critical to soil structure, water infiltration, and nutrient cycling. Any management system that leads to increased soil organic carbon is likely to improve aggregate stability.

Measuring Aggregate Stability

Aggregate stability is determined by a wet sieving technique preceded by vacuum saturation of the 1-2 mm size aggregates as described in USDA-ARS (1966). Stable aggregates are corrected for sand greater than 0.25 mm as follows: Aggregate stability (%) = ((wt. of stable aggregates and sand) – (wt. of sand))/((wt. of sample) – (wt. of sand)).

References

Blanco-Canqui, H., and R. Lal. 2004. Mechanisms of carbon sequestration in soil aggregates. Criti. Rev. Plant Sci. 23:481-504. doi: 10.1080/07352680490886842

Cambardella, C.A., and E.T. Elliott. 1993. Carbon and nitrogen distribution in aggregates from cultivated and native grassland soils. Soil Sci. Soc. Am. J. 57:1071-1076. doi: 10.2136/sssaj1993.03615995005700040032x

Denef, K., J. Six, H. Bossuyt, S.D. Frey, E.T. Elliott, R. Merckx, and K. Paustian. 2001. Influence of dry-wet cycles on the interrelationship between aggregate, particulate organic matter, and microbial community dynamics. Soil Biol. Biochem. 33:1599-1611. doi: 10.1016/s0038-0717(01)00076-1

Gale, W.J., and C.A. Cambardella. 2000. Carbon dynamics of surface residue- and root-derived organic matter under simulated no-till. Soil Sci. Soc. Am. J. 64:190-195. doi: 10.2136/sssaj2000.641190x

Gale, W.J., C.A. Cambardella, and T.B. Bailey. 2000a. Root-derived carbon and the formation and stabilization of aggregates. Soil Sci. Soc. Am. J. 64:201-207. doi: 10.2136/sssaj2000.641201x

Gale, W.J., C.A. Cambardella, and T.B. Bailey. 2000b. Surface residue- and root-derived carbon in stable and unstable aggregates. Soil Sci. Soc. Am. J. 64:196-201. doi: 10.2136/sssaj2000.641196x

Martin, J.P. 1971. Decomposition and binding action of polysaccharides in soil. Soil Biol. Biochem. 3:33–41.

Six, J., E.T. Elliott, and K. Paustian. 1999. Aggregate and soil organic matter dynamics under conventional and no-tillage systems. Soil Sci. Soc. Am. J. 63:1350-1358.

Six, J., K. Paustian, E.T. Elliott, and C. Combrink. 2000. Soil structure and organic matter: I. Distribution of aggregate-size classes and aggregate-associated carbon. Soil Sci. Soc. Am. J. 64:681-689.

Tisdall, J.M., and J.M. Oades. 1982. Organic matter and water-stable aggregates in soil. J. Soil Sci. 33:141-163.

USDA-ARS. 1966. Aggregate stability of soils from western United States and Canada. Tech. Bull. No. 1355. Agricultural Research Service, United States Department of Agriculture in cooperation with Colorado Agricultural Experiment Station. U.S. Govn’t Printing Office. Washington, D.C.

Report—Soil Health - Aggregate Stability (West US)

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes						
Rhoades	55	E	0-3	62	78	85
		Btn	3-8	21	54	75
Daglum	33	A	0-3	78	85	90
		E	3-5	71	77	83
		Btn	5-18	47	64	80
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes						
Dogtooth	55	E	0-2	65	75	82
		Btn	2-10	53	67	78
Janesburg	33	A	0-7	73	81	85
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes						
Dogtooth	35	E	0-2	65	75	82
		Btn	2-8	53	67	78
Janesburg	25	A	0-6	77	83	88
Cabba	22	A	0-3	69	81	90
		Bk	3-8	59	66	75
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes						
Vebar	50	Ap	0-6	61	67	72
Cohagen	25	Ap	0-6	46	57	69
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes						
Vebar	40	A	0-6	61	67	74
Flasher	30	A	0-5	45	59	66
		AC	5-10	35	53	61
Tally	18	A	0-6	61	70	76
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes						
Beisigl	40	A	0-5	54	63	70
		Bk	5-27	45	49	55
Flasher	26	A	0-6	45	50	55
Telfer	15	A	0-6	54	62	70

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes						
Flasher	36	A	0-3	45	59	66
		AC	3-9	35	53	61
Vebar	22	A	0-5	61	67	74
		Bw1	5-10	55	63	69
Parshall	15	A	0-9	65	75	78
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes						
Lihen	60	Ap	0-9	54	62	70
Parshall	20	Ap	0-7	55	70	78
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes						
Cabba	41	A	0-3	57	69	78
		Bk	3-8	55	61	71
Chama	27	A	0-4	63	73	83
		Bw	4-7	58	70	81
Shambo	15	A	0-6	69	80	87
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes						
Arikara	33	Oi	0-1	—	—	—
		A	1-2	74	83	87
		Bw	2-14	59	68	75
Cabba	18	A	0-3	59	70	78
		Bk	3-15	50	56	66
Shambo, steep	17	A	0-9	69	81	87
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes						
Chama	43	Ap	0-4	58	73	82
		Bw	4-8	59	72	81
Cabba	28	A	0-3	59	70	78
		Bk	3-15	50	57	66
Sen	18	Ap	0-6	69	76	82

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes						
Cabba	42	A	0-3	59	70	78
		Bk	3-15	50	57	66
Chama	26	A	0-4	58	73	82
		Bw	4-8	59	72	81
Sen	16	A	0-6	69	76	82
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes						
Chama	44	Ap	0-4	58	73	82
		Bw	4-8	59	72	81
Sen	25	Ap	0-6	69	76	82
Cabba	15	A	0-3	59	70	78
		Bk	3-15	50	57	66
E3107F—Cabba-Badland complex, 6 to 70 percent slopes						
Cabba	46	A	0-3	59	70	78
		Bk	3-15	50	56	66
Badland	36	A	0-2	59	61	72
		Cr	2-60	12	40	56
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes						
Cabba	30	A	0-3	59	70	78
		Bk	3-15	50	57	66
Cherry	26	A	0-3	50	69	78
		Bw	3-33	50	66	75
Cherry	18	A	0-3	50	69	78
		Bw	3-33	50	66	75
E3541B—Williams-Zahl loams, 3 to 6 percent slopes						
Williams	50	Ap	0-6	70	80	85
Zahl	27	Ap	0-5	59	70	82
		Bk	5-20	19	64	75

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes						
Zahl	30	A	0-5	59	70	82
		Bk	5-20	19	64	75
Cabba	24	A	0-3	59	70	78
		Bk	3-15	50	57	66
Maschetah, strongly sloping	12	A	0-7	70	76	82
Maschetah, gently sloping	10	Ap	0-7	70	76	82
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes						
Zahl	32	A	0-5	59	70	82
		Bk	5-20	19	64	75
Cabba	26	A	0-3	59	70	78
		Bk	3-15	50	57	66
Williams	20	A	0-6	70	80	85
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes						
Manning	30	A	0-5	65	75	81
		Bw	5-18	55	67	75
Schaller	25	A	0-9	55	67	74
Wabek	20	A	0-5	58	66	72
		Bk	5-10	14	48	62
E4729A—Heil silty clay loam, 0 to 1 percent slopes						
Heil	84	E	0-3	78	86	91
		Btn	3-24	0	27	52
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes						
Maltese	45	A	0-3	69	76	82
		E	3-5	59	70	78
		Btn	5-17	43	64	78
Gerda	35	E	0-2	57	74	82
		Btn	2-7	7	44	78

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes						
Rhame	40	A	0-6	61	72	80
Chinook	30	A	0-6	61	75	83
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes						
Rhame	37	A	0-5	61	72	80
		Bw1	5-9	55	63	69
Fleak	34	A	0-5	50	63	73
		C	5-14	—	—	—
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes						
Rhame	32	A	0-6	61	72	80
Arikara, low precipitation	25	Oi	0-1	—	—	—
		A	1-6	84	91	97
Fleak	21	A	0-5	50	63	73
		C	5-14	—	—	—
L2145A—Kremlin loam, 0 to 2 percent slopes						
Kremlin	85	Ap	0-6	69	76	85
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes						
Rhame	40	A	0-8	54	66	74
Bullock	22	E	0-4	54	60	65
		Btn	4-10	33	51	67
Kremlin	15	A	0-11	59	71	78
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes						
Scairt	30	E	0-2	65	75	82
		Btn	2-6	61	77	85
Maltese	20	A	0-7	69	76	82
Boxwell	15	A	0-5	59	71	78
		Bw	5-14	59	67	73

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes						
Rhame	40	A	0-8	55	67	74
Kremlin	25	A	0-11	59	71	78
Archin	15	A	0-4	54	65	73
		E	4-6	41	59	70
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped						
Cabbart	29	A	0-3	47	64	72
		Bk	3-18	38	54	66
Kremlin	19	A	0-11	59	71	78
Boxwell	17	A	0-5	59	71	78
		Bw	5-14	59	67	73
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes						
Boxwell	36	A	0-5	69	76	82
		Bw1	5-8	65	74	81
Cabbart	29	A	0-4	69	77	87
		BC	4-11	48	61	71
Arikara, low precipitation	16	Oi	0-1	—	—	—
		A	1-6	84	91	97
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes						
Boxwell	63	Ap	0-6	69	76	82
Kremlin	25	Ap	0-6	69	76	85
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes						
Boxwell	46	A	0-5	69	76	82
		Bw1	5-8	59	67	77
Kremlin	32	A	0-7	69	76	85

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes						
Kirby, channery loam	38	A	0-5	65	77	87
		Bk	5-14	55	70	85
Badland	25	C	0-2	23	51	66
		Cr	2-79	0	0	0
Patent, badland fan	20	A	0-3	74	81	87
		AC	3-7	69	77	82
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes						
Kirby, channery loam	50	A	0-4	55	63	70
		Bk	4-12	46	54	61
Scairt	15	E	0-2	65	75	82
		Btn	2-6	61	77	85
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes						
Badland	60	C	0-2	23	51	66
		Cr	2-79	0	0	0
Cabbart	30	A	0-2	67	77	87
		BC	2-10	47	61	71
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes						
Cabbart	50	A	0-2	67	77	87
		BC	2-10	47	61	71
Badland	25	C	0-2	23	51	66
		Cr	2-79	0	0	0
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes						
Lonna	43	A	0-3	69	79	85
		Bw	3-11	59	72	81
Cabbart	32	A	0-4	69	77	87
		BC	4-11	48	61	71

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes						
Patent, badland fan	35	A	0-4	74	81	87
		AC	4-13	69	77	82
Badland	20	C	0-2	23	51	66
		Cr	2-79	0	0	0
Cabbart	20	A	0-2	67	77	87
		BC	2-10	47	61	71
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes						
Badland	30	C	0-2	23	51	66
		Cr	2-79	0	0	0
Arikara, low precipitation	27	Oi	0-1	—	—	—
		A	1-2	84	91	97
		Bw	2-14	59	72	81
Cabbart	17	A	0-4	69	77	87
		BC	4-11	48	61	71
L3197F—Badland, 9 to 150 percent slopes						
Badland	88	C	0-2	23	51	66
		Cr	2-79	0	0	0
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes						
Arikara, low precipitation	62	Oi	0-1	—	—	—
		A	1-6	84	91	97
Cabbart	19	A	0-4	67	77	87
		BC	4-11	47	61	71
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes						
Patent, occasionally flooded	35	AC	0-7	59	71	78
Patent, gullied, occasionally flooded	20	AC	0-1	32	51	63
		C	1-60	0	22	52
Glendive, frequently flooded	15	A	0-5	46	53	59
		C1	5-16	45	53	59

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded						
Patent, occasionally flooded	80	AC	0-7	59	71	78
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes						
Patent, occasionally flooded	40	AC	0-7	59	71	78
Vanda	25	A	0-4	0	23	44
		Byz	4-60	0	9	42
Gerda, severely eroded	15	E	0-0	69	73	78
		Btn	0-6	36	55	70
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes						
Kremlin	25	Ap	0-11	59	71	78
Ethridge	22	Ap	0-3	59	70	78
		Bt	3-10	66	72	78
Gerda	20	E	0-2	69	76	82
		Btn	2-11	61	77	85
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded						
Wolf point, occasionally flooded	85	A1	0-1	53	62	67
		A2	1-10	56	63	69
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded						
Wolf point, wooded, occasionally flooded	78	A1	0-1	53	62	67
		A2	1-10	56	63	69
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded						
Havre, occasionally flooded	82	Ap	0-7	56	69	78

Soil Health - Aggregate Stability (West US)–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (Inches)**	**Aggregate Stability low (Pct)**	**Aggregate Stability RV (Pct)**	**Aggregate Stability high (Pct)**
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded						
Havre, rarely flooded, mollic	86	Ap	0-7	68	80	85
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded						
Glendive, channeled, frequently flooded	40	A	0-5	61	75	81
		C1	5-24	52	62	75
Fluvaquents, channeled, frequently flooded	30	Ag	0-5	51	64	73
		Cg	5-79	15	48	71
Havre, channeled, frequently flooded	20	A	0-6	65	78	87
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded						
Glendive, occasionally flooded	75	Ap	0-7	53	67	74
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded						
Hanly, occasionally flooded	80	A	0-4	64	72	78
		C1	4-44	51	64	74
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes						
Tinsley	53	A	0-4	49	59	67
		AC	4-11	14	48	62
Chanta	17	A	0-6	59	71	78

Soil Health - Bulk Density and Texture

Bulk density is a physical soil property measured by the ratio of dry weight of soil to its volume.

Significance

Bulk density is one of several soil properties frequently used as a measure of soil health (Volchko, et al., 2014) and is an indicator for soil compaction and root restriction. Even though bulk density varies with soil texture, it is a dynamic soil property that changes based on soil management with different soil cover, amount

of organic matter, soil structure, and porosity (USDA, 2008). It influences water movement in the soil, root growth and penetration and seed germination. Some of the practices that can improve bulk density include increasing organic matter content, reducing soil disturbance when the soil is wet, and maintaining soil surface protection with a cover crop, especially multi-species that can provide a wide range of root penetration.

Bulk density influences plant growth and engineering applications. Within a family level particle-size class, bulk density is an indicator of how well plant roots are able to extend into the soil. Bulk density is used to calculate porosity. Bulk density at a water tension of 1/3 bar (33 kPa) is used for soil classification in the required characteristics for andic soil properties and in the criteria for Andic, Aquandic, and Vitrandic subgroups.

Factors Affecting Bulk Density

Inherent - Bulk density is dependent on soil texture and the densities of soil mineral (sand, silt, and clay) and organic matter particles, as well as their packing arrangement. Generally, loose, porous soils and those rich in organic matter have lower bulk density. Sandy soils have relatively high bulk density since total pore space in sands is less than that of silt or clay soils. Finer-textured soils that have good structure, such as silt loams and clay loams, have higher pore space and lower bulk density compared to sandy soils.

General relationship of soil bulk density to root growth based on soil texture

Soil Texture	Ideal bulk densities for plant growth (g/cm3)	Bulk densities that restrict root growth (g/cm3)
Sandy	Less than 1.60	More than 1.80
Loamy	Less than 1.40	More than 1.65
Clayey	Less than 1.10	More than 1.47

Dynamic - Bulk density is changed by crop and land management practices that affect soil cover, organic matter, soil structure, and/or porosity. Cultivation can result in compacted soil layers with increased bulk density. Livestock as well as the use of agricultural and construction equipment exert pressure that compacts the soil and reduces porosity, especially on wet soils. Freeze-thaw action in the soil can lead to lowered bulk density.

Database Entries

Methods: In general, there are two broad groupings of bulk density methods. One group is for soil materials coherent enough that a field sample can be removed, and the other group is for soils that are too fragile to remove a sample and therefore an excavation operation must be performed. In the former group, there are clod methods in which the sample has an undefined volume and is coated and then the volume is determined by submergence. Also under the former there are various methods in which a cylinder of known volume is obtained of soil sufficiently coherent that it remains in the cylinder. The detailed procedures are outlined in Soil Survey Investigations Report No. 42, Soil Survey Laboratory Methods Manual, Version 5.0, November 2014, USDA, NRCS.

Bulk density, one-third bar is the oven-dried weight of the less than 2 millimeter soil material per unit volume of soil at a water tension of 1/3 bar (33 kPa). The bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material. Three columns represent the low, representative value (RV), and high values expected in the soil horizon.

Bulk density is used to convert the results of other soil measurements from a weight to a volume basis.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." The representative texture of each horizon is displayed.

References:

Soil Survey Staff. 2014. Kellogg Soil Survey Laboratory Methods Manual. Soil Survey Investigations Report No. 42, Version 5.0. R. Burt and Soil Survey Staff (ed.). U.S. Department of Agriculture, Natural Resources Conservation Service.

United State Department of Agriculture, Natural Resources Conservation Service. 2008. Soil Quality Indicators – Bulk Density.

Volchko Y, Norrman J, Rosèn, and Norberg T. 2014. A minimum data set for evaluation the ecological soil functions in remediation projects. J Soils Sediments 14:1850-1860.

Report—Soil Health - Bulk Density and Texture

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes							
Rhoades	55	E	0-3	Loam	1.30	1.40	1.50
		Btn	3-8	Clay loam	1.30	1.40	1.45
		Btknyz	8-14	Clay loam	1.30	1.40	1.50
		Bkyz	14-46	Clay loam	1.40	1.45	1.50
		C	46-79	Clay	1.35	1.45	1.50
Daglum	33	A	0-3	Silt loam	1.15	1.20	1.25
		E	3-5	Silt loam	1.30	1.35	1.40
		Btn	5-18	Silty clay loam	1.30	1.35	1.40
		Btkny	18-32	Clay loam	1.40	1.45	1.50
		BCk	32-47	Clay loam	1.30	1.40	1.50
		C	47-79	Clay	1.35	1.45	1.50

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes							
Dogtooth	55	E	0-2	Loam	1.40	1.50	1.60
		Btn	2-10	Clay loam	1.35	1.40	1.45
		Btnk	10-15	Clay loam	1.35	1.45	1.55
		Bkyz	15-28	Silty clay	1.40	1.45	1.50
		Cr	28-79	Bedrock			
Janesburg	33	A	0-7	Silt loam	1.20	1.25	1.30
		E	7-9	Silt loam	1.40	1.45	1.50
		Btn	9-16	Silty clay loam	1.35	1.40	1.45
		Btnk	16-25	Silty clay	1.35	1.40	1.45
		BCkyz	25-32	Silty clay	1.40	1.45	1.50
		Cr	32-79	Bedrock			
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes							
Dogtooth	35	E	0-2	Loam	1.40	1.50	1.60
		Btn	2-8	Clay loam	1.35	1.40	1.45
		Btnk	8-13	Clay loam	1.35	1.45	1.55
		Bkyz	13-21	Silty clay	1.40	1.45	1.50
		Cr	21-79	Bedrock			
Janesburg	25	A	0-6	Silty clay loam	1.25	1.35	1.40
		E	6-8	Silt loam	1.40	1.45	1.50
		Btn	8-14	Silty clay loam	1.35	1.40	1.45
		Btnk	14-21	Silty clay	1.35	1.40	1.45
		BCkyz	21-26	Silty clay	1.40	1.45	1.50
		Cr	26-79	Bedrock			
Cabba	22	A	0-3	Loam	1.25	1.30	1.45
		Bk	3-8	Silt loam	1.30	1.40	1.50
		C	8-12	Silt loam	1.40	1.45	1.50
		Cr	12-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes							
Vebar	50	Ap	0-6	Fine sandy loam	1.30	1.40	1.50
		Bw1	6-11	Fine sandy loam	1.35	1.45	1.55
		Bw2	11-17	Fine sandy loam	1.45	1.50	1.55
		Bk	17-29	Fine sandy loam	1.45	1.55	1.60
		Cr	29-79	Bedrock			
Cohagen	25	Ap	0-6	Fine sandy loam	1.40	1.50	1.60
		C	6-17	Fine sandy loam	1.40	1.50	1.60
		Cr	17-79	Bedrock			
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes							
Vebar	40	A	0-6	Fine sandy loam	1.30	1.40	1.50
		Bw1	6-11	Fine sandy loam	1.35	1.45	1.55
		Bw2	11-17	Fine sandy loam	1.45	1.50	1.55
		Bk	17-29	Fine sandy loam	1.45	1.55	1.60
		Cr	29-79	Bedrock			
Flasher	30	A	0-5	Loamy fine sand	1.35	1.40	1.60
		AC	5-10	Loamy fine sand	1.40	1.45	1.60
		C	10-15	Loamy fine sand	1.45	1.50	1.60
		Cr	15-79	Bedrock			
Tally	18	A	0-6	Fine sandy loam	1.45	1.50	1.55
		Bw1	6-12	Fine sandy loam	1.45	1.50	1.55
		Bw2	12-18	Fine sandy loam	1.45	1.50	1.55
		Bk	18-33	Fine sandy loam	1.50	1.55	1.60
		C	33-70	Fine sandy loam	1.50	1.55	1.60
		Cr	70-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes							
Beisigl	40	A	0-5	Loamy fine sand	1.35	1.45	1.55
		Bk	5-27	Loamy fine sand	1.30	1.50	1.70
		Cr	27-60	Bedrock	1.45	1.58	1.70
Flasher	26	A	0-6	Loamy fine sand	1.35	1.45	1.55
		AC	6-10	Loamy fine sand	1.35	1.45	1.55
		Cr	10-60	Bedrock	1.45	1.58	1.70
Telfer	15	A	0-6	Loamy fine sand	1.35	1.45	1.55
		C	6-60	Fine sand	1.40	1.55	1.70
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes							
Flasher	36	A	0-3	Loamy fine sand	1.35	1.40	1.60
		AC	3-9	Loamy fine sand	1.40	1.45	1.60
		C	9-14	Loamy fine sand	1.45	1.50	1.60
		Cr	14-79	Bedrock			
Vebar	22	A	0-5	Fine sandy loam	1.30	1.40	1.50
		Bw1	5-10	Fine sandy loam	1.35	1.45	1.55
		Bw2	10-13	Fine sandy loam	1.45	1.50	1.55
		Bk	13-26	Fine sandy loam	1.45	1.55	1.60
		Cr	26-79	Bedrock			
Parshall	15	A	0-9	Fine sandy loam	1.35	1.45	1.55
		Bw1	9-25	Fine sandy loam	1.40	1.50	1.60
		Bw2	25-35	Fine sandy loam	1.40	1.50	1.60
		Bk	35-42	Fine sandy loam	1.50	1.55	1.65
		C	42-79	Fine sandy loam	1.50	1.55	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes							
Lihen	60	Ap	0-9	Loamy fine sand	1.35	1.45	1.55
		A	9-24	Loamy sand	1.35	1.45	1.55
		Bk	24-32	Sand	1.35	1.45	1.55
		C	32-60	Sand	1.40	1.50	1.60
Parshall	20	Ap	0-7	Fine sandy loam	1.30	1.40	1.50
		A	7-12	Fine sandy loam	1.30	1.40	1.50
		Bw	12-29	Fine sandy loam	1.30	1.45	1.60
		Bk	29-48	Fine sandy loam	1.40	1.50	1.60
		BCk	48-60	Loamy fine sand	1.40	1.50	1.60
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes							
Cabba	41	A	0-3	Loam	1.30	1.40	1.50
		Bk	3-8	Silt loam	1.35	1.40	1.50
		C	8-12	Silt loam	1.40	1.50	1.55
		Cr	12-79	Bedrock			
Chama	27	A	0-4	Loam	1.00	1.20	1.40
		Bw	4-7	Loam	1.10	1.20	1.40
		Bk	7-18	Silt loam	1.15	1.35	1.45
		BCk	18-28	Silt loam	1.25	1.40	1.60
		Cr	28-79	Bedrock			
Shambo	15	A	0-6	Loam	1.00	1.30	1.40
		Bw1	6-11	Loam	1.20	1.30	1.40
		Bw2	11-24	Loam	1.20	1.30	1.40
		Bk	24-38	Loam	1.20	1.40	1.50
		BCk	38-44	Loam	1.20	1.40	1.50
		C	44-71	Loam	1.30	1.50	1.60
		Cr	71-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes							
Arikara	33	Oi	0-1	Slightly decomposed plant material	0.02	0.05	0.15
		A	1-2	Loam	1.00	1.10	1.20
		Bw	2-14	Loam	1.20	1.30	1.40
		Bk	14-39	Loam	1.20	1.30	1.40
		C	39-60	Loam	1.15	1.25	1.35
Cabba	18	A	0-3	Loam	1.30	1.40	1.50
		Bk	3-15	Loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Shambo, steep	17	A	0-9	Loam	1.00	1.15	1.30
		Bw1	9-13	Loam	1.20	1.35	1.50
		Bw2	13-29	Loam	1.20	1.35	1.50
		Bk	29-48	Loam	1.20	1.35	1.50
		C	48-60	Loam	1.20	1.35	1.50
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes							
Chama	43	Ap	0-4	Silt loam	1.10	1.23	1.35
		Bw	4-8	Silt loam	1.20	1.35	1.50
		Bk	8-34	Silt loam	1.20	1.35	1.50
		Cr	34-60	Bedrock	1.40	1.53	1.65
Cabba	28	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Sen	18	Ap	0-6	Silt loam	1.00	1.15	1.30
		Bw	6-17	Silt loam	1.20	1.30	1.40
		Bk	17-34	Silt loam	1.40	1.50	1.60
		Cr	34-60	Bedrock	1.40	1.53	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes							
Cabba	42	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Chama	26	A	0-4	Silt loam	1.10	1.23	1.35
		Bw	4-8	Silt loam	1.20	1.35	1.50
		Bk	8-34	Silt loam	1.20	1.35	1.50
		Cr	34-60	Bedrock	1.40	1.53	1.65
Sen	16	A	0-6	Silt loam	1.00	1.15	1.30
		Bw	6-17	Silt loam	1.20	1.30	1.40
		Bk	17-34	Silt loam	1.40	1.50	1.60
		Cr	34-60	Bedrock	1.40	1.53	1.65
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes							
Chama	44	Ap	0-4	Silt loam	1.10	1.23	1.35
		Bw	4-8	Silt loam	1.20	1.35	1.50
		Bk	8-34	Silt loam	1.20	1.35	1.50
		Cr	34-60	Bedrock	1.40	1.53	1.65
Sen	25	Ap	0-6	Silt loam	1.00	1.15	1.30
		Bw	6-17	Silt loam	1.20	1.30	1.40
		Bk	17-34	Silt loam	1.40	1.50	1.60
		Cr	34-60	Bedrock	1.40	1.53	1.65
Cabba	15	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
E3107F—Cabba-Badland complex, 6 to 70 percent slopes							
Cabba	46	A	0-3	Loam	1.30	1.40	1.50
		Bk	3-15	Loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Badland	36	A	0-2	Silt loam	1.30	1.40	1.50
		Cr	2-60	Bedrock	1.40	1.53	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes							
Cabba	30	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Cherry	26	A	0-3	Silt loam	1.15	1.25	1.35
		Bw	3-33	Silty clay loam	1.20	1.40	1.60
		C	33-60	Silty clay loam	1.40	1.55	1.70
Cherry	18	A	0-3	Silt loam	1.15	1.25	1.35
		Bw	3-33	Silty clay loam	1.20	1.40	1.60
		C	33-60	Silty clay loam	1.40	1.55	1.70
E3541B—Williams-Zahl loams, 3 to 6 percent slopes							
Williams	50	Ap	0-6	Loam	1.00	1.20	1.40
		Bt1	6-10	Clay loam	1.20	1.30	1.40
		Bt2	10-15	Clay loam	1.20	1.30	1.40
		Btk	15-24	Clay loam	1.20	1.30	1.50
		Bk	24-36	Clay loam	1.30	1.40	1.50
		C	36-60	Clay loam	1.30	1.40	1.50
Zahl	27	Ap	0-5	Loam	1.10	1.25	1.40
		Bk	5-20	Clay loam	1.30	1.40	1.50
		C	20-60	Clay loam	1.30	1.40	1.50

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes							
Zahl	30	A	0-5	Loam	1.10	1.25	1.40
		Bk	5-20	Clay loam	1.30	1.40	1.50
		C	20-60	Clay loam	1.30	1.40	1.50
Cabba	24	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Maschetah, strongly sloping	12	A	0-7	Silt loam	1.10	1.20	1.30
		Bk	7-48	Silt loam	1.20	1.30	1.40
		C	48-90	Silty clay loam	1.25	1.35	1.45
Maschetah, gently sloping	10	Ap	0-7	Silt loam	1.10	1.20	1.30
		Bk	7-48	Silt loam	1.20	1.30	1.40
		C	48-90	Silty clay loam	1.25	1.35	1.45
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes							
Zahl	32	A	0-5	Loam	1.10	1.25	1.40
		Bk	5-20	Clay loam	1.30	1.40	1.50
		C	20-60	Clay loam	1.30	1.40	1.50
Cabba	26	A	0-3	Silt loam	1.30	1.40	1.50
		Bk	3-15	Silt loam	1.30	1.40	1.50
		Cr	15-60	Bedrock	1.40	1.53	1.65
Williams	20	A	0-6	Loam	1.00	1.20	1.40
		Bt1	6-10	Clay loam	1.20	1.30	1.40
		Bt2	10-15	Clay loam	1.20	1.30	1.40
		Btk	15-24	Clay loam	1.20	1.30	1.50
		Bk	24-36	Clay loam	1.30	1.40	1.50
		C	36-60	Clay loam	1.30	1.40	1.50

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes							
Manning	30	A	0-5	Fine sandy loam	1.20	1.35	1.50
		Bw	5-18	Fine sandy loam	1.30	1.40	1.55
		Bk	18-25	Fine sandy loam	1.35	1.45	1.55
		2C	25-60	Extremely gravelly loamy coarse sand	1.50	1.60	1.70
Schaller	25	A	0-9	Sandy loam	1.20	1.35	1.50
		Bk	9-15	Fine sandy loam	1.35	1.45	1.55
		C	15-60	Gravelly loamy coarse sand	1.50	1.60	1.70
Wabek	20	A	0-5	Loam	1.10	1.20	1.30
		Bk	5-10	Gravelly coarse sandy loam	1.35	1.45	1.60
		C	10-60	Very gravelly coarse sand	1.40	1.55	1.70
E4729A—Heil silty clay loam, 0 to 1 percent slopes							
Heil	84	E	0-3	Silty clay loam	1.00	1.20	1.40
		Btn	3-24	Silty clay	1.20	1.38	1.55
		Bg	24-38	Silty clay	1.30	1.45	1.60
		Byg	38-52	Silty clay	1.30	1.45	1.60
		Cg	52-60	Silty clay	1.30	1.45	1.60
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes							
Maltese	45	A	0-3	Silt loam	1.30	1.40	1.45
		E	3-5	Silt loam	1.35	1.45	1.50
		Btn	5-17	Silty clay loam	1.45	1.55	1.65
		Btkn	17-26	Silty clay loam	1.45	1.55	1.65
		Btkny	26-36	Silty clay loam	1.50	1.60	1.70
		BCy	36-43	Silty clay loam	1.50	1.60	1.70
		C	43-79	Silty clay loam	1.45	1.55	1.65
Gerda	35	E	0-2	Loam	1.35	1.45	1.50
		Btn	2-7	Silty clay loam	1.45	1.55	1.65
		Btkny	7-19	Silty clay loam	1.45	1.55	1.65
		Bky	19-44	Silty clay loam	1.50	1.60	1.70
		C	44-79	Silt loam	1.45	1.55	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes							
Rhame	40	A	0-6	Fine sandy loam	1.30	1.40	1.50
		Bw1	6-12	Fine sandy loam	1.45	1.50	1.55
		Bw2	12-18	Fine sandy loam	1.50	1.50	1.55
		Bk	18-28	Fine sandy loam	1.45	1.55	1.65
		C	28-35	Fine sandy loam	1.45	1.55	1.60
		Cr	35-79	Bedrock			
Chinook	30	A	0-6	Fine sandy loam	1.35	1.40	1.50
		Bw1	6-14	Fine sandy loam	1.40	1.50	1.55
		Bw2	14-24	Fine sandy loam	1.45	1.50	1.55
		Bk	24-38	Fine sandy loam	1.50	1.55	1.60
		C	38-79	Fine sandy loam	1.50	1.50	1.55
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes							
Rhame	37	A	0-5	Fine sandy loam	1.30	1.40	1.50
		Bw1	5-9	Fine sandy loam	1.35	1.50	1.55
		Bw2	9-16	Fine sandy loam	1.40	1.50	1.60
		BCk	16-23	Fine sandy loam	1.45	1.55	1.65
		C	23-31	Fine sandy loam	1.45	1.55	1.60
		Cr	31-79	Bedrock			
Fleak	34	A	0-5	Loamy fine sand	1.45	1.50	1.60
		C	5-14	Loamy fine sand	1.45	1.50	1.55
		Cr	14-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes							
Rhame	32	A	0-6	Fine sandy loam	1.30	1.40	1.50
		Bw1	6-10	Fine sandy loam	1.35	1.50	1.55
		Bw2	10-16	Fine sandy loam	1.40	1.50	1.60
		BCk	16-23	Fine sandy loam	1.45	1.55	1.65
		C	23-31	Fine sandy loam	1.45	1.55	1.60
		Cr	31-79	Bedrock			
Arikara, low precipitation	25	Oi	0-1	Slightly decomposed plant material	0.20	0.25	0.30
		A	1-6	Loam	0.90	1.05	1.15
		Bt	6-12	Clay loam	1.30	1.45	1.55
		Btk	12-22	Clay loam	1.30	1.45	1.55
		Bk	22-39	Loam	1.35	1.50	1.55
		C	39-61	Loam	1.40	1.45	1.50
		2Cr	61-79	Bedrock			
Fleak	21	A	0-5	Loamy fine sand	1.45	1.50	1.60
		C	5-14	Loamy fine sand	1.45	1.50	1.55
		Cr	14-79	Bedrock			
L2145A—Kremlin loam, 0 to 2 percent slopes							
Kremlin	85	Ap	0-6	Loam	1.30	1.45	1.55
		Bw1	6-12	Loam	1.30	1.35	1.45
		Bw2	12-21	Loam	1.35	1.40	1.45
		Bk	21-38	Loam	1.40	1.50	1.55
		C	38-79	Loam	1.35	1.50	1.60

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes							
Rhame	40	A	0-8	Fine sandy loam	1.10	1.30	1.50
		Bw	8-19	Fine sandy loam	1.10	1.30	1.50
		C	19-34	Fine sandy loam	1.10	1.30	1.50
		Cr	34-79	Bedrock	1.45	1.58	1.70
Bullock	22	E	0-4	Fine sandy loam	1.35	1.48	1.60
		Btn	4-10	Sandy clay loam	1.50	1.65	1.80
		Bkyz	10-15	Loam	1.35	1.50	1.65
		BCyz	15-23	Fine sandy loam	1.40	1.50	1.60
		Cr	23-60	Bedrock	1.45	1.58	1.70
Kremlin	15	A	0-11	Loam	1.15	1.25	1.35
		Bw	11-19	Loam	1.25	1.35	1.45
		Bk	19-60	Loam	1.30	1.42	1.55
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes							
Scairt	30	E	0-2	Silt loam	1.10	1.20	1.30
		Btn	2-6	Silty clay	1.20	1.30	1.40
		Btnz	6-13	Silty clay loam	1.20	1.40	1.50
		Bkz	13-22	Silty clay loam	1.20	1.40	1.50
		BCy	22-28	Silty clay loam	1.20	1.40	1.50
		Cr	28-60	Bedrock	1.40	1.50	1.60
Maltese	20	A	0-7	Silt loam	1.00	1.10	1.20
		E	7-10	Silt loam	1.20	1.30	1.40
		Btn	10-16	Silty clay	1.20	1.30	1.40
		Btkn	16-20	Silty clay	1.30	1.40	1.45
		Btkny	20-33	Silty clay loam	1.30	1.40	1.45
		BCy	33-60	Silty clay loam	1.30	1.40	1.45
Boxwell	15	A	0-5	Loam	1.20	1.30	1.40
		Bw	5-14	Loam	1.30	1.40	1.50
		Bk	14-28	Loam	1.30	1.40	1.50
		Cr	28-79	Bedrock	1.40	1.53	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes							
Rhame	40	A	0-8	Fine sandy loam	1.10	1.30	1.50
		Bw	8-19	Fine sandy loam	1.10	1.30	1.50
		C	19-34	Fine sandy loam	1.10	1.30	1.50
		Cr	34-79	Bedrock	1.45	1.58	1.70
Kremlin	25	A	0-11	Loam	1.15	1.25	1.35
		Bw	11-19	Loam	1.25	1.35	1.45
		Bk	19-60	Loam	1.30	1.42	1.55
Archin	15	A	0-4	Fine sandy loam	1.35	1.50	1.65
		E	4-6	Loam	1.35	1.48	1.60
		Btn	6-17	Loam	1.35	1.50	1.65
		Bkyz	17-28	Loam	1.35	1.50	1.65
		C	28-60	Loam	1.40	1.50	1.60
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped							
Cabbart	29	A	0-3	Loam	1.00	1.10	1.20
		Bk	3-18	Loam	1.10	1.20	1.30
		Cr	18-79	Bedrock	1.40	1.53	1.65
Kremlin	19	A	0-11	Loam	1.15	1.25	1.35
		Bw	11-19	Loam	1.25	1.35	1.45
		Bk	19-60	Loam	1.30	1.42	1.55
Boxwell	17	A	0-5	Loam	1.20	1.30	1.40
		Bw	5-14	Loam	1.30	1.40	1.50
		Bk	14-28	Loam	1.30	1.40	1.50
		Cr	28-79	Bedrock	1.40	1.53	1.65

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes							
Boxwell	36	A	0-5	Loam	1.35	1.40	1.50
		Bw1	5-8	Loam	1.30	1.35	1.40
		Bw2	8-14	Loam	1.30	1.35	1.45
		Bk	14-24	Loam	1.40	1.45	1.50
		Cr	24-79	Bedrock			
Cabbart	29	A	0-4	Silt loam	1.25	1.30	1.35
		BC	4-11	Silt loam	1.40	1.50	1.55
		C	11-18	Silt loam	1.40	1.45	1.50
		Cr	18-79	Bedrock			
Arikara, low precipitation	16	Oi	0-1	Slightly decomposed plant material	0.20	0.25	0.30
		A	1-6	Loam	0.90	1.05	1.15
		Bt	6-12	Clay loam	1.30	1.45	1.55
		Btk	12-22	Clay loam	1.30	1.45	1.55
		Bk	22-39	Loam	1.35	1.50	1.55
		C	39-61	Loam	1.40	1.45	1.50
		2Cr	61-79	Bedrock			
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes							
Boxwell	63	Ap	0-6	Loam	1.40	1.45	1.55
		Bw	6-14	Loam	1.30	1.35	1.45
		Bk	14-29	Loam	1.40	1.45	1.50
		Cr	29-79	Bedrock			
Kremlin	25	Ap	0-6	Loam	1.30	1.45	1.55
		Bw1	6-12	Loam	1.30	1.40	1.45
		Bw2	12-21	Loam	1.35	1.40	1.45
		Bk	21-38	Loam	1.40	1.50	1.55
		C	38-79	Loam	1.35	1.50	1.60

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes							
Boxwell	46	A	0-5	Loam	1.25	1.40	1.50
		Bw1	5-8	Loam	1.30	1.40	1.50
		Bw2	8-13	Loam	1.35	1.40	1.50
		Bk	13-24	Loam	1.35	1.45	1.55
		Cr	24-79	Bedrock			
Kremlin	32	A	0-7	Loam	1.20	1.30	1.45
		Bw1	7-12	Loam	1.20	1.35	1.40
		Bw2	12-18	Loam	1.20	1.40	1.50
		Bk	18-35	Loam	1.20	1.45	1.50
		C	35-71	Loam	1.30	1.50	1.60
		Cr	71-79	Bedrock			
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes							
Kirby, channery loam	38	A	0-5	Channery loam	1.15	1.30	1.45
		Bk	5-14	Extremely channery loam	1.30	1.45	1.50
		2C	14-79	Channers	1.55	1.60	1.60
Badland	25	C	0-2	Silt loam	1.40	1.45	1.50
		Cr	2-79	Bedrock			
Patent, badland fan	20	A	0-3	Loam	1.05	1.20	1.40
		AC	3-7	Loam	1.25	1.35	1.45
		C	7-79	Loam	1.35	1.45	1.55
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes							
Kirby, channery loam	50	A	0-4	Channery loam	1.30	1.45	1.60
		Bk	4-12	Very channery loam	1.45	1.55	1.65
		2C	12-60	Channers	1.00	1.15	1.30
Scairt	15	E	0-2	Silt loam	1.10	1.20	1.30
		Btn	2-6	Silty clay	1.20	1.30	1.40
		Btnz	6-13	Silty clay loam	1.20	1.40	1.50
		Bkz	13-22	Silty clay loam	1.20	1.40	1.50
		BCy	22-28	Silty clay loam	1.20	1.40	1.50
		Cr	28-60	Bedrock	1.40	1.50	1.60

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes							
Badland	60	C	0-2	Silt loam	1.40	1.45	1.55
		Cr	2-79	Bedrock			
Cabbart	30	A	0-2	Loam	1.30	1.40	1.50
		BC	2-10	Loam	1.35	1.45	1.55
		C	10-14	Silt loam	1.40	1.45	1.55
		Cr	14-79	Bedrock			
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes							
Cabbart	50	A	0-2	Loam	1.30	1.40	1.50
		BC	2-10	Loam	1.35	1.45	1.55
		C	10-14	Silt loam	1.40	1.45	1.55
		Cr	14-79	Bedrock			
Badland	25	C	0-2	Silt loam	1.40	1.45	1.55
		Cr	2-79	Bedrock			
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes							
Lonna	43	A	0-3	Silt loam	1.10	1.20	1.35
		Bw	3-11	Silt loam	1.30	1.35	1.40
		Bk	11-34	Silty clay loam	1.35	1.40	1.50
		C	34-79	Silt loam	1.35	1.40	1.45
Cabbart	32	A	0-4	Silt loam	1.25	1.30	1.35
		BC	4-11	Silt loam	1.40	1.50	1.55
		C	11-18	Silt loam	1.40	1.45	1.50
		Cr	18-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes							
Patent, badland fan	35	A	0-4	Loam	1.05	1.15	1.35
		AC	4-13	Loam	1.25	1.30	1.45
		C	13-79	Loam	1.35	1.45	1.50
Badland	20	C	0-2	Silt loam	1.40	1.45	1.55
		Cr	2-79	Bedrock			
Cabbart	20	A	0-2	Loam	1.30	1.40	1.50
		BC	2-10	Loam	1.35	1.45	1.55
		C	10-14	Silt loam	1.40	1.45	1.55
		Cr	14-79	Bedrock			
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes							
Badland	30	C	0-2	Silt loam	1.40	1.45	1.50
		Cr	2-79	Bedrock			
Arikara, low precipitation	27	Oi	0-1	Slightly decomposed plant material	0.20	0.25	0.30
		A	1-2	Loam	0.90	1.05	1.15
		Bw	2-14	Loam	1.30	1.40	1.50
		Bk	14-39	Loam	1.30	1.40	1.50
		C	39-61	Loam	1.40	1.45	1.50
		2Cr	61-79	Bedrock			
Cabbart	17	A	0-4	Silt loam	1.25	1.30	1.35
		BC	4-11	Silt loam	1.40	1.50	1.55
		C	11-18	Silt loam	1.40	1.45	1.50
		Cr	18-79	Bedrock			
L3197F—Badland, 9 to 150 percent slopes							
Badland	88	C	0-2	Silt loam	1.40	1.45	1.55
		Cr	2-79	Bedrock			

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes							
Arikara, low precipitation	62	Oi	0-1	Slightly decomposed plant material	0.20	0.25	0.30
		A	1-6	Loam	0.90	1.05	1.15
		Bt	6-12	Clay loam	1.30	1.45	1.55
		Btk	12-22	Clay loam	1.30	1.45	1.55
		Bk	22-39	Loam	1.35	1.50	1.55
		C	39-61	Loam	1.40	1.45	1.50
		2Cr	61-79	Bedrock			
Cabbart	19	A	0-4	Loam	1.15	1.35	1.50
		BC	4-11	Loam	1.35	1.45	1.55
		C	11-18	Silt loam	1.40	1.45	1.50
		Cr	18-79	Bedrock			
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes							
Patent, occasionally flooded	35	AC	0-7	Loam	1.10	1.25	1.40
		C	7-60	Loam	1.20	1.40	1.60
Patent, gullied, occasionally flooded	20	AC	0-1	Loam	1.10	1.25	1.40
		C	1-60	Loam	1.20	1.40	1.60
Glendive, frequently flooded	15	A	0-5	Fine sandy loam	1.40	1.50	1.60
		C1	5-16	Loam	1.30	1.40	1.50
		C2	16-60	Fine sandy loam	1.30	1.40	1.50
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded							
Patent, occasionally flooded	80	AC	0-7	Loam	1.10	1.25	1.40
		C	7-60	Loam	1.20	1.40	1.60

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes							
Patent, occasionally flooded	40	AC	0-7	Loam	1.10	1.25	1.40
		C	7-60	Loam	1.20	1.40	1.60
Vanda	25	A	0-4	Silty clay	1.25	1.35	1.45
		Byz	4-60	Clay	1.30	1.40	1.50
Gerda, severely eroded	15	E	0-0	Loam	1.10	1.20	1.30
		Btn	0-6	Silty clay	1.20	1.30	1.40
		Btkny	6-13	Silty clay	1.25	1.40	1.50
		Bkyz	13-44	Silty clay loam	1.30	1.40	1.50
		C	44-80	Silty clay loam	1.30	1.40	1.45
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes							
Kremlin	25	Ap	0-11	Loam	1.15	1.25	1.35
		Bw	11-19	Loam	1.25	1.35	1.45
		Bk	19-60	Loam	1.30	1.42	1.55
Ethridge	22	Ap	0-3	Silt loam	1.10	1.20	1.30
		Bt	3-10	Silty clay loam	1.30	1.40	1.50
		Btk	10-23	Silty clay loam	1.30	1.40	1.50
		Bk	23-38	Silty clay loam	1.30	1.40	1.50
		Bky	38-60	Silt loam	1.30	1.40	1.50
Gerda	20	E	0-2	Loam	1.10	1.20	1.30
		Btn	2-11	Silty clay	1.20	1.30	1.40
		Btkny	11-19	Silty clay	1.25	1.40	1.50
		Bky	19-29	Silty clay loam	1.30	1.40	1.50
		Bk	29-44	Silty clay	1.30	1.40	1.50
		C	44-80	Silt loam	1.30	1.40	1.50

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded							
Wolf point, occasionally flooded	85	A1	0-1	Silty clay loam	1.20	1.30	1.40
		A2	1-10	Clay	1.20	1.30	1.40
		C	10-60	Silty clay	1.20	1.30	1.40
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded							
Wolf point, wooded, occasionally flooded	78	A1	0-1	Silty clay loam	1.20	1.30	1.40
		A2	1-10	Clay	1.20	1.30	1.40
		C	10-60	Silty clay	1.20	1.30	1.40
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded							
Havre, occasionally flooded	82	Ap	0-7	Silt loam	1.40	1.45	1.50
		C1	7-18	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50
		C2	18-32	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50
		Ab	32-36	Loam	1.40	1.45	1.50
		C3	36-79	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded							
Havre, rarely flooded, mollic	86	Ap	0-7	Loam	1.30	1.45	1.55
		C1	7-18	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50
		C2	18-32	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50
		Ab	32-36	Loam	1.40	1.45	1.50
		C3	36-79	Stratified fine sandy loam to silty clay loam	1.40	1.45	1.50

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded							
Glendive, channeled, frequently flooded	40	A	0-5	Fine sandy loam	1.35	1.40	1.50
		C1	5-24	Stratified fine sandy loam to loam to silt loam	1.40	1.50	1.60
		C2	24-43	Stratified fine sandy loam to loam to silt loam	1.45	1.50	1.60
		Cg	43-79	Stratified sand to fine sand to loamy sand to loamy fine sand to sandy loam to fine sandy loam	1.55	1.60	1.65
Fluvaquents, channeled, frequently flooded	30	Ag	0-5	Fine sandy loam	1.40	1.45	1.50
		Cg	5-79	Stratified loamy sand to loamy fine sand to sandy loam to fine sandy loam to loam to silt loam to sandy clay loam	1.40	1.60	1.70
Havre, channeled, frequently flooded	20	A	0-6	Loam	1.25	1.35	1.45
		C1	6-22	Stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam	1.35	1.45	1.50
		Ab	22-25	Loam	1.25	1.35	1.45
		C2	25-45	Stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam	1.40	1.45	1.50
		Cg	45-79	Stratified fine sandy loam to loam to silt loam to sandy clay loam to clay loam to silty clay loam	1.40	1.50	1.55

Soil Health - Bulk Density and Texture–McKenzie County, North Dakota							
Map symbol and soil name	**Pct. of map unit**	**Horizon name**	**Depth (inches)**	**USDA texture - RV**	**Bulk density 1/3 bar low (g/cm3)**	**Bulk density 1/3 bar RV (g/cm3)**	**Bulk density 1/3 bar high (g/cm3)**
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded							
Glendive, occasionally flooded	75	Ap	0-7	Fine sandy loam	1.50	1.55	1.60
		C1	7-15	Stratified fine sandy loam to loam to silt loam	1.45	1.50	1.60
		C2	15-46	Stratified fine sandy loam to loam to silt loam	1.45	1.50	1.55
		C3	46-79	Stratified sand to fine sand to loamy sand to loamy fine sand to fine sandy loam	1.55	1.60	1.65
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded							
Hanly, occasionally flooded	80	A	0-4	Fine sandy loam	1.35	1.40	1.45
		C1	4-44	Stratified fine sand to loamy sand to loamy fine sand to sandy loam to fine sandy loam to loam	1.45	1.50	1.60
		C2	44-79	Stratified fine sand to loamy sand to loamy fine sand	1.55	1.60	1.65
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes							
Tinsley	53	A	0-4	Gravelly sandy loam	1.30	1.40	1.50
		AC	4-11	Gravelly coarse sandy loam	1.35	1.45	1.60
		C	11-60	Extremely gravelly loamy sand	1.45	1.55	1.65
Chanta	17	A	0-6	Loam	1.20	1.30	1.40
		Bw1	6-22	Loam	1.20	1.30	1.40
		Bw2	22-26	Sandy loam	1.30	1.40	1.50
		2C	26-60	Cobbly sand	1.40	1.55	1.70
L4999—Water							
Water	100		—				

Soil Health - Compaction, Surface Sealing

Soil health is primarily influenced by human management, which is not captured in soil survey data at this time. These interpretations provide information on inherent soil properties that influence our ability to build healthy soils through management.

The ratings are both verbal and numerical. Numerical ratings indicate the propensity of individual soil properties to influence specific aspects of soil health management. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest ability to enhance soil health (1.00) and the point at which the soil feature becomes least likely to enhance soil health (0.00).

The ratings for*soil susceptibility to compaction* are based on soil properties in the upper 12 inches of soil. Factors considered are soil texture, soil organic matter content, soil structure, rock fragment content, and the existing bulk density. Each of these factors contributes to the soil's ability to resist compaction. Rating class terms indicate the potential for soil compaction. "Low" indicates that the potential for compaction is insignificant. Soils with a low rating can support standard equipment with minimal compaction. These soils are moisture insensitive, exhibiting only small changes in density with changing moisture content. "Medium" indicates that the potential for compaction is significant. The growth rate of seedlings may be reduced following compaction. After the initial compaction (i.e., the first pass of equipment), soils with a medium rating are able to support standard equipment with only minimal increases in soil density. These soils are intermediate between moisture insensitive and moisture sensitive. "High" indicates that the potential for compaction is significant. The growth rate of seedlings will be reduced following compaction. After initial compaction, soils with a high rating are still able to support standard equipment but will continue to compact with each subsequent pass. These soils are moisture sensitive, exhibiting large changes in density with changing moisture content.

The ratings for*soil susceptibility to surface sealing* are based on soil properties at the soil surface. They are applicable to conditions or times when the soil surface, or any portion of it, is exposed to the impact of raindrops and there is significant rain or sprinkler irrigation. Soil surfaces that are void of vegetative, canopy, residue, litter, or duff cover are the most vulnerable to surface sealing. Factors considered are exchangeable sodium, a silt/crusting index, water dispersible clay, and organic matter. Rating class terms indicate the soil's inherent potential to form a surface seal. "Low" indicates that the soil has a low inherent susceptibility to form a surface seal. These soils are not likely to form a surface seal. "Moderate" indicates that the soil has a moderate inherent susceptibility to form a surface seal. The potential to form a surface seal is significant. "High" indicates that the soil has a high susceptibility to form a surface seal. The inherent soil properties are highly conducive to forming a surface seal. Management that protects the soil from raindrop impact and minimizes soil disturbance helps prevent surface sealing. Plant and mulch cover can shield the soil from raindrop impact and so reduce sealing in otherwise susceptible soils. Soil management practices that increase organic matter content combined with the use of plant or residue cover for protection help prevent the formation of surface seals in most soils. Because tillage disrupts soil structure and aggregates, it accelerates the formation of seals. Management that minimizes soil disturbances and protects the soil from raindrop impact greatly increases infiltration and reduces runoff.

Report—Soil Health - Compaction, Surface Sealing

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top limitations for any given soil. The soil may have additional limitations]

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes					
Rhoades	55	High		Medium	
		High exchangeable sodium	1.00	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.20	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.13	Subaerial	1.00
		Moderate organic matter relative to clay	0.03	Organic matter content, 0-30 cm	0.89
				Soil structure grade, 0-12 inches	0.50
Daglum	33	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.65
				Soil structure grade, 0-12 inches	0.50

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes					
Dogtooth	55	Moderate		Medium	
		Moderate exchangeable sodium	0.43	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.27	Subaerial	1.00
		Moderate water dispersible clay	0.09	Organic matter content, 0-30 cm	0.89
				Soil structure grade, 0-12 inches	0.50
Janesburg	33	Moderate		Medium	
		Moderate silt/crusting potential	0.42	Soil texture, 0-12 inches	1.00
		Moderate water dispersible clay	0.07	Rock fragments, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.03	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.62

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes					
Dogtooth	35	Moderate		Medium	
		Moderate exchangeable sodium	0.33	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.26	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.21	Subaerial	1.00
		Moderate water dispersible clay	0.07	Organic matter content, 0-30 cm	0.93
				Bulk density-compactibility to 30cm	0.90
Janesburg	25	Moderate		Medium	
		Moderate organic matter relative to clay	0.30	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.26	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.15	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.69
Cabba	22	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes					
Vebar	50	Moderate		Medium	
		Moderate organic matter relative to clay	0.27	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.20	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.18	Subaerial	1.00
				Organic matter content, 0-30 cm	0.95
				Bulk density-compactibility to 30cm	0.84
Cohagen	25	Moderate		Medium	
		Moderate water dispersible clay	0.99	Rock fragments, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.99	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.31	Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.88

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes					
Vebar	40	Moderate		Medium	
		Moderate organic matter relative to clay	0.25	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.17	Subaerial	1.00
				Organic matter content, 0-30 cm	0.95
				Bulk density-compactibility to 30cm	0.78
Flasher	30	Moderate		Low	
		Moderate silt/crusting potential	0.11	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Tally	18	Moderate		Medium	
		Moderate silt/crusting potential	0.17	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.83
				Soil texture, 0-12 inches	0.50

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes					
Beisigl	40	Moderate		Low	
		Moderate silt/crusting potential	0.02	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Flasher	26	Moderate		Low	
		Moderate organic matter relative to clay	0.59	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.49	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.13	Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Telfer	15	Moderate		Low	
		Moderate silt/crusting potential	0.25	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes					
Flasher	36	Moderate		Low	
		Moderate water dispersible clay	0.28	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.07	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Vebar	22	Moderate		Medium	
		Moderate organic matter relative to clay	0.21	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.16	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.14	Subaerial	1.00
				Organic matter content, 0-30 cm	0.97
				Bulk density-compactibility to 30cm	0.84
Parshall	15	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.63
				Soil texture, 0-12 inches	0.50

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes					
Lihen	60	Moderate		Low	
		Moderate silt/crusting potential	0.25	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.89
Parshall	20	Moderate		Medium	
		Moderate silt/crusting potential	0.12	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.12	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.78

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes					
Cabba	41	Moderate		Medium	
		Moderate water dispersible clay	0.29	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.22	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.18	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Chama	27	Moderate		Medium	
		Moderate organic matter relative to clay	0.36	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.28	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.04	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Shambo	15	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.64

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes					
Arikara	33	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Cabba	18	Moderate		Medium	
		Moderate organic matter relative to clay	0.10	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.06	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.02	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Shambo, steep	17	Moderate		Medium	
		Moderate silt/crusting potential	0.12	Soil texture, 0-12 inches	1.00
		Moderate water dispersible clay	0.11	Rock fragments, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.02	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes					
Chama	43	Moderate		Medium	
		Moderate silt/crusting potential	0.68	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.56	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Cabba	28	Moderate		High	
		Moderate organic matter relative to clay	0.79	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.58	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.10	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Sen	18	Moderate		Medium	
		Moderate silt/crusting potential	0.60	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes					
Cabba	42	Moderate		High	
		Moderate organic matter relative to clay	0.73	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.53	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Chama	26	Moderate		Medium	
		Moderate silt/crusting potential	0.62	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.52	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Sen	16	Moderate		Medium	
		Moderate silt/crusting potential	0.55	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.31	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes					
Chama	44	Moderate		Medium	
		Moderate silt/crusting potential	0.68	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.56	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Sen	25	Moderate		Medium	
		Moderate silt/crusting potential	0.60	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Cabba	15	Moderate		High	
		Moderate organic matter relative to clay	0.79	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.58	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.10	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E3107F—Cabba-Badland complex, 6 to 70 percent slopes					
Cabba	46	Moderate		Medium	
		Moderate organic matter relative to clay	0.14	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.08	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.03	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Badland	36	Low		High	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes					
Cabba	30	Moderate		High	
		Moderate organic matter relative to clay	0.40	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.29	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.05	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Cherry	26	Moderate		High	
		Moderate organic matter relative to clay	0.65	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.57	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.02	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Cherry	18	Moderate		High	
		Moderate organic matter relative to clay	0.86	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.75	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.02	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E3541B—Williams-Zahl loams, 3 to 6 percent slopes					
Williams	50	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Zahl	27	Moderate		Medium	
		Moderate water dispersible clay	0.99	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.78	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.37	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes					
Zahl	30	Moderate		Medium	
		Moderate water dispersible clay	0.28	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.22	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.10	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Cabba	24	Moderate		High	
		Moderate organic matter relative to clay	0.15	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.11	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.02	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Maschetah, strongly sloping	12	Moderate		Medium	
		Moderate silt/crusting potential	0.57	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.32	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Maschetah, gently sloping	10	Moderate		Medium	
		Moderate silt/crusting potential	0.60	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.01	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes					
Zahl	32	Moderate		Medium	
		Moderate water dispersible clay	0.91	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.72	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.34	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Cabba	26	Moderate		High	
		Moderate organic matter relative to clay	0.73	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.53	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Williams	20	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes					
Manning	30	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.74
Schaller	25	Moderate		Medium	
		Moderate organic matter relative to clay	0.23	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.18	Soil structure grade, 0-12 inches	1.00
		Moderate water dispersible clay	0.11	Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.94
Wabek	20	Moderate		High	
		Moderate organic matter relative to clay	0.61	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.31	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
E4729A—Heil silty clay loam, 0 to 1 percent slopes					
Heil	84	Moderate		Medium	
		Moderate organic matter relative to clay	0.41	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.26	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.22	Subaerial	1.00
				Organic matter content, 0-30 cm	0.99
				Bulk density-compactibility to 30cm	0.67

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes					
Maltese	45	Moderate		Medium	
		Moderate silt/crusting potential	0.53	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.02	Subaerial	1.00
				Organic matter content, 0-30 cm	0.90
				Soil structure grade, 0-12 inches	0.50
Gerda	35	High		Low	
		High exchangeable sodium	1.00	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.45	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.30	Organic matter content, 0-30 cm	1.00
		Moderate water dispersible clay	0.10	Subaerial	1.00
				Soil structure grade, 0-12 inches	0.50
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes					
Rhame	40	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.83
				Bulk density-compactibility to 30cm	0.65
Chinook	30	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.72
				Bulk density-compactibility to 30cm	0.54

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes					
Rhame	37	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.88
				Bulk density-compactibility to 30cm	0.68
Fleak	34	Moderate		Low	
		Moderate silt/crusting potential	0.04	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes					
Rhame	32	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.85
				Bulk density-compactibility to 30cm	0.67
Arikara, low precipitation	25	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.38
Fleak	21	Moderate		Low	
		Moderate water dispersible clay	0.03	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.01	Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Soil structure grade, 0-12 inches	1.00
L2145A—Kremlin loam, 0 to 2 percent slopes					
Kremlin	85	Moderate		Medium	
		Moderate organic matter relative to clay	0.34	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.32	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.12	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.78

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes					
Rhame	40	Moderate		Medium	
		Moderate silt/crusting potential	0.09	Rock fragments, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.09	Soil structure grade, 0-12 inches	1.00
		Moderate water dispersible clay	0.07	Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.98
Bullock	22	Moderate		Medium	
		Moderate silt/crusting potential	0.42	Rock fragments, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Soil texture, 0-12 inches	0.50
				Soil structure grade, 0-12 inches	0.50
Kremlin	15	Moderate		Medium	
		Moderate organic matter relative to clay	0.60	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.24	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.14	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes					
Scairt	30	Moderate		Low	
		Moderate silt/crusting potential	0.42	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.32	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Subaerial	1.00
		Low exchangeable sodium	0.04	Organic matter content, 0-30 cm	0.83
				Soil structure grade, 0-12 inches	0.50
Maltese	20	Moderate		Medium	
		Moderate silt/crusting potential	0.37	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.28	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.08	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Boxwell	15	Moderate		Medium	
		Moderate organic matter relative to clay	0.82	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes					
Rhame	40	Moderate		Medium	
		Moderate organic matter relative to clay	0.26	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.15	Soil structure grade, 0-12 inches	1.00
		Moderate water dispersible clay	0.14	Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.98
Kremlin	25	Moderate		Medium	
		Moderate organic matter relative to clay	0.82	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Archin	15	Moderate		Medium	
		Moderate silt/crusting potential	0.38	Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped					
Cabbart	29	Moderate		High	
		Moderate exchangeable sodium	0.56	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.56	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.23	Soil structure grade, 0-12 inches	1.00
		Moderate water dispersible clay	0.11	Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Kremlin	19	Moderate		Medium	
		Moderate organic matter relative to clay	0.79	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.33	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Boxwell	17	Moderate		Medium	
		Moderate organic matter relative to clay	0.60	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.25	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.14	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes					
Boxwell	36	Moderate		Medium	
		Moderate organic matter relative to clay	0.14	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.12	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.05	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.81
Cabbart	29	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.93
Arikara, low precipitation	16	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.38

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes					
Boxwell	63	Moderate		Medium	
		Moderate organic matter relative to clay	0.34	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.30	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.13	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.83
Kremlin	25	Moderate		Medium	
		Moderate organic matter relative to clay	0.34	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.32	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.12	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.78
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes					
Boxwell	46	Moderate		Medium	
		Moderate organic matter relative to clay	0.31	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.27	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.12	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.90
Kremlin	32	Moderate		Medium	
		Moderate silt/crusting potential	0.34	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.31	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.76

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes					
Kirby, channery loam	38	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.74
				Bulk density-compactibility to 30cm	0.54
Badland	25	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Patent, badland fan	20	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.71

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes					
Kirby, channery loam	50	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Scairt	15	Moderate		Low	
		Moderate silt/crusting potential	0.35	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.26	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.08	Subaerial	1.00
		Low exchangeable sodium	0.04	Organic matter content, 0-30 cm	0.83
				Soil structure grade, 0-12 inches	0.50
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes					
Badland	60	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Cabbart	30	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes					
Cabbart	50	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Badland	25	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes					
Lonna	43	Moderate		Medium	
		Moderate silt/crusting potential	0.42	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.17	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.03	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.82
Cabbart	32	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.93

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes					
Patent, badland fan	35	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.72
Badland	20	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Cabbart	20	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes					
Badland	30	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Arikara, low precipitation	27	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.76
Cabbart	17	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.93
L3197F—Badland, 9 to 150 percent slopes					
Badland	88	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes					
Arikara, low precipitation	62	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.38
Cabbart	19	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.93

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes					
Patent, occasionally flooded	35	High		High	
		High water dispersible clay	1.00	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.87	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.36	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Patent, gullied, occasionally flooded	20	Low		Medium	
				Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
Glendive, frequently flooded	15	High		Medium	
		Low organic matter relative to clay	1.00	Soil texture, 0-12 inches	1.00
		High water dispersible clay	1.00	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.31	Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded					
Patent, occasionally flooded	80	High		High	
		High water dispersible clay	1.00	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.87	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.36	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes					
Patent, occasionally flooded	40	High		High	
		High water dispersible clay	1.00	Soil texture, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.87	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.36	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
Vanda	25	High		Medium	
		High exchangeable sodium	1.00	Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Soil texture, 0-12 inches	0.50
Gerda, severely eroded	15	Moderate		Medium	
		Moderate organic matter relative to clay	0.56	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.33	Subaerial	1.00
		Moderate water dispersible clay	0.18	Organic matter content, 0-30 cm	0.94
				Soil texture, 0-12 inches	0.50
				Soil structure grade, 0-12 inches	0.50

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes					
Kremlin	25	Moderate		Medium	
		Moderate organic matter relative to clay	0.87	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.36	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.21	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
Ethridge	22	Moderate		Medium	
		Moderate organic matter relative to clay	0.79	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.60	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.09	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.97
Gerda	20	Moderate		Medium	
		Moderate organic matter relative to clay	0.34	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.28	Subaerial	1.00
		Moderate water dispersible clay	0.18	Bulk density-compactibility to 30cm	0.71
				Organic matter content, 0-30 cm	0.69
				Soil texture, 0-12 inches	0.50
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded					
Wolf point, occasionally flooded	85	High		Medium	
		Low organic matter relative to clay	1.00	Rock fragments, 0-12 inches	1.00
		High water dispersible clay	1.00	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.52	Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.88

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded					
Wolf point, wooded, occasionally flooded	78	High		Medium	
		Low organic matter relative to clay	1.00	Rock fragments, 0-12 inches	1.00
		High water dispersible clay	1.00	Soil structure grade, 0-12 inches	1.00
		Moderate silt/crusting potential	0.52	Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.88
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded					
Havre, occasionally flooded	82	Moderate		Medium	
		Moderate organic matter relative to clay	0.70	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.65	Rock fragments, 0-12 inches	1.00
		Low exchangeable sodium	0.14	Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.98
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded					
Havre, rarely flooded, mollic	86	Moderate		Medium	
		Moderate silt/crusting potential	0.24	Soil texture, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Rock fragments, 0-12 inches	1.00
		Low exchangeable sodium	0.14	Soil structure grade, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.03	Subaerial	1.00
				Organic matter content, 0-30 cm	0.62

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded					
Glendive, channeled, frequently flooded	40	Moderate		Medium	
		Moderate exchangeable sodium	0.43	Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Subaerial	1.00
				Soil structure grade, 0-12 inches	1.00
				Organic matter content, 0-30 cm	0.76
Fluvaquents, channeled, frequently flooded	30	Moderate		Medium	
		Moderate silt/crusting potential	0.30	Rock fragments, 0-12 inches	1.00
		Low exchangeable sodium	0.14	Bulk density-compactibility to 30cm	1.00
				Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Soil structure grade, 0-12 inches	1.00
Havre, channeled, frequently flooded	20	Moderate		Medium	
		Moderate exchangeable sodium	0.43	Soil texture, 0-12 inches	1.00
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.67

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded					
Glendive, occasionally flooded	75	Moderate		Medium	
		Moderate organic matter relative to clay	0.27	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.25	Soil structure grade, 0-12 inches	1.00
		Moderate water dispersible clay	0.11	Subaerial	1.00
				Organic matter content, 0-30 cm	0.93
				Soil texture, 0-12 inches	0.50
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded					
Hanly, occasionally flooded	80	Low		Medium	
				Rock fragments, 0-12 inches	1.00
				Soil structure grade, 0-12 inches	1.00
				Subaerial	1.00
				Organic matter content, 0-30 cm	0.82
				Bulk density-compactibility to 30cm	0.62

Soil Health - Compaction, Surface Sealing–McKenzie County, North Dakota					
Map symbol and soil name	Pct. of map unit	Soil Susceptibility to Surface Sealing		Soil Susceptibilty to Compaction	
		Rating class and limiting features	Value	Rating class and limiting features	Value
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes					
Tinsley	53	Moderate		Medium	
		Moderate water dispersible clay	0.28	Rock fragments, 0-12 inches	1.00
		Moderate silt/crusting potential	0.17	Soil structure grade, 0-12 inches	1.00
		Moderate organic matter relative to clay	0.14	Organic matter content, 0-30 cm	1.00
				Subaerial	1.00
				Bulk density-compactibility to 30cm	0.99
Chanta	17	Moderate		Medium	
		Moderate organic matter relative to clay	0.82	Soil texture, 0-12 inches	1.00
		Moderate silt/crusting potential	0.34	Rock fragments, 0-12 inches	1.00
		Moderate water dispersible clay	0.19	Soil structure grade, 0-12 inches	1.00
				Bulk density-compactibility to 30cm	1.00
				Subaerial	1.00
L4999—Water					
Water	100	Not rated		Not rated	

Soil Health - Organic Matter

Organic matter percent is the weight of decomposed plant, animal, and microbial residues exclusive of non-decomposed plant and animal residues. It is expressed as a percentage, by weight, of the soil material that is less than 2 mm in diameter.

Significance

Soil organic matter (SOM) influences the physical, chemical, and biological properties of soils far more than suggested by its relatively small proportion in most soils. The organic fraction influences plant growth through its influence on these soil properties. It encourages soil aggregation, especially macroaggregation, increases porosity, and lowers bulk density. Because the soil structure is improved, water infiltration rates increase. SOM has a high capacity to adsorb and exchange cations and is important to pesticide binding. It furnishes energy to microorganisms in the soil. As SOM is decomposed by soil microbes, it releases nitrogen, phosphorous, sulfur, and many micronutrients, which become available for plant growth. SOM is a heterogeneous, dynamic substance that varies in particle size, carbon content, decomposition rate, and turnover time. In general, the content of SOM is highest at

the surface—where plant, animal, and microbial residue inputs are greatest—and decreases with depth.

Total organic carbon (TOC) is the carbon (C) stored in SOM. Total organic carbon is also referred to as soil organic carbon (SOC) in the scientific literature. Organic carbon enters the soil through the decomposition of plant and animal residues, root exudates, and living and dead microorganisms. Inorganic carbon is common in calcareous soils in the form of calcium and magnesium carbonates. In calcareous soils, the content of inorganic carbon can exceed TOC.

Factors Affecting Content of SOM and SOC

Inherent factors - Soil texture, parent material, drainage, climate, and time affect accumulation of SOM. Soils that are rich in clay have greater capacity to protect SOM from decomposition by stabilizing substances that bind to clay surfaces. The formation of soil aggregates—enabled by the presence of clay, aluminum and iron oxides, fungal hyphae, bacterial exudates (carbohydrates), and fine roots—protects SOM from microbial decomposition. Extractable aluminum and allophanes, which are present in volcanic soils, can react with SOM to form compounds that are stable and resist microbial decomposition. Warm temperatures increase decomposition rates of SOM. High mean annual precipitation increases accumulation rates of SOM by stimulating the production of plant biomass.

Loss of SOM through erosion results in SOM variations along slope gradients. Areas of level topography tend to have much more SOM than areas with other slope classes. Both elevation and topographic gradients affect local climate, vegetation distribution, and soil properties. They also affect associated biogeochemical processes, including SOM dynamics. Analysis of factors affecting C in the conterminous United States indicates that the effects of land use, topography (elevation and slope), and mean annual precipitation on SOM are more obvious than the effects of mean annual temperature. However, when other variables are highly restricted, SOM content clearly declines with increasing temperature.

Dynamic factors - Dynamic gains and losses in SOM are due primarily to management decisions in combination with climate and microbial influences. Accumulation of SOM is controlled by the rate of C mineralization, the amount and stage of decomposition of plant residues, and the addition of organic amendments to soil.

Soil organic carbon comprises approximately 52 to 58% of the SOM and is the main source of energy for soil microorganisms. The C within plant residues, particulate organic matter, and soil microbial biomass is generally considered to be within the active pool of SOM (table 1). The emergent view of SOM focuses on microbial access to SOM and includes an emphasis on the need to manage C flows rather than discrete C pools. During decomposition of SOM, energy and nutrients are released and utilized by plant roots and soil biota. Recognizing that SOM is a continuum of decomposition products is a first step in designing management strategies for renewing SOM sources throughout the year.

Table 1—Soil Organic Matter Pools

Soil organic matter fraction	Particle size	Description
Soil microbial biomass	Variable	The living pool of soil organic matter, particularly bacteria and fungi
Plant residues	>= 2.0 mm	Recognizable plant shoots and roots
Particulate organic matter	0.06 to 2 mm	Partially decomposed plant material, hyphae, seeds, etc.

Soil organic matter fraction	Particle size	Description
Biochemically stable organic matter		The ultimate stage of decomposition, dominated by stable compounds

Soil aggregates of various sizes and stabilities can act as sites at which SOM is physically protected from decomposition and C mineralization. Soil disturbance and aggregate destruction increase biodegradation of SOM. Aggregates are readily broken apart by tillage operations.

Crop residues incorporated into or left on the soil surface reduce erosion and the losses of SOM associated with sediment. In acidic soils, applications of lime increase plant productivity, microbial activity, organic matter decomposition, and CO_2 release.

The diversity of the soil microbial population affects SOM. For example, while soil bacteria and some fungi participate in SOM loss by mineralizing C compounds, other fungi, such as mycorrhizae, facilitate stabilization and physical protection by aggregating SOM with clay and minerals. SOM is better protected from degradation within aggregates than in free-form.

Relationship to Soil Function

SOM is one of the most important soil constituents. It affects plant growth by improving aggregate stability, soil structure, water availability, and nutrient cycling. SOM fractions in the active pool, described above, are the main source of energy and nutrients for soil microorganisms, which mediate nutrient cycling in the soil. Biochemically stable SOM participates in aggregate stability and in holding capacity for nutrients and water.

Microaggregates are formed by mineral interactions with iron and aluminum oxides and are generally considered an inherent soil characteristic. They are, however, impacted by current and past management. Fine roots, fungal hyphae, and organic carbon compounds, such as complex sugars (carbohydrates) and proteins (also referred to as glues), bind mineral particles and microaggregates together to form macroaggregates that are still porous enough to allow air, water, and plant roots to move through the soil.

An increase in SOM leads to greater biological diversity and activity in the soil, thus increasing biological control of plant diseases and pests.

Problems Associated with Low Organic Matter Levels

Low levels of SOM result in energy-source shortages and thereby lowered levels of microbial biomass, activity, and nutrient mineralization. In noncalcareous soils, aggregate stability, infiltration, drainage, and airflow are also reduced. Scarcity of SOM results in less diversity in soil biota and a risk of disruption to the food chain equilibrium. This disruption can cause disturbance in the soil environment (e.g., increased plant pests and diseases and accumulation of toxic substances).

Improving SOM Levels

An estimated 4.4×10^9 tons of C have been lost from soils of the United States due to traditional farming practices. Most of this carbon was SOC. Nearly half of the SOM has been lost from many agricultural soils. Other farming practices, such as no-till and cover cropping (especially when used together), can stop losses of SOM and even lead to increases. Continuous application of manure and compost can increase SOM. Burning, harvesting, or otherwise removing plant residues decreases SOM.

Measurement

SOM is measured in the laboratory by determining total carbon (TC) content using either dry or wet-dry combustion. Current analytical methods do not distinguish between decomposed and nondecomposed residues, so soil is first sieved to 2 mm to remove as much of the recognizable plant material as possible. If no carbonates are present, TC is considered to be the same as TOC (or SOC). For calcareous soils, soil inorganic carbon in the form carbonates must also be measured and then subtracted from the TC to determine TOC content. Results are given as the percent TOC in dry soil. To convert percent TOC to percent SOM, multiply the TOC percentage by 1.724. To convert percent SOM to percent TOC, divide the SOM percentage by 1.724. Note that this value continues to be debated by researchers with possible values ranging from 1.4 to 2.5 (Pribyl, 2010). A conversion factor of 2 has been suggested for this database but has not yet been adopted. Detailed procedures for measurement of SOM are outlined in “Soil Survey Investigations Report No. 42, Kellogg Soil Survey Laboratory Methods Manual, Version 5.0,” (Soil Survey Staff, 2014).

Many soil testing laboratories use a “loss on ignition” method to estimate soil organic matter. The estimate produced by this method must be correlated to analytical TOC measurements for each area to improve accuracy. The loss on ignition method can provide a good indication of the trend in SOM content within a field. It is important to note that temperature and timing used for the loss on ignition approach vary across labs and can influence results. Thus, comparisons should be made using only results from within a given lab.

Many soil testing laboratories use a “loss on ignition” method to estimate soil organic matter. The estimate produced by this method must be correlated to analytical TOC measurements for each area to improve accuracy. The loss on ignition method can provide a good indication of the trend in SOM content within a field. It is important to note that temperature and timing used for the loss on ignition approach vary across labs and can influence results. Thus, comparisons should be made using only results from within a given lab.

Currently, no standard method exists to measure TOC in the field. Attempts have been made to develop charts that match color to TOC content, but the correlation is better within soil landscapes and only for limited soils. Near-infrared spectroscopy has been tested for measuring C directly in the field, but it is expensive and sensitive to moisture content.

Estimates

Color and feel are soil characteristics that can be used to estimate SOM content. Color comparisons in areas of similar parent materials and textures can be correlated with laboratory data and thereby enable a soil scientist to make field estimates. In general, darker colors or black indicate the presence of higher amounts of organic matter. The contrast of color between the A horizon and subsurface horizons is also a good indicator. Sandy soils tend to look darker with a lower content of SOM. In general, lower numbers for hue, value, and chroma (in the Munsell soil color system) tend to be associated with darker soil colors that are attributed to higher content of SOM, soil moisture, or both.

References

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Edwards, J.H., C.W. Wood, D.L. Thurlow, and M.E. Ruf. 1999. Tillage and crop rotation effects on fertility status of a Hapludalf soil. Soil Science Society of America Journal 56:1577–1582.

Sikora, L.J., and D.E. Stott. 1996. Soil organic carbon and nitrogen. In: J.W. Doran and A.J. Jones, editors, Methods for assessing soil quality. Madison, WI. p. 157–167.

Schulze, D.G., J.L. Nagel, G.E. Van Scoyoc, T.L. Henderson, M.F. Baumgardner, and D.E. Stott. 1993. Significance of organic matter in determining soil colors. In: J.M. Bigham and E.J. Ciolkosz, editors, Soil color. Soil Science Society of America, Madison, WI. p. 71–90.

Soil Survey Staff. 2014. Kellogg Soil Survey Laboratory methods manual. Soil Survey Investigations Report No. 42, Version 5.0. R. Burt and Soil Survey Staff (ed.). U.S. Department of Agriculture, Natural Resources Conservation Service.

Report—Soil Health - Organic Matter

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes						
Rhoades	55	E	0-3	3.0	4.0	5.0
		Btn	3-8	0.5	1.3	2.0
		Btknyz	8-14	0.5	1.3	2.0
		Bkyz	14-46	0.0	0.3	0.5
		C	46-79	0.0	0.3	0.5
Daglum	33	A	0-3	4.0	5.5	7.0
		E	3-5	2.5	3.5	4.5
		Btn	5-18	1.5	2.0	3.0
		Btkny	18-32	0.5	0.8	1.0
		BCk	32-47	0.0	0.5	1.0
		C	47-79	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes						
Dogtooth	55	E	0-2	2.0	3.0	4.0
		Btn	2-10	1.5	2.0	2.5
		Btnk	10-15	0.5	1.0	1.5
		Bkyz	15-28	0.3	0.5	1.0
		Cr	28-79	—	—	—
Janesburg	33	A	0-7	3.0	4.0	5.0
		E	7-9	1.5	2.5	3.0
		Btn	9-16	1.0	1.5	2.5
		Btnk	16-25	0.5	1.0	1.5
		BCkyz	25-32	0.3	0.5	1.0
		Cr	32-79	—	—	—
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes						
Dogtooth	35	E	0-2	2.0	3.0	4.0
		Btn	2-8	1.5	2.0	2.5
		Btnk	8-13	0.5	1.0	1.5
		Bkyz	13-21	0.3	0.5	1.0
		Cr	21-79	—	—	—
Janesburg	25	A	0-6	3.0	4.0	5.0
		E	6-8	1.5	2.5	3.0
		Btn	8-14	1.0	1.5	2.5
		Btnk	14-21	0.5	1.0	1.5
		BCkyz	21-26	0.3	0.5	1.0
		Cr	26-79	—	—	—
Cabba	22	A	0-3	2.0	4.5	7.0
		Bk	3-8	1.0	1.5	2.0
		C	8-12	0.3	0.5	1.0
		Cr	12-79	—	—	—

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes						
Vebar	50	Ap	0-6	1.5	2.0	2.5
		Bw1	6-11	1.0	1.5	2.0
		Bw2	11-17	0.5	1.0	1.5
		Bk	17-29	0.3	0.5	1.0
		Cr	29-79	—	—	—
Cohagen	25	Ap	0-6	0.5	1.0	2.0
		C	6-17	0.3	0.5	1.0
		Cr	17-79	—	—	—
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes						
Vebar	40	A	0-6	1.5	2.0	3.0
		Bw1	6-11	1.0	1.5	2.0
		Bw2	11-17	0.5	1.0	1.5
		Bk	17-29	0.3	0.5	1.0
		Cr	29-79	—	—	—
Flasher	30	A	0-5	0.5	1.5	2.3
		AC	5-10	0.3	1.0	1.5
		C	10-15	0.3	0.5	0.8
		Cr	15-79	—	—	—
Tally	18	A	0-6	1.5	2.5	3.5
		Bw1	6-12	1.0	2.0	3.0
		Bw2	12-18	1.0	1.5	2.0
		Bk	18-33	0.5	1.0	1.5
		C	33-70	0.3	0.5	1.0
		Cr	70-79	—	—	—
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes						
Beisigl	40	A	0-5	1.0	2.0	3.0
		Bk	5-27	0.5	0.8	1.0
		Cr	27-60	0.0	0.3	0.5
Flasher	26	A	0-6	0.5	0.8	1.0
		AC	6-10	0.0	0.3	0.5
		Cr	10-60	0.0	0.3	0.5
Telfer	15	A	0-6	1.0	2.0	3.0
		C	6-60	0.0	0.5	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes						
Flasher	36	A	0-3	0.5	1.5	2.3
		AC	3-9	0.3	1.0	1.5
		C	9-14	0.3	0.5	0.8
		Cr	14-79	—	—	—
Vebar	22	A	0-5	1.5	2.0	3.0
		Bw1	5-10	1.0	1.5	2.0
		Bw2	10-13	0.5	1.0	1.5
		Bk	13-26	0.3	0.5	1.0
		Cr	26-79	—	—	—
Parshall	15	A	0-9	2.0	3.5	4.0
		Bw1	9-25	1.0	2.0	3.0
		Bw2	25-35	0.5	1.0	2.0
		Bk	35-42	0.5	0.8	1.0
		C	42-79	0.1	0.3	0.5
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes						
Lihen	60	Ap	0-9	1.0	2.0	3.0
		A	9-24	1.0	2.0	3.0
		Bk	24-32	1.0	1.5	2.0
		C	32-60	0.0	0.3	0.5
Parshall	20	Ap	0-7	1.0	2.5	4.0
		A	7-12	1.0	2.5	4.0
		Bw	12-29	1.0	2.0	3.0
		Bk	29-48	0.0	0.5	1.0
		BCk	48-60	0.0	0.5	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes						
Cabba	41	A	0-3	1.0	2.0	3.0
		Bk	3-8	0.8	1.0	1.5
		C	8-12	0.3	0.5	1.0
		Cr	12-79	—	—	—
Chama	27	A	0-4	1.5	2.5	4.0
		Bw	4-7	1.0	2.0	3.0
		Bk	7-18	0.5	1.0	1.5
		BCk	18-28	0.5	0.8	1.0
		Cr	28-79	—	—	—
Shambo	15	A	0-6	2.0	4.0	6.0
		Bw1	6-11	1.0	2.5	3.0
		Bw2	11-24	1.0	2.0	3.0
		Bk	24-38	0.5	0.8	1.0
		BCk	38-44	0.5	0.8	1.0
		C	44-71	0.1	0.5	1.0
		Cr	71-79	—	—	—
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes						
Arikara	33	Oi	0-1	90.0	95.0	100.0
		A	1-2	3.0	4.5	6.0
		Bw	2-14	1.0	1.5	2.0
		Bk	14-39	1.0	1.5	2.0
		C	39-60	0.5	0.8	1.0
Cabba	18	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Shambo, steep	17	A	0-9	2.0	4.0	6.0
		Bw1	9-13	1.0	2.0	3.0
		Bw2	13-29	1.0	1.5	2.0
		Bk	29-48	0.5	0.8	1.0
		C	48-60	0.0	0.5	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes						
Chama	43	Ap	0-4	1.0	2.5	4.0
		Bw	4-8	1.0	2.0	3.0
		Bk	8-34	0.5	0.8	1.0
		Cr	34-60	0.0	0.3	0.5
Cabba	28	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Sen	18	Ap	0-6	2.0	3.0	4.0
		Bw	6-17	1.0	2.0	3.0
		Bk	17-34	1.0	1.5	2.0
		Cr	34-60	0.0	0.3	0.5
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes						
Cabba	42	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Chama	26	A	0-4	1.0	2.5	4.0
		Bw	4-8	1.0	2.0	3.0
		Bk	8-34	0.5	0.8	1.0
		Cr	34-60	0.0	0.3	0.5
Sen	16	A	0-6	2.0	3.0	4.0
		Bw	6-17	1.0	2.0	3.0
		Bk	17-34	1.0	1.5	2.0
		Cr	34-60	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes						
Chama	44	Ap	0-4	1.0	2.5	4.0
		Bw	4-8	1.0	2.0	3.0
		Bk	8-34	0.5	0.8	1.0
		Cr	34-60	0.0	0.3	0.5
Sen	25	Ap	0-6	2.0	3.0	4.0
		Bw	6-17	1.0	2.0	3.0
		Bk	17-34	1.0	1.5	2.0
		Cr	34-60	0.0	0.3	0.5
Cabba	15	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
E3107F—Cabba-Badland complex, 6 to 70 percent slopes						
Cabba	46	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Badland	36	A	0-2	1.0	1.0	2.0
		Cr	2-60	0.0	0.3	0.5
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes						
Cabba	30	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Cherry	26	A	0-3	0.5	1.8	3.0
		Bw	3-33	0.5	1.3	2.0
		C	33-60	0.0	0.5	1.0
Cherry	18	A	0-3	0.5	1.8	3.0
		Bw	3-33	0.5	1.3	2.0
		C	33-60	0.0	0.5	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E3541B—Williams-Zahl loams, 3 to 6 percent slopes						
Williams	50	Ap	0-6	2.5	4.0	5.0
		Bt1	6-10	1.0	3.0	4.0
		Bt2	10-15	1.0	3.0	4.0
		Btk	15-24	1.0	2.0	4.0
		Bk	24-36	0.0	0.5	1.0
		C	36-60	0.0	0.5	0.5
Zahl	27	Ap	0-5	1.0	2.0	4.0
		Bk	5-20	0.0	1.0	2.0
		C	20-60	0.0	0.5	0.5
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes						
Zahl	30	A	0-5	1.0	2.0	4.0
		Bk	5-20	0.0	1.0	2.0
		C	20-60	0.0	0.5	0.5
Cabba	24	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Maschetah, strongly sloping	12	A	0-7	2.0	3.0	4.0
		Bk	7-48	0.5	1.8	3.0
		C	48-90	0.0	0.3	0.5
Maschetah, gently sloping	10	Ap	0-7	2.0	3.0	4.0
		Bk	7-48	0.5	1.8	3.0
		C	48-90	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes						
Zahl	32	A	0-5	1.0	2.0	4.0
		Bk	5-20	0.0	1.0	2.0
		C	20-60	0.0	0.5	0.5
Cabba	26	A	0-3	1.0	2.0	3.0
		Bk	3-15	0.5	0.8	1.0
		Cr	15-60	0.0	0.3	0.5
Williams	20	A	0-6	2.5	4.0	5.0
		Bt1	6-10	1.0	3.0	4.0
		Bt2	10-15	1.0	3.0	4.0
		Btk	15-24	1.0	2.0	4.0
		Bk	24-36	0.0	0.5	1.0
		C	36-60	0.0	0.5	0.5
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes						
Manning	30	A	0-5	2.0	3.5	5.0
		Bw	5-18	1.0	2.0	3.0
		Bk	18-25	1.0	1.5	2.0
		2C	25-60	0.0	0.5	1.0
Schaller	25	A	0-9	1.0	2.0	3.0
		Bk	9-15	0.0	1.0	2.0
		C	15-60	0.0	0.3	0.5
Wabek	20	A	0-5	1.0	1.5	2.0
		Bk	5-10	0.0	0.5	1.0
		C	10-60	0.0	0.5	1.0
E4729A—Heil silty clay loam, 0 to 1 percent slopes						
Heil	84	E	0-3	3.0	4.5	6.0
		Btn	3-24	0.0	0.5	1.0
		Bg	24-38	0.0	0.3	0.5
		Byg	38-52	0.0	0.3	0.5
		Cg	52-60	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes						
Maltese	45	A	0-3	2.0	3.0	4.0
		E	3-5	1.0	2.0	3.0
		Btn	5-17	1.0	1.5	2.0
		Btkn	17-26	0.8	1.0	1.5
		Btkny	26-36	0.5	0.8	1.0
		BCy	36-43	0.3	0.5	0.8
		C	43-79	0.1	0.3	0.5
Gerda	35	E	0-2	2.0	3.0	4.0
		Btn	2-7	0.5	1.0	2.0
		Btkny	7-19	0.5	0.8	1.0
		Bky	19-44	0.1	0.3	0.5
		C	44-79	0.1	0.2	0.5
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes						
Rhame	40	A	0-6	1.5	3.0	4.5
		Bw1	6-12	1.0	1.5	2.0
		Bw2	12-18	0.5	1.0	1.3
		Bk	18-28	0.3	0.7	1.0
		C	28-35	0.3	0.5	1.0
		Cr	35-79	—	—	—
Chinook	30	A	0-6	1.5	3.5	5.5
		Bw1	6-14	1.0	2.0	2.5
		Bw2	14-24	0.5	1.0	1.5
		Bk	24-38	0.5	0.8	1.3
		C	38-79	0.3	0.5	1.0
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes						
Rhame	37	A	0-5	1.5	3.0	4.5
		Bw1	5-9	1.0	1.5	2.0
		Bw2	9-16	0.5	1.0	1.3
		BCk	16-23	0.3	0.7	1.0
		C	23-31	0.3	0.5	1.0
		Cr	31-79	—	—	—
Fleak	34	A	0-5	0.8	2.0	3.5
		C	5-14	0.5	0.8	1.5
		Cr	14-79	—	—	—

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes						
Rhame	32	A	0-6	1.5	3.0	4.5
		Bw1	6-10	1.0	1.5	2.0
		Bw2	10-16	0.5	1.0	1.3
		BCk	16-23	0.3	0.7	1.0
		C	23-31	0.3	0.5	1.0
		Cr	31-79	—	—	—
Arikara, low precipitation	25	Oi	0-1	90.0	95.0	100.0
		A	1-6	6.0	8.0	12.0
		Bt	6-12	1.0	2.0	3.0
		Btk	12-22	1.0	1.5	2.0
		Bk	22-39	0.8	1.0	1.5
		C	39-61	0.5	0.8	1.0
		2Cr	61-79	—	—	—
Fleak	21	A	0-5	0.8	2.0	3.5
		C	5-14	0.5	0.8	1.5
		Cr	14-79	—	—	—
L2145A—Kremlin loam, 0 to 2 percent slopes						
Kremlin	85	Ap	0-6	2.0	3.0	5.0
		Bw1	6-12	1.0	2.0	3.0
		Bw2	12-21	1.0	1.5	2.0
		Bk	21-38	0.5	0.8	1.0
		C	38-79	0.1	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes						
Rhame	40	A	0-8	1.0	2.0	3.0
		Bw	8-19	0.5	0.8	1.0
		C	19-34	0.0	0.3	0.5
		Cr	34-79	0.0	0.3	0.5
Bullock	22	E	0-4	1.0	1.5	2.0
		Btn	4-10	0.8	1.0	1.5
		Bkyz	10-15	0.3	0.5	1.0
		BCyz	15-23	0.0	0.3	0.5
		Cr	23-60	0.0	0.3	0.5
Kremlin	15	A	0-11	1.0	2.0	3.0
		Bw	11-19	0.0	0.5	1.0
		Bk	19-60	0.0	0.5	1.0
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes						
Scairt	30	E	0-2	2.0	3.0	4.0
		Btn	2-6	2.0	3.0	4.0
		Btnz	6-13	1.0	1.5	2.0
		Bkz	13-22	0.5	0.8	1.0
		BCy	22-28	0.0	0.3	0.5
		Cr	28-60	0.0	0.3	0.5
Maltese	20	A	0-7	2.0	3.0	4.0
		E	7-10	2.0	3.0	4.0
		Btn	10-16	1.0	2.0	3.0
		Btkn	16-20	1.0	1.5	2.0
		Btkny	20-33	1.0	1.5	2.0
		BCy	33-60	0.5	0.8	1.0
Boxwell	15	A	0-5	1.0	2.0	3.0
		Bw	5-14	1.0	1.5	2.0
		Bk	14-28	0.5	0.8	1.0
		Cr	28-79	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes						
Rhame	40	A	0-8	1.0	2.0	3.0
		Bw	8-19	0.5	0.8	1.0
		C	19-34	0.0	0.3	0.5
		Cr	34-79	0.0	0.3	0.5
Kremlin	25	A	0-11	1.0	2.0	3.0
		Bw	11-19	0.0	0.5	1.0
		Bk	19-60	0.0	0.5	1.0
Archin	15	A	0-4	1.0	2.0	3.0
		E	4-6	0.5	1.3	2.0
		Btn	6-17	0.5	0.8	1.0
		Bkyz	17-28	0.0	0.5	1.0
		C	28-60	0.0	0.3	0.5
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped						
Cabbart	29	A	0-3	1.0	1.5	2.0
		Bk	3-18	0.5	0.8	1.0
		Cr	18-79	0.0	0.3	0.5
Kremlin	19	A	0-11	1.0	2.0	3.0
		Bw	11-19	0.0	0.5	1.0
		Bk	19-60	0.0	0.5	1.0
Boxwell	17	A	0-5	1.0	2.0	3.0
		Bw	5-14	1.0	1.5	2.0
		Bk	14-28	0.5	0.8	1.0
		Cr	28-79	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes						
Boxwell	36	A	0-5	2.0	3.0	4.0
		Bw1	5-8	1.5	2.5	3.5
		Bw2	8-14	1.0	1.5	2.5
		Bk	14-24	0.5	0.8	1.0
		Cr	24-79	—	—	—
Cabbart	29	A	0-4	2.0	3.5	6.0
		BC	4-11	0.5	1.0	1.5
		C	11-18	0.5	0.5	1.0
		Cr	18-79	—	—	—
Arikara, low precipitation	16	Oi	0-1	90.0	95.0	100.0
		A	1-6	6.0	8.0	12.0
		Bt	6-12	1.0	2.0	3.0
		Btk	12-22	1.0	1.5	2.0
		Bk	22-39	0.8	1.0	1.5
		C	39-61	0.5	0.8	1.0
		2Cr	61-79	—	—	—
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes						
Boxwell	63	Ap	0-6	2.0	3.0	4.0
		Bw	6-14	1.0	1.5	2.5
		Bk	14-29	0.5	0.8	1.0
		Cr	29-79	—	—	—
Kremlin	25	Ap	0-6	2.0	3.0	5.0
		Bw1	6-12	1.0	2.0	3.0
		Bw2	12-21	1.0	1.5	2.0
		Bk	21-38	0.5	0.8	1.0
		C	38-79	0.1	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes						
Boxwell	46	A	0-5	2.0	3.0	4.0
		Bw1	5-8	1.0	1.5	2.5
		Bw2	8-13	0.8	1.0	1.5
		Bk	13-24	0.5	0.8	1.0
		Cr	24-79	—	—	—
Kremlin	32	A	0-7	2.0	3.0	5.0
		Bw1	7-12	1.0	2.0	3.5
		Bw2	12-18	1.0	1.5	2.5
		Bk	18-35	0.5	0.8	1.0
		C	35-71	0.1	0.5	1.0
		Cr	71-79	—	—	—
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes						
Kirby, channery loam	38	A	0-5	2.0	3.5	6.0
		Bk	5-14	1.0	2.0	4.0
		2C	14-79	0.1	0.3	0.8
Badland	25	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
Patent, badland fan	20	A	0-3	3.0	4.5	6.0
		AC	3-7	2.0	3.0	4.0
		C	7-79	0.8	1.5	2.5
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes						
Kirby, channery loam	50	A	0-4	1.0	1.5	2.0
		Bk	4-12	0.5	0.8	1.0
		2C	12-60	0.0	0.3	0.5
Scairt	15	E	0-2	2.0	3.0	4.0
		Btn	2-6	2.0	3.0	4.0
		Btnz	6-13	1.0	1.5	2.0
		Bkz	13-22	0.5	0.8	1.0
		BCy	22-28	0.0	0.3	0.5
		Cr	28-60	0.0	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes						
Badland	60	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
Cabbart	30	A	0-2	2.0	3.5	6.0
		BC	2-10	0.5	1.0	1.5
		C	10-14	0.5	0.5	1.0
		Cr	14-79	—	—	—
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes						
Cabbart	50	A	0-2	2.0	3.5	6.0
		BC	2-10	0.5	1.0	1.5
		C	10-14	0.5	0.5	1.0
		Cr	14-79	—	—	—
Badland	25	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes						
Lonna	43	A	0-3	2.0	3.5	5.0
		Bw	3-11	1.0	2.0	3.0
		Bk	11-34	0.5	0.8	1.0
		C	34-79	0.3	0.5	1.0
Cabbart	32	A	0-4	2.0	3.5	6.0
		BC	4-11	0.5	1.0	1.5
		C	11-18	0.5	0.5	1.0
		Cr	18-79	—	—	—
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes						
Patent, badland fan	35	A	0-4	3.0	4.5	6.0
		AC	4-13	2.0	3.0	4.0
		C	13-79	0.8	1.5	2.5
Badland	20	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
Cabbart	20	A	0-2	2.0	3.5	6.0
		BC	2-10	0.5	1.0	1.5
		C	10-14	0.5	0.5	1.0
		Cr	14-79	—	—	—

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes						
Badland	30	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
Arikara, low precipitation	27	Oi	0-1	90.0	95.0	100.0
		A	1-2	6.0	8.0	12.0
		Bw	2-14	1.0	2.0	3.0
		Bk	14-39	1.0	1.5	2.0
		C	39-61	0.5	0.8	1.0
		2Cr	61-79	—	—	—
Cabbart	17	A	0-4	2.0	3.5	6.0
		BC	4-11	0.5	1.0	1.5
		C	11-18	0.5	0.5	1.0
		Cr	18-79	—	—	—
L3197F—Badland, 9 to 150 percent slopes						
Badland	88	C	0-2	0.1	0.5	1.0
		Cr	2-79	—	—	—
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes						
Arikara, low precipitation	62	Oi	0-1	90.0	95.0	100.0
		A	1-6	6.0	8.0	12.0
		Bt	6-12	1.0	2.0	3.0
		Btk	12-22	1.0	1.5	2.0
		Bk	22-39	0.8	1.0	1.5
		C	39-61	0.5	0.8	1.0
		2Cr	61-79	—	—	—
Cabbart	19	A	0-4	2.0	3.5	6.0
		BC	4-11	0.5	1.0	1.5
		C	11-18	0.5	0.5	1.0
		Cr	18-79	—	—	—

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes						
Patent, occasionally flooded	35	AC	0-7	1.0	2.0	3.0
		C	7-60	0.5	0.8	1.0
Patent, gullied, occasionally flooded	20	AC	0-1	0.3	0.5	1.0
		C	1-60	0.0	0.3	0.5
Glendive, frequently flooded	15	A	0-5	0.5	0.8	1.0
		C1	5-16	0.5	0.8	1.0
		C2	16-60	0.5	0.8	1.0
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded						
Patent, occasionally flooded	80	AC	0-7	1.0	2.0	3.0
		C	7-60	0.5	0.8	1.0
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes						
Patent, occasionally flooded	40	AC	0-7	1.0	2.0	3.0
		C	7-60	0.5	0.8	1.0
Vanda	25	A	0-4	0.5	1.3	2.0
		Byz	4-60	0.0	0.3	0.5
Gerda, severely eroded	15	E	0-0	2.0	2.5	3.0
		Btn	0-6	1.5	2.0	2.5
		Btkny	6-13	1.0	1.5	2.0
		Bkyz	13-44	1.0	1.5	2.0
		C	44-80	0.5	0.8	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes						
Kremlin	25	Ap	0-11	1.0	2.0	3.0
		Bw	11-19	0.0	0.5	1.0
		Bk	19-60	0.0	0.5	1.0
Ethridge	22	Ap	0-3	1.0	2.0	3.0
		Bt	3-10	1.0	1.5	2.0
		Btk	10-23	1.0	1.5	2.0
		Bk	23-38	0.5	0.8	1.0
		Bky	38-60	0.0	0.3	0.5
Gerda	20	E	0-2	2.0	3.0	4.0
		Btn	2-11	2.0	3.0	4.0
		Btkny	11-19	1.0	1.5	2.0
		Bky	19-29	1.0	1.5	2.0
		Bk	29-44	0.5	0.8	1.0
		C	44-80	0.5	0.8	1.0
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded						
Wolf point, occasionally flooded	85	A1	0-1	0.5	0.8	1.0
		A2	1-10	0.5	0.8	1.0
		C	10-60	0.0	0.3	0.5
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded						
Wolf point, wooded, occasionally flooded	78	A1	0-1	0.5	0.8	1.0
		A2	1-10	0.5	0.8	1.0
		C	10-60	0.0	0.3	0.5
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded						
Havre, occasionally flooded	82	Ap	0-7	1.0	2.0	3.0
		C1	7-18	0.8	1.0	2.0
		C2	18-32	0.5	0.8	1.0
		Ab	32-36	0.8	1.5	2.5
		C3	36-79	0.1	0.3	0.5

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded						
Havre, rarely flooded, mollic	86	Ap	0-7	2.5	4.0	5.0
		C1	7-18	1.0	2.0	3.0
		C2	18-32	0.5	0.8	1.0
		Ab	32-36	2.0	3.0	4.0
		C3	36-79	0.1	0.3	0.5
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded						
Glendive, channeled, frequently flooded	40	A	0-5	2.0	4.0	5.0
		C1	5-24	1.0	1.5	3.0
		C2	24-43	0.3	1.0	1.5
		Cg	43-79	0.1	0.5	1.0
Fluvaquents, channeled, frequently flooded	30	Ag	0-5	1.0	2.0	3.0
		Cg	5-79	0.1	0.8	2.0
Havre, channeled, frequently flooded	20	A	0-6	2.0	4.0	6.0
		C1	6-22	1.0	2.0	3.0
		Ab	22-25	2.0	3.0	4.0
		C2	25-45	0.5	1.0	1.5
		Cg	45-79	0.1	0.5	1.0
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded						
Glendive, occasionally flooded	75	Ap	0-7	1.0	2.0	3.0
		C1	7-15	0.8	1.5	2.0
		C2	15-46	0.5	1.0	1.5
		C3	46-79	0.1	0.3	0.5
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded						
Hanly, occasionally flooded	80	A	0-4	2.0	3.0	4.0
		C1	4-44	1.0	2.0	3.0
		C2	44-79	0.1	0.5	1.0

Soil Health - Organic Matter–McKenzie County, North Dakota						
Map symbol and soil name	**Pct. of map unit**	**Horizon Name**	**Depth (inches)**	**Organic matter low (Pct)**	**Organic matter RV (Pct)**	**Organic matter high (Pct)**
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes						
Tinsley	53	A	0-4	0.7	1.4	2.0
		AC	4-11	0.0	0.5	1.0
		C	11-60	0.0	0.3	0.5
Chanta	17	A	0-6	1.0	2.0	3.0
		Bw1	6-22	1.0	1.8	2.0
		Bw2	22-26	1.0	1.5	2.0
		2C	26-60	0.5	0.8	1.0
L4999—Water						
Water	100		—	—	—	—

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence

Soil health is primarily influenced by human management, which is not captured in soil survey data at this time. These interpretations provide information on inherent soil properties that influence our ability to build healthy soils through management.

The ratings are both verbal and numerical. Numerical ratings indicate the propensity of individual soil properties to influence specific aspects of soil health resources. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. For organic matter depletion, salt concentration, and organic soil subsidence, ratings indicate gradations between the point at which a soil feature has the greatest ability to enable depletion of the soil health resource (1.00) and the point at which the soil feature becomes least likely to allow depletion of the soil health resource (0.00). For aerobic soil organisms, ratings indicate gradations between the point at which a soil feature is most favorable to enhance the soil health resource (1.00) and the point at which the soil feature is least favorable to enhance the soil health resource (0.00).

The ratings for *soil organic matter depletion* are based on seasonal saturation, organic matter content, clay content, and shape of the land surface. The degree of limitation caused by each of these properties is rated for a soil, and the sum of the ratings is the overall rating. Rating class terms indicate the extent to which the soils enable the depletion of organic matter. "Organic matter depletion high" indicates that the soil and site have features that are very conducive to the depletion of organic matter. Very careful management will be needed to prevent serious organic matter loss when these soils are farmed. "Organic matter depletion moderately high," "Organic matter depletion moderate," and "Organic matter depletion moderately low" are a gradient of the level of management needed to avoid organic matter depletion. "Organic matter depletion low" indicates that the soil that has features that are favorable for organic matter accumulation. These soils can maintain favorable organic matter levels under more management options.

The ratings for *surface salt concentration* are based on excess salts, which are measured by the electrical conductivity of the soil, the amount of precipitation

relative to evapotranspiration, shape of the land surface, and depth to saturation. The rating of the attribute that contributes the least to surface salinization is the overall rating. Rating class terms indicate the rate at which the soils are likely to accumulate salts considering all the soil features that are examined for this rating. "High surface salinization risk or already saline" indicates that the soil has features that are very favorable for the accumulation of salts at the surface or is already saline. These soils are already limited by excess surface salts. "Surface salinization risk" indicates that the soil has features that are somewhat favorable for surface salinization. Careful management will be needed to avoid damage from salinity. "Low surface salinization risk" indicates that the soil has one or more features that are unfavorable for salinization. These soils exist in climates where salinization does not occur or occur in landscape positions where salts are unlikely to accumulate.

The ratings for *suitability for aerobic soil organisms* are based on soil temperature, the average total yearly precipitation, soil organic matter content, soil pore space, soil water, and osmotic conditions. The degree of favorability of each of these properties is rated for a soil, and the degree of limitation of the least favorable attribute determines the overall rating. Rating class terms indicate the extent to which the soils are favorable considering all the soil features that are examined for this land use. "Very favorable" indicates that the soil has features that are very favorable for aerobic soil organisms. Healthy and thriving populations can be expected under properly managed agricultural systems on these soils. "Somewhat favorable" indicates that the soil has features that are moderately favorable for aerobic soil organisms. The soil can be made more favorable by careful management. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for aerobic soil organisms.

The ratings for *agriculture organic soil subsidence* are based on soil temperature, degree of saturation, and soil acidity. The degree to which each of the soil properties considered promotes oxidation is rated. The average degree of accelerating microbial oxidation of organic matter is taken as the overall rating. Rating class terms indicate the extent to which the soils enable the depletion of organic matter. "Organic matter depletion high" indicates that the soil and site have features are very conducive to the depletion of organic matter. Very careful management is needed to prevent serious organic matter loss when these soils are farmed. "Organic matter depletion moderately high," "Organic matter depletion moderate," and "Organic matter depletion moderately low" are a gradient of the level of management needed to avoid organic matter depletion. "Organic matter depletion low" indicates that the soil has features that are favorable for organic matter accumulation. These soils can maintain favorable organic matter levels under more management options.

Report—Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation or suitability. The table shows only the top limitations for any given soil. The soil may have additional limitations]

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes									
Rhoades	55			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Well aerated	1.00	Electrical conductivity	1.00	Moderate moisture deficit	0.69
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate antecedent organic matter content	0.66
				pH	0.61	Flooding and ponding	1.00	Not water gathering surface	0.60
				Frost-free days	0.29	Existing electrical conductivity, 0-30cm	0.86	Moderate oxidation rate	0.18
Daglum	33			Mineral soil		Low surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Well aerated	1.00	Electrical conductivity	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.69
				pH	0.70	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.44
				Frost-free days	0.29			Medium amount of clay surface area	0.23

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes									
Dogtooth	55			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.69
				pH	0.66	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.68
				Frost-free days	0.29	Electrical conductivity	1.00	Not water gathering surface	0.60
						Surface shape concentrates salts	0.67	Moderate oxidation rate	0.18
Janesburg	33			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Not saline	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.87	Electrical conductivity	0.83	Medium amount of clay surface area	0.61
				Frost-free days	0.29	Existing electrical conductivity, 0-30cm	0.03	Moderate antecedent organic matter content	0.39

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes									
Dogtooth	35			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.69
				pH	0.68	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.68
				Frost-free days	0.29	Electrical conductivity	1.00	Not water gathering surface	0.60
						Existing electrical conductivity, 0-30cm	0.77	Moderate oxidation rate	0.18
Janesburg	25			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Not saline	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.88	Electrical conductivity	0.78	Moderate antecedent organic matter content	0.43
				Frost-free days	0.29	Existing electrical conductivity, 0-30cm	0.10	Medium amount of clay surface area	0.26
Cabba	22			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.87
				pH	0.80	Electrical conductivity	0.16	Moderate moisture deficit	0.69
				Frost-free days	0.29	Existing electrical conductivity, 0-30cm	0.06	Moderate antecedent organic matter content	0.60
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes									
Vebar	50			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.99	Electrical conductivity	0.02	Moderate antecedent organic matter content	0.75
				Frost-free days	0.29			Moderate moisture deficit	0.69
Cohagen	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.96	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.93
				Frost-free days	0.29			Moderate moisture deficit	0.69

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes									
Vebar	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.99	Electrical conductivity	0.02	Moderate antecedent organic matter content	0.75
				Frost-free days	0.29			Moderate moisture deficit	0.69
Flasher	30			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.92	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.85
				Frost-free days	0.29			Moderate moisture deficit	0.69
Tally	18			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.89	Electrical conductivity	0.01	Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes									
Beisigl	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.87			Moderate antecedent organic matter content	0.81
				Frost-free days	0.29			Moderate moisture deficit	0.69
Flasher	26			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.94			Moderate antecedent organic matter content	0.98
				Frost-free days	0.29			Moderate moisture deficit	0.69
Telfer	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.99			Moderate antecedent organic matter content	0.80
				Frost-free days	0.29			Moderate moisture deficit	0.69

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes									
Flasher	36			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.92	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.87
				Frost-free days	0.29			Moderate moisture deficit	0.69
Vebar	22			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.99	Electrical conductivity	0.02	Moderate antecedent organic matter content	0.76
				Frost-free days	0.29			Moderate moisture deficit	0.69
Parshall	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Low amount of clay surface area	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.95	Surface shape concentrates salts	0.67	Not water gathering surface	0.60
				Frost-free days	0.29	Electrical conductivity	0.02	Moderate antecedent organic matter content	0.46
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes									
Lihen	60			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.92			Moderate antecedent organic matter content	0.73
				Frost-free days	0.29			Moderate moisture deficit	0.69
Parshall	20			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Low amount of clay surface area	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.94	Surface shape concentrates salts	0.67	Moderate antecedent organic matter content	0.64
				Frost-free days	0.29			Not water gathering surface	0.60

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes									
Cabba	41			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.88
				pH	0.80	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Chama	27			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.89
				pH	0.81	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.70
				Frost-free days	0.29			Moderate moisture deficit	0.69
Shambo	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.80
				pH	0.96	Electrical conductivity	0.10	Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.43

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes									
Arikara	33			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.74
				pH	0.90	Electrical conductivity	0.12	Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.68
Cabba	18			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.92
				pH	0.87	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.86
				Frost-free days	0.29			Moderate moisture deficit	0.69
Shambo, steep	17			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.74
				pH	0.92			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.36

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes									
Chama	43			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.74
				pH	0.86	Electrical conductivity	0.08	Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.68
Cabba	28			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Sen	18			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.84
				pH	0.91			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.59

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes									
Cabba	42			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Chama	26			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.74
				pH	0.86	Electrical conductivity	0.08	Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.68
Sen	16			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.84
				pH	0.91			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.59

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes									
Chama	44			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.74
				pH	0.86	Electrical conductivity	0.08	Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.68
Sen	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.84
				pH	0.91			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.59
Cabba	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
E3107F—Cabba-Badland complex, 6 to 70 percent slopes									
Cabba	46			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.92
				pH	0.87	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.86
				Frost-free days	0.29			Moderate moisture deficit	0.69
Badland	36			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.91
				pH	0.94	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes									
Cabba	30			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Cherry	26			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.83
				pH	0.77	Electrical conductivity	0.25	Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.62
Cherry	18			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.83
				pH	0.77	Electrical conductivity	0.25	Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.62
E3541B—Williams-Zahl loams, 3 to 6 percent slopes									
Williams	50			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.90	Electrical conductivity	0.03	Medium amount of clay surface area	0.61
				Frost-free days	0.29			Moderate antecedent organic matter content	0.41
Zahl	27			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.79
				pH	0.87			Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.57

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes									
Zahl	30			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.79
				pH	0.87			Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.57
Cabba	24			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Maschetah, strongly sloping	12			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.81
				pH	0.76			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.57
Maschetah, gently sloping	10			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.81
				pH	0.76			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.57

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes									
Zahl	32			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.79
				pH	0.87			Moderate moisture deficit	0.69
				Frost-free days	0.29			Medium amount of clay surface area	0.57
Cabba	26			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				pH	0.87	Electrical conductivity	0.10	Medium amount of clay surface area	0.84
				Frost-free days	0.29			Moderate moisture deficit	0.69
Williams	20			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.69
				pH	0.90	Electrical conductivity	0.03	Medium amount of clay surface area	0.61
				Frost-free days	0.29			Moderate antecedent organic matter content	0.41

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes									
Manning	30			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.92			Moderate moisture deficit	0.69
				Frost-free days	0.29			Moderate antecedent organic matter content	0.55
Schaller	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Low amount of clay surface area	1.00
				pH	0.95			Moderate antecedent organic matter content	0.73
				Frost-free days	0.29			Moderate moisture deficit	0.69
Wabek	20			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Non-leaching climate	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.99
				pH	0.95			Moderate antecedent organic matter content	0.88
				Frost-free days	0.29			Moderate moisture deficit	0.69
E4729A—Heil silty clay loam, 0 to 1 percent slopes									
Heil	84			Mineral soil		High surface salinization risk or already saline		OM depletion moderate	
				Subaerial	1.00	Non-leaching climate	1.00	Moderately aerated	0.77
				pH	0.85	Persistent water table	1.00	Moderate antecedent organic matter content	0.71
				Flooding and ponding	0.50	Existing electrical conductivity, 0-30cm	1.00	Moderate moisture deficit	0.69
				Frost-free days	0.29	Water table at the surface, months	1.00	Moderate oxidation rate	0.18
						Electrical conductivity	1.00		

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes									
Maltese	45			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Well aerated	1.00	Electrical conductivity	1.00	Moderate antecedent organic matter content	0.70
				Subaerial	1.00	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				pH	0.67			Medium amount of clay surface area	0.24
Gerda	35			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Well aerated	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.82
				Subaerial	1.00	Electrical conductivity	1.00	Moderate moisture deficit	0.66
				pH	0.52	Non-leaching climate	0.91	Not water gathering surface	0.60
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.84	Moderate oxidation rate	0.12

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes									
Rhame	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.95	Electrical conductivity	0.06	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.61
Chinook	30			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Low amount of clay surface area	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.66
				pH	0.92	Non-leaching climate	0.91	Not water gathering surface	0.60
				Frost-free days	0.19	Electrical conductivity	0.01	Moderate antecedent organic matter content	0.52

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes									
Rhame	37			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.95	Electrical conductivity	0.06	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.64
Fleak	34			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.90	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.82
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes									
Rhame	32			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.95	Electrical conductivity	0.06	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.61
Arikara, low precipitation	25			Mineral soil		Low surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				pH	0.88	Electrical conductivity	0.16	Medium amount of clay surface area	0.36
				Frost-free days	0.19			Moderate oxidation rate	0.12
Fleak	21			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.90	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.82
				Frost-free days	0.19			Moderate moisture deficit	0.66
L2145A—Kremlin loam, 0 to 2 percent slopes									
Kremlin	85			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.80
				pH	0.90	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.59

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes									
Rhame	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.98			Moderate antecedent organic matter content	0.73
				Frost-free days	0.19			Moderate moisture deficit	0.66
Bullock	22			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Medium amount of clay surface area	0.93
				pH	0.83	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.86
				Not saline	0.50	Electrical conductivity	1.00	Moderate moisture deficit	0.66
				Frost-free days	0.19	Non-leaching climate	0.91	Not water gathering surface	0.33
Kremlin	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.74
				pH	0.92	Electrical conductivity	0.06	Moderate antecedent organic matter content	0.73
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes									
Scairt	30			Mineral soil		High surface salinization risk or already saline		OM depletion moderate	
				Flooding and ponding	1.00	Existing electrical conductivity, 0-30cm	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.66
				pH	0.79	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.61
				Frost-free days	0.19	Electrical conductivity	1.00	Moderate oxidation rate	0.12
						Non-leaching climate	0.91	Medium amount of clay surface area	0.03
Maltese	20			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				pH	0.81	Electrical conductivity	1.00	Moderate moisture deficit	0.66
				Frost-free days	0.19	Non-leaching climate	0.91	Medium amount of clay surface area	0.66
								Moderate antecedent organic matter content	0.55
Boxwell	15			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.76
				pH	0.95	Electrical conductivity	0.15	Medium amount of clay surface area	0.74
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes									
Rhame	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.98			Moderate antecedent organic matter content	0.73
				Frost-free days	0.19			Moderate moisture deficit	0.66
Kremlin	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Medium amount of clay surface area	0.74
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.73
				pH	0.92	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				Frost-free days	0.19	Electrical conductivity	0.06	Not water gathering surface	0.33
Archin	15			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Water table at the surface, months	1.00	Medium amount of clay surface area	0.98
				pH	0.83	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.82
				Frost-free days	0.19	Electrical conductivity	1.00	Moderate moisture deficit	0.66
						Non-leaching climate	0.91	Not water gathering surface	0.33

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped									
Cabbart	29			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.90
				pH	0.85	Electrical conductivity	0.10	Medium amount of clay surface area	0.74
				Frost-free days	0.19			Moderate moisture deficit	0.66
Kremlin	19			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Medium amount of clay surface area	0.74
				Subaerial	1.00	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.73
				pH	0.92	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				Frost-free days	0.19	Electrical conductivity	0.06	Not water gathering surface	0.33
Boxwell	17			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.76
				pH	0.95	Electrical conductivity	0.15	Medium amount of clay surface area	0.74
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes									
Boxwell	36			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.79
				pH	0.94	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.58
Cabbart	29			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.87
				pH	0.90	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.68
				Frost-free days	0.19			Moderate moisture deficit	0.66
Arikara, low precipitation	16			Mineral soil		Low surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				pH	0.88	Electrical conductivity	0.16	Medium amount of clay surface area	0.36
				Frost-free days	0.19			Moderate oxidation rate	0.12

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes									
Boxwell	63			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.80
				pH	0.91	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.61
Kremlin	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.80
				pH	0.90	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.59

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes									
Boxwell	46			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.79
				pH	0.92	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.66
Kremlin	32			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.81
				pH	0.94	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.56

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes									
Kirby, channery loam	38			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.92
				pH	0.94	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.55
Badland	25			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66
Patent, badland fan	20			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.74
				pH	0.76	Electrical conductivity	0.55	Moderate moisture deficit	0.66
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.25	Moderate antecedent organic matter content	0.46

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes									
Kirby, channery loam	50			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.92	Electrical conductivity	0.02	Moderate antecedent organic matter content	0.89
				Frost-free days	0.19			Moderate moisture deficit	0.66
Scairt	15			Mineral soil		High surface salinization risk or already saline		OM depletion moderate	
				Flooding and ponding	1.00	Existing electrical conductivity, 0-30cm	1.00	Well aerated	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.66
				pH	0.79	Flooding and ponding	1.00	Moderate antecedent organic matter content	0.61
				Frost-free days	0.19	Electrical conductivity	1.00	Moderate oxidation rate	0.12
						Non-leaching climate	0.91	Medium amount of clay surface area	0.03

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes									
Badland	60			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66
Cabbart	30			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.86
				pH	0.88	Electrical conductivity	0.22	Moderate antecedent organic matter content	0.80
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.06	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes									
Cabbart	50			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.86
				pH	0.88	Electrical conductivity	0.22	Moderate antecedent organic matter content	0.80
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.06	Moderate moisture deficit	0.66
Badland	25			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes									
Lonna	43			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Not saline	1.00	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				pH	0.62	Electrical conductivity	0.65	Medium amount of clay surface area	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.62
Cabbart	32			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.87
				pH	0.90	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.68
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes									
Patent, badland fan	35			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.80
				pH	0.77	Electrical conductivity	0.49	Moderate moisture deficit	0.66
				Frost-free days	0.19			Moderate antecedent organic matter content	0.41
Badland	20			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66
Cabbart	20			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.86
				pH	0.88	Electrical conductivity	0.22	Moderate antecedent organic matter content	0.80
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.06	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes									
Badland	30			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66
Arikara, low precipitation	27			Mineral soil		Low surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Surface shape concentrates salts	1.00	Well aerated	1.00
				Not saline	1.00	Water table at the surface, months	1.00	Moderate moisture deficit	0.66
				Subaerial	1.00	Flooding and ponding	1.00	Medium amount of clay surface area	0.61
				pH	0.87	Non-leaching climate	0.91	Not water gathering surface	0.60
				Frost-free days	0.19	Electrical conductivity	0.16	Moderate antecedent organic matter content	0.56
Cabbart	17			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.87
				pH	0.90	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.68
				Frost-free days	0.19			Moderate moisture deficit	0.66
L3197F—Badland, 9 to 150 percent slopes									
Badland	88			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Low antecedent organic matter content	1.00
				Not saline	1.00	Flooding and ponding	1.00	Well aerated	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Not water gathering surface	1.00
				pH	0.75	Electrical conductivity	0.63	Medium amount of clay surface area	0.84
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.59	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes									
Arikara, low precipitation	62			Mineral soil		Low surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				pH	0.88	Electrical conductivity	0.16	Medium amount of clay surface area	0.36
				Frost-free days	0.19			Moderate oxidation rate	0.12
Cabbart	19			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.87
				pH	0.87	Electrical conductivity	0.26	Moderate antecedent organic matter content	0.68
				Frost-free days	0.19			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes									
Patent, occasionally flooded	35			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.75
				pH	0.76	Electrical conductivity	0.51	Medium amount of clay surface area	0.74
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.01	Moderate moisture deficit	0.66
Patent, gullied, occasionally flooded	20			Mineral soil		High surface salinization risk or already saline		OM depletion moderately high	
				Flooding and ponding	1.00	Existing electrical conductivity, 0-30cm	1.00	Low antecedent organic matter content	1.00
				Subaerial	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				pH	0.55	Flooding and ponding	1.00	Not water gathering surface	1.00
				Frost-free days	0.19	Electrical conductivity	1.00	Medium amount of clay surface area	0.74
						Non-leaching climate	0.91	Moderate moisture deficit	0.66
Glendive, frequently flooded	15			Mineral soil		Surface salinization risk		OM depletion moderately high	

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.86	Electrical conductivity	0.32	Moderate antecedent organic matter content	0.96
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.28	Moderate moisture deficit	0.66
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded									
Patent, occasionally flooded	80			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.75
				pH	0.76	Electrical conductivity	0.51	Medium amount of clay surface area	0.74
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.01	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes									
Patent, occasionally flooded	40			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.75
				pH	0.76	Electrical conductivity	0.51	Medium amount of clay surface area	0.74
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.01	Moderate moisture deficit	0.66
Vanda	25			Mineral soil		High surface salinization risk or already saline		OM depletion moderately high	
				Flooding and ponding	1.00	Electrical conductivity	1.00	Well aerated	1.00
				Subaerial	1.00	Existing electrical conductivity, 0-30cm	1.00	Not water gathering surface	1.00
				pH	0.44	Water table at the surface, months	1.00	Moderate antecedent organic matter content	0.96
				Frost-free days	0.19	Flooding and ponding	1.00	Moderate moisture deficit	0.66
						Non-leaching climate	0.91	Moderate oxidation rate	0.12
Gerda, severely eroded	15			Mineral soil		High surface salinization risk or already saline		OM depletion moderate	
				Flooding and ponding	1.00	Electrical conductivity	1.00	Well aerated	1.00

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				Subaerial	1.00	Existing electrical conductivity, 0-30cm	1.00	Moderate antecedent organic matter content	0.75
				pH	0.54	Water table at the surface, months	1.00	Moderate moisture deficit	0.66
				Frost-free days	0.19	Flooding and ponding	1.00	Moderate oxidation rate	0.12
						Non-leaching climate	0.91		

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes									
Kremlin	25			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.74
				pH	0.92	Electrical conductivity	0.06	Moderate antecedent organic matter content	0.73
				Frost-free days	0.19			Moderate moisture deficit	0.66
Ethridge	22			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Moderate antecedent organic matter content	0.78
				pH	0.80	Electrical conductivity	0.11	Moderate moisture deficit	0.66
				Frost-free days	0.19			Medium amount of clay surface area	0.16
Gerda	20			Mineral soil		Surface salinization risk		OM depletion moderate	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
				pH	0.78	Electrical conductivity	1.00	Moderate antecedent organic matter content	0.55
				Frost-free days	0.19	Non-leaching climate	0.91	Moderate oxidation rate	0.12
						Existing electrical conductivity, 0-30cm	0.43		
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded									
Wolf point, occasionally flooded	85			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Subaerial	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				pH	0.89	Electrical conductivity	1.00	Moderate antecedent organic matter content	0.96
				Not saline	0.88	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.27	Moderate oxidation rate	0.12

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded									
Wolf point, wooded, occasionally flooded	78			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Well aerated	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Electrical conductivity	1.00	Moderate antecedent organic matter content	0.96
				pH	0.89	Non-leaching climate	0.91	Moderate moisture deficit	0.66
				Not saline	0.88	Existing electrical conductivity, 0-30cm	0.27	Moderate oxidation rate	0.12
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded									
Havre, occasionally flooded	82			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.86
				pH	0.76	Electrical conductivity	0.49	Moderate antecedent organic matter content	0.75
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.09	Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded									
Havre, rarely flooded, mollic	86			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.74
				pH	0.76	Electrical conductivity	0.49	Moderate moisture deficit	0.66
				Frost-free days	0.19	Existing electrical conductivity, 0-30cm	0.10	Moderate antecedent organic matter content	0.40

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded									
Glendive, channeled, frequently flooded	40			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Well aerated	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				Subaerial	1.00	Electrical conductivity	0.35	Moderate moisture deficit	0.66
				pH	0.70			Moderate antecedent organic matter content	0.52
Fluvaquents, channeled, frequently flooded	30			Mineral soil		Surface salinization risk		OM depletion moderate	
				Subaerial	1.00	Depth to Saturation	1.00	Low amount of clay surface area	1.00
				Not saline	1.00	Persistent water table	1.00	Moderate antecedent organic matter content	0.80
				pH	0.76	Water table at the surface, months	1.00	Moderate moisture deficit	0.66
				Frost-free days	0.19	Non-leaching climate	0.91	Not water gathering surface	0.33
						Surface shape concentrates salts	0.67	Moderately aerated	0.23

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Havre, channeled, frequently flooded	20			Mineral soil		Surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Well aerated	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.84
				Subaerial	1.00	Electrical conductivity	0.42	Moderate moisture deficit	0.66
				pH	0.74	Existing electrical conductivity, 0-30cm	0.13	Moderate antecedent organic matter content	0.46
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded									
Glendive, occasionally flooded	75			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Well aerated	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				Subaerial	1.00	Electrical conductivity	0.10	Moderate antecedent organic matter content	0.74
				pH	0.66			Moderate moisture deficit	0.66

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded									
Hanly, occasionally flooded	80			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Well aerated	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				Subaerial	1.00	Electrical conductivity	0.10	Moderate moisture deficit	0.66
				pH	0.74			Moderate antecedent organic matter content	0.64

Organic Matter Depletion, Salt Concentration, Aerobic Soil Organisms, Organic Soil Subsidence–McKenzie County, North Dakota									
Map symbol and soil name	Pct. of map unit	Suitability for Aerobic Soil Organisms		Agricultural Organic Soil Subsidence		Surface Salt Concentration		Organic Matter Depletion	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes									
Tinsley	53			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Low amount of clay surface area	1.00
				pH	0.95	Electrical conductivity	0.07	Moderate antecedent organic matter content	0.92
				Frost-free days	0.19			Moderate moisture deficit	0.66
Chanta	17			Mineral soil		Low surface salinization risk		OM depletion moderately high	
				Flooding and ponding	1.00	Water table at the surface, months	1.00	Well aerated	1.00
				Not saline	1.00	Flooding and ponding	1.00	Not water gathering surface	1.00
				Subaerial	1.00	Non-leaching climate	0.91	Medium amount of clay surface area	0.74
				pH	0.94			Moderate antecedent organic matter content	0.74
				Frost-free days	0.19			Moderate moisture deficit	0.66
L4999—Water									
Water	100			Not rated		Not rated		Not rated	

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. 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.

Physical Soil Properties

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

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

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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 earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear

extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

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

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

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

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

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

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

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes														
Rhoades	0-3	35-40- 45	30-36- 45	18-24- 27	1.30-1.40-1.50	4.23-7.13-14.11	0.20-0.21-0.22	2.1- 3.7- 4.7	3.0- 4.0-5.0	.37	.37	2	6	48
	3-8	8-22- 30	35-40- 55	35-38- 50	1.30-1.40-1.45	0.01-0.28-0.42	0.15-0.18-0.23	4.7- 6.4-11.0	0.5- 1.3-2.0	.37	.37			
	8-14	5-22- 30	35-40- 55	35-38- 50	1.30-1.40-1.50	0.01-0.28-0.42	0.11-0.13-0.15	4.2- 6.1-10.5	0.5- 1.3-2.0	.37	.37			
	14-46	5-22- 30	35-40- 55	25-38- 50	1.40-1.45-1.50	0.01-0.28-0.42	0.10-0.11-0.14	2.0- 6.2-10.0	0.0- 0.3-0.5	.43	.43			
	46-79	15-28- 35	25-30- 45	20-42- 60	1.35-1.45-1.50	0.42-1.21-1.41	0.09-0.10-0.12	1.1- 6.6-13.0	0.0- 0.3-0.5	.24	.24			
Daglum	0-3	10-17- 20	55-60- 70	18-23- 27	1.15-1.20-1.25	4.23-12.25-14.11	0.22-0.23-0.24	1.8- 2.8- 3.8	4.0- 5.5-7.0	.37	.37	2	6	48
	3-5	10-27- 35	40-53- 65	18-20- 27	1.30-1.35-1.40	4.23-9.15-14.11	0.20-0.22-0.24	2.0- 2.8- 4.6	2.5- 3.5-4.5	.43	.43			
	5-18	5-15- 30	20-47- 65	30-38- 50	1.30-1.35-1.40	0.01-0.43-1.41	0.15-0.17-0.19	3.7- 6.9-11.7	1.5- 2.0-3.0	.32	.32			
	18-32	5-22- 30	20-40- 55	30-38- 50	1.40-1.45-1.50	0.01-0.43-1.41	0.12-0.13-0.14	2.7- 5.9-10.1	0.5- 0.8-1.0	.32	.32			
	32-47	5-25- 35	15-37- 65	30-38- 50	1.30-1.40-1.50	0.01-0.32-1.41	0.10-0.11-0.12	2.4- 5.6- 9.6	0.0- 0.5-1.0	.32	.32			
	47-79	15-28- 35	25-30- 45	20-42- 60	1.35-1.45-1.50	0.01-0.32-1.41	0.09-0.10-0.12	1.1- 6.6-13.0	0.0- 0.3-0.5	.28	.28			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes														
Dogtooth	0-2	35-42- 45	30-36- 45	18-22- 27	1.40-1.50-1.60	1.41-3.75-4.23	0.20-0.21-0.22	1.9- 3.1- 4.5	2.0- 3.0-4.0	.43	.43	2	6	48
	2-10	15-30- 40	30-34- 55	27-36- 50	1.35-1.40-1.45	0.01-0.28-0.42	0.14-0.18-0.20	3.1- 6.3-11.5	1.5- 2.0-2.5	.37	.37			
	10-15	10-25- 40	30-37- 55	27-38- 50	1.35-1.45-1.55	0.01-0.28-0.42	0.07-0.13-0.18	2.5- 6.1-10.9	0.5- 1.0-1.5	.37	.37			
	15-28	10-15- 30	25-43- 60	27-42- 50	1.40-1.45-1.50	0.01-0.22-0.42	0.07-0.10-0.17	2.5- 7.0-10.5	0.3- 0.5-1.0	.37	.37			
	28-79	—	—	—	—	0.01-0.05-0.42	—	—	—					
Janesburg	0-7	10-15- 20	55-61- 70	18-24- 27	1.20-1.25-1.30	1.41-5.25-14.11	0.22-0.23-0.24	1.9- 3.4- 4.6	3.0- 4.0-5.0	.43	.43	2	6	48
	7-9	10-18- 30	45-62- 75	15-20- 27	1.40-1.45-1.50	1.41-3.75-4.23	0.20-0.22-0.24	1.3- 2.4- 4.2	1.5- 2.5-3.0	.49	.49			
	9-16	5-12- 30	20-50- 65	27-38- 50	1.35-1.40-1.45	0.01-0.48-1.41	0.13-0.18-0.20	2.6- 6.4-11.2	1.0- 1.5-2.5	.37	.37			
	16-25	5-10- 30	20-48- 65	27-42- 50	1.35-1.40-1.45	0.01-0.25-1.41	0.11-0.15-0.20	2.2- 6.9-10.5	0.5- 1.0-1.5	.37	.37			
	25-32	5- 7- 30	20-48- 65	27-45- 50	1.40-1.45-1.50	0.01-0.22-1.41	0.07-0.13-0.17	2.2- 7.4-10.1	0.3- 0.5-1.0	.37	.37			
	32-79	—	—	—	—	0.01-0.05-0.42	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes														
Dogtooth	0-2	35-42- 45	30-36- 45	18-22- 27	1.40-1.50-1.60	4.23-5.25-14.11	0.18-0.20-0.22	1.8- 2.8- 4.4	2.0- 3.0-4.0	.43	.43	2	6	48
	2-8	15-30- 40	30-34- 55	27-36- 50	1.35-1.40-1.45	0.01-0.28-0.42	0.12-0.16-0.20	2.7- 6.2-11.0	1.5- 2.0-2.5	.37	.37			
	8-13	10-25- 40	30-37- 55	27-38- 50	1.35-1.45-1.55	0.01-0.28-0.42	0.06-0.13-0.20	2.3- 5.9-10.5	0.5- 1.0-1.5	.37	.37			
	13-21	10-15- 30	25-43- 60	27-42- 50	1.40-1.45-1.50	0.01-0.22-0.42	0.06-0.11-0.18	2.3- 6.7-10.1	0.3- 0.5-1.0	.37	.37			
	21-79	—	—	—	—	0.01-0.05-0.42	—	—	—					
Janesburg	0-6	10-15- 20	45-55- 60	27-30- 38	1.25-1.35-1.40	1.41-3.75-14.11	0.18-0.22-0.23	3.5- 4.7- 8.9	3.0- 4.0-5.0	.37	.37	2	6	48
	6-8	10-18- 30	45-62- 75	15-20- 27	1.40-1.45-1.50	4.23-5.25-14.11	0.20-0.22-0.23	1.3- 2.4- 4.2	1.5- 2.5-3.0	.49	.49			
	8-14	5-12- 30	20-50- 65	27-38- 50	1.35-1.40-1.45	0.01-0.48-1.41	0.13-0.18-0.20	2.6- 6.4-11.2	1.0- 1.5-2.5	.37	.37			
	14-21	5-10- 30	20-48- 65	27-42- 50	1.35-1.40-1.45	0.01-0.25-1.41	0.11-0.15-0.21	2.2- 6.9-10.5	0.5- 1.0-1.5	.37	.37			
	21-26	5- 7- 30	20-48- 65	27-45- 50	1.40-1.45-1.50	0.01-0.22-1.41	0.06-0.12-0.19	2.2- 7.4-10.1	0.3- 0.5-1.0	.37	.37			
	26-79	—	—	—	—	0.01-0.05-0.42	—	—	—					
Cabba	0-3	25-35- 45	30-45- 50	18-20- 27	1.25-1.30-1.45	4.23-9.17-14.11	0.15-0.18-0.20	1.4- 2.7- 4.9	2.0- 4.5-7.0	.37	.37	2	4L	86
	3-8	15-25- 40	25-53- 65	18-22- 35	1.30-1.40-1.50	4.23-6.75-14.11	0.15-0.20-0.22	1.0- 1.9- 4.9	1.0- 1.5-2.0	.49	.49			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	8-12	15-22- 40	25-56- 65	18-22- 35	1.40-1.45-1.50	1.41-2.25-4.23	0.14-0.20-0.22	1.0- 1.9- 4.6	0.3- 0.5-1.0	.55	.55			
	12-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes														
Vebar	0-6	55-68- 75	7-18- 32	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.14-0.16-0.18	0.9- 1.6- 2.3	1.5- 2.0-2.5	.15	.15	3	3	86
	6-11	55-70- 75	7-16- 30	10-14- 18	1.35-1.45-1.55	14.11-28.23-42.34	0.13-0.15-0.18	0.8- 1.4- 2.1	1.0- 1.5-2.0	.17	.17			
	11-17	60-72- 80	2-14- 28	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.14-0.17	0.8- 1.3- 2.1	0.5- 1.0-1.5	.24	.24			
	17-29	60-74- 80	2-12- 27	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.5- 1.3- 2.0	0.3- 0.5-1.0	.24	.24			
	29-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
Cohagen	0-6	60-68- 75	10-18- 30	10-14- 18	1.40-1.50-1.60	14.11-28.23-42.34	0.15-0.16-0.17	0.8- 1.4- 1.9	0.5- 1.0-2.0	.20	.20	2	3	86
	6-17	60-74- 80	5-14- 30	10-12- 18	1.40-1.50-1.60	14.11-28.23-42.34	0.12-0.14-0.17	0.8- 1.1- 1.8	0.3- 0.5-1.0	.24	.24			
	17-79	—	—	—	—	0.42-3.85-4.23	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes														
Vebar	0-6	55-68- 75	7-18- 32	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.14-0.16-0.18	0.9- 1.6- 2.3	1.5- 2.0-3.0	.15	.15	3	3	86
	6-11	55-70- 75	7-16- 30	10-14- 18	1.35-1.45-1.55	14.11-28.23-42.34	0.13-0.15-0.18	0.8- 1.4- 2.1	1.0- 1.5-2.0	.17	.17			
	11-17	60-72- 80	2-14- 28	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.14-0.17	0.8- 1.3- 2.1	0.5- 1.0-1.5	.24	.24			
	17-29	60-74- 80	2-12- 27	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.5- 1.3- 2.0	0.3- 0.5-1.0	.24	.24			
	29-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
Flasher	0-5	70-84- 90	5- 9- 25	3- 7- 10	1.35-1.40-1.60	42.34-91.74-141.14	0.10-0.11-0.12	0.2- 0.7- 1.2	0.5- 1.5-2.3	.24	.24	2	2	134
	5-10	75-85- 90	5-10- 20	1- 5- 10	1.40-1.45-1.60	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.5- 1.1	0.3- 1.0-1.5	.20	.20			
	10-15	75-84- 90	5-12- 20	1- 5- 10	1.45-1.50-1.60	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.4- 1.1	0.3- 0.5-0.8	.24	.24			
	15-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
Tally	0-6	55-65- 75	10-21- 35	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.16-0.17-0.18	0.9- 1.5- 2.0	1.5- 2.5-3.5	.17	.17	5	3	86
	6-12	55-68- 75	10-18- 35	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.14-0.16-0.18	0.9- 1.4- 2.0	1.0- 2.0-3.0	.24	.24			
	12-18	55-70- 75	10-16- 35	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.14-0.17	0.9- 1.4- 2.0	1.0- 1.5-2.0	.24	.24			
	18-33	60-75- 85	5-13- 35	5-12- 18	1.50-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.2- 1.1- 1.7	0.5- 1.0-1.5	.24	.24			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	33-70	60-78- 85	5-12- 35	5-10- 18	1.50-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.3- 0.9- 1.8	0.3- 0.5-1.0	.24	.24			
	70-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes														
Beisigl	0-5	-86-	- 7-	3- 7- 10	1.35-1.45-1.55	10.00-92.00-705.00	0.11-0.12-0.13	0.0- 1.5- 2.9	1.0- 2.0-3.0	.15	.15	3	2	134
	5-27	-79-	-16-	1- 5- 10	1.30-1.50-1.70	10.00-92.00-705.00	0.05-0.08-0.10	0.0- 1.5- 2.9	0.5- 0.8-1.0	.17	.17			
	27-60	-82-	-13-	1- 5- 10	1.45-1.58-1.70	0.10-7.21-100.00	0.04-0.06-0.08	—	0.0- 0.3-0.5	.49	.49			
Flasher	0-6	-86-	- 7-	3- 7- 10	1.35-1.45-1.55	10.00-91.74-100.00	0.10-0.11-0.12	0.0- 1.5- 2.9	0.5- 0.8-1.0	.20	.20	2	2	134
	6-10	-79-	-16-	1- 5- 10	1.35-1.45-1.55	10.00-91.74-100.00	0.10-0.11-0.12	0.0- 1.5- 2.9	0.0- 0.3-0.5	.17	.17			
	10-60	-82-	-13-	1- 5- 10	1.45-1.58-1.70	1.00-7.21-10.00	0.04-0.06-0.08	—	0.0- 0.3-0.5	.49	.49			
Telfer	0-6	-79-	-16-	1- 5- 10	1.35-1.45-1.55	10.00-91.74-705.00	0.10-0.11-0.12	0.0- 1.5- 2.9	1.0- 2.0-3.0	.20	.20	5	2	134
	6-60	-94-	- 1-	1- 5- 10	1.40-1.55-1.70	10.00-91.74-705.00	0.06-0.08-0.10	0.0- 1.5- 2.9	0.0- 0.5-1.0	.17	.17			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes														
Flasher	0-3	70-84- 90	5- 9- 25	3- 7- 10	1.35-1.40-1.60	42.34-91.74-141.14	0.10-0.11-0.12	0.2- 0.6- 1.0	0.5- 1.5-2.3	.24	.24	2	2	134
	3-9	75-85- 90	5-10- 20	1- 5- 10	1.40-1.45-1.60	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.4- 0.8	0.3- 1.0-1.5	.20	.20			
	9-14	75-84- 90	5-12- 20	1- 5- 10	1.45-1.50-1.60	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.4- 0.7	0.3- 0.5-0.8	.24	.24			
	14-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
Vebar	0-5	55-68- 75	7-18- 32	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.14-0.16-0.18	0.9- 1.6- 2.3	1.5- 2.0-3.0	.15	.15	3	3	86
	5-10	55-70- 75	7-16- 30	10-14- 18	1.35-1.45-1.55	14.11-28.23-42.34	0.13-0.15-0.18	0.8- 1.4- 2.1	1.0- 1.5-2.0	.17	.17			
	10-13	60-72- 80	2-14- 28	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.14-0.17	0.8- 1.3- 2.1	0.5- 1.0-1.5	.24	.24			
	13-26	60-74- 80	2-12- 27	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.5- 1.3- 2.0	0.3- 0.5-1.0	.24	.24			
	26-79	—	—	—	—	0.42-3.85-4.23	—	—	—					
Parshall	0-9	55-62- 75	15-24- 35	10-14- 18	1.35-1.45-1.55	14.11-28.23-42.34	0.13-0.17-0.18	1.0- 1.5- 2.0	2.0- 3.5-4.0	.15	.15	5	3	86
	9-25	55-65- 75	15-21- 35	10-14- 18	1.40-1.50-1.60	14.11-28.23-42.34	0.12-0.16-0.17	0.9- 1.4- 2.0	1.0- 2.0-3.0	.20	.20			
	25-35	60-72- 80	10-18- 30	5-10- 18	1.40-1.50-1.60	14.11-28.23-141.14	0.10-0.15-0.17	0.4- 1.0- 2.0	0.5- 1.0-2.0	.20	.20			
	35-42	65-75- 85	10-15- 30	5-10- 18	1.50-1.55-1.65	14.11-28.23-141.14	0.08-0.14-0.16	0.3- 0.8- 1.8	0.5- 0.8-1.0	.17	.17			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	42-79	65-76- 85	10-14- 30	5-10- 18	1.50-1.55-1.65	14.11-28.23-141.14	0.08-0.13-0.16	0.3- 0.8- 1.8	0.1- 0.3-0.5	.17	.17			
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes														
Lihen	0-9	-79-	-16-	1- 5- 10	1.35-1.45-1.55	10.00-91.74-100.00	0.06-0.12-0.18	0.0- 1.5- 2.9	1.0- 2.0-3.0	.17	.17	5	2	134
	9-24	-79-	-17-	1- 5- 10	1.35-1.45-1.55	10.00-91.74-100.00	0.06-0.12-0.18	0.0- 1.5- 2.9	1.0- 2.0-3.0	.15	.15			
	24-32	-94-	- 1-	1- 5- 10	1.35-1.45-1.55	10.00-91.74-100.00	0.06-0.09-0.12	0.0- 1.5- 2.9	1.0- 1.5-2.0	.17	.17			
	32-60	-94-	- 1-	1- 5- 10	1.40-1.50-1.60	10.00-91.74-100.00	0.05-0.09-0.12	0.0- 1.5- 2.9	0.0- 0.3-0.5	.17	.17			
Parshall	0-7	-70-	-16-	10-14- 18	1.30-1.40-1.50	10.00-28.23-100.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 2.5-4.0	.17	.17	4	3	86
	7-12	-70-	-16-	10-14- 18	1.30-1.40-1.50	10.00-28.23-100.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 2.5-4.0	.17	.17			
	12-29	-70-	-16-	10-14- 18	1.30-1.45-1.60	10.00-28.23-100.00	0.12-0.15-0.17	0.0- 1.5- 2.9	1.0- 2.0-3.0	.20	.20			
	29-48	-70-	-16-	5-14- 18	1.40-1.50-1.60	10.00-28.23-100.00	0.12-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.5-1.0	.24	.24			
	48-60	-83-	-10-	5- 8- 18	1.40-1.50-1.60	10.00-91.74-100.00	0.10-0.11-0.12	0.0- 1.5- 2.9	0.0- 0.5-1.0	.17	.17			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes														
Cabba	0-3	15-35- 52	30-46- 65	14-19- 27	1.30-1.40-1.50	4.23-9.17-14.11	0.15-0.19-0.22	1.0- 1.8- 3.3	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-8	10-26- 52	30-52- 65	15-22- 35	1.35-1.40-1.50	1.41-9.17-14.11	0.15-0.17-0.22	0.9- 1.9- 4.3	0.8- 1.0-1.5	.49	.49			
	8-12	10-24- 52	30-54- 65	15-22- 35	1.40-1.50-1.55	1.41-9.17-14.11	0.15-0.17-0.22	0.9- 2.0- 4.3	0.3- 0.5-1.0	.55	.55			
	12-79	—	—	—	—	0.42-1.25-4.23	—	—	—					
Chama	0-4	10-31- 35	40-47- 70	15-22- 30	1.00-1.20-1.40	1.41-9.17-14.11	0.15-0.19-0.22	1.1- 2.6- 4.0	1.5- 2.5-4.0	.32	.32	3	4L	86
	4-7	5-30- 35	40-49- 70	15-21- 35	1.10-1.20-1.40	1.41-9.17-14.11	0.15-0.19-0.22	1.1- 2.3- 4.7	1.0- 2.0-3.0	.43	.43			
	7-18	2-18- 20	50-62- 70	18-20- 35	1.15-1.35-1.45	1.41-9.17-14.11	0.16-0.20-0.22	1.2- 1.8- 4.3	0.5- 1.0-1.5	.49	.49			
	18-28	2-11- 20	55-67- 75	18-22- 35	1.25-1.40-1.60	1.41-9.17-14.11	0.16-0.20-0.22	1.2- 2.0- 4.3	0.5- 0.8-1.0	.49	.49			
	28-79	—	—	—	—	0.42-1.25-4.23	—	—	—					
Shambo	0-6	29-43- 49	28-35- 53	18-22- 27	1.00-1.30-1.40	4.23-9.17-14.11	0.15-0.20-0.22	1.7- 2.9- 3.8	2.0- 4.0-6.0	.24	.24	5	6	48
	6-11	32-41- 49	25-35- 50	18-24- 30	1.20-1.30-1.40	1.41-9.17-14.11	0.15-0.20-0.22	1.9- 3.4- 4.4	1.0- 2.5-3.0	.32	.32			
	11-24	30-44- 53	24-32- 50	18-24- 30	1.20-1.30-1.40	1.41-9.17-14.11	0.15-0.18-0.20	1.8- 3.5- 4.6	1.0- 2.0-3.0	.37	.37			
	24-38	27-44- 65	16-32- 52	18-24- 30	1.20-1.40-1.50	1.41-9.17-14.11	0.15-0.18-0.20	1.6- 3.2- 4.4	0.5- 0.8-1.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	38-44	32-47- 55	22-30- 53	14-23- 30	1.20-1.40-1.50	1.41-9.17-14.11	0.14-0.17-0.20	1.1- 2.9- 4.5	0.5- 0.8-1.0	.37	.37			
	44-71	18-47- 58	21-29- 49	18-24- 35	1.30-1.50-1.60	1.41-9.17-14.11	0.14-0.17-0.20	1.6- 3.5- 5.2	0.1- 0.5-1.0	.37	.37			
	71-79	—	—	—	—	0.42-1.25-4.23	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes														
Arikara	0-1	- 5-	-90-	0- 5- 15	0.02-0.05-0.15	100.00-423.34-705.00	0.55-0.60-0.65	—	90.0-95.0-100.0	.02	.02	5	6	48
	1-2	-39-	-37-	18-25- 27	1.00-1.10-1.20	1.00-9.17-10.00	0.20-0.21-0.22	3.0- 4.5- 6.0	3.0- 4.5-6.0	.24	.24			
	2-14	-39-	-37-	18-25- 35	1.20-1.30-1.40	1.00-9.17-10.00	0.18-0.20-0.22	3.0- 4.5- 5.9	1.0- 1.5-2.0	.28	.28			
	14-39	-39-	-37-	15-25- 35	1.20-1.30-1.40	1.00-9.17-10.00	0.15-0.17-0.20	3.0- 4.5- 5.9	1.0- 1.5-2.0	.28	.28			
	39-60	-39-	-37-	15-25- 35	1.15-1.25-1.35	1.00-9.17-10.00	0.14-0.17-0.20	0.0- 1.5- 2.9	0.5- 0.8-1.0	.28	.28			
Cabba	0-3	-42-	-38-	18-20- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.28	.28	2	4L	86
	3-15	-42-	-38-	18-20- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-40-	-40-	5-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.06-0.08-0.10	—	0.0- 0.3-0.5	.43	.43			
Shambo, steep	0-9	-39-	-37-	18-24- 27	1.00-1.15-1.30	1.00-9.17-10.00	0.20-0.21-0.22	0.0- 1.5- 2.9	2.0- 4.0-6.0	.20	.20	5	6	48
	9-13	-39-	-37-	18-24- 30	1.20-1.35-1.50	1.00-9.17-10.00	0.20-0.21-0.22	0.0- 1.5- 2.9	1.0- 2.0-3.0	.28	.28			
	13-29	-39-	-37-	18-24- 30	1.20-1.35-1.50	1.00-9.17-10.00	0.17-0.18-0.19	0.0- 1.5- 2.9	1.0- 1.5-2.0	.28	.28			
	29-48	-39-	-37-	18-24- 30	1.20-1.35-1.50	1.00-9.17-10.00	0.17-0.18-0.19	0.0- 1.5- 2.9	0.5- 0.8-1.0	.32	.32			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	48-60	-39-	-37-	18-24- 35	1.20-1.35-1.50	1.00-9.17-10.00	0.17-0.18-0.19	0.0- 1.5- 2.9	0.0- 0.5-1.0	.32	.32			
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes														
Chama	0-4	-11-	-67-	15-22- 27	1.10-1.23-1.35	1.00-9.17-100.00	0.20-0.22-0.24	0.0- 1.5- 2.9	1.0- 2.5-4.0	.37	.37	3	4L	86
	4-8	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	1.0- 2.0-3.0	.32	.32			
	8-34	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Sen	0-6	-11-	-67-	18-22- 27	1.00-1.15-1.30	1.00-9.17-100.00	0.22-0.23-0.24	0.0- 1.5- 2.9	2.0- 3.0-4.0	.37	.37	3	6	48
	6-17	-11-	-67-	18-22- 35	1.20-1.30-1.40	1.00-9.17-100.00	0.21-0.22-0.23	0.0- 1.5- 5.9	1.0- 2.0-3.0	.43	.43			
	17-34	-11-	-67-	18-22- 30	1.40-1.50-1.60	1.00-9.17-100.00	0.20-0.21-0.22	0.0- 1.5- 5.9	1.0- 1.5-2.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes														
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-100.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-100.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Chama	0-4	-11-	-67-	15-22- 27	1.10-1.23-1.35	1.00-9.17-100.00	0.20-0.22-0.24	0.0- 1.5- 2.9	1.0- 2.5-4.0	.37	.37	3	4L	86
	4-8	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	1.0- 2.0-3.0	.32	.32			
	8-34	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Sen	0-6	-11-	-67-	18-22- 27	1.00-1.15-1.30	1.00-9.17-100.00	0.22-0.23-0.24	0.0- 1.5- 2.9	2.0- 3.0-4.0	.32	.32	3	6	48
	6-17	-11-	-67-	18-22- 35	1.20-1.30-1.40	1.00-9.17-100.00	0.21-0.22-0.23	0.0- 1.5- 5.9	1.0- 2.0-3.0	.43	.43			
	17-34	-11-	-67-	18-22- 30	1.40-1.50-1.60	1.00-9.17-100.00	0.20-0.21-0.22	0.0- 1.5- 5.9	1.0- 1.5-2.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes														
Chama	0-4	-11-	-67-	15-22- 27	1.10-1.23-1.35	1.00-9.17-100.00	0.20-0.22-0.24	0.0- 1.5- 2.9	1.0- 2.5-4.0	.37	.37	3	4L	86
	4-8	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	1.0- 2.0-3.0	.32	.32			
	8-34	- 7-	-68-	18-25- 35	1.20-1.35-1.50	1.00-9.17-100.00	0.18-0.19-0.20	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Sen	0-6	-11-	-67-	18-22- 27	1.00-1.15-1.30	1.00-9.17-100.00	0.22-0.23-0.24	0.0- 1.5- 2.9	2.0- 3.0-4.0	.37	.37	3	6	48
	6-17	-11-	-67-	18-22- 35	1.20-1.30-1.40	1.00-9.17-100.00	0.21-0.22-0.23	0.0- 1.5- 5.9	1.0- 2.0-3.0	.43	.43			
	17-34	-11-	-67-	18-22- 30	1.40-1.50-1.60	1.00-9.17-100.00	0.20-0.21-0.22	0.0- 1.5- 5.9	1.0- 1.5-2.0	.43	.43			
	34-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	0.10-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E3107F—Cabba-Badland complex, 6 to 70 percent slopes														
Cabba	0-3	-42-	-38-	18-20- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.28	.28	2	4L	86
	3-15	-42-	-38-	18-20- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-40-	-40-	5-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.06-0.08-0.10	—	0.0- 0.3-0.5	.43	.43			
Badland	0-2	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 1.0-2.0	.37	.37		4L	86
	2-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	0.0- 3.0- 6.0	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes														
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Cherry	0-3	-10-	-68-	18-23- 27	1.15-1.25-1.35	1.00-9.00-10.00	0.20-0.22-0.24	0.1- 1.5- 2.9	0.5- 1.8-3.0	.49	.49	5	4L	86
	3-33	- 7-	-66-	18-27- 35	1.20-1.40-1.60	1.00-2.00-10.00	0.16-0.19-0.22	0.0- 1.5- 5.9	0.5- 1.3-2.0	.37	.37			
	33-60	- 9-	-57-	18-34- 50	1.40-1.55-1.70	1.00-2.00-10.00	0.13-0.18-0.22	0.0- 4.5- 9.0	0.0- 0.5-1.0	.37	.37			
Cherry	0-3	-10-	-68-	18-23- 27	1.15-1.25-1.35	1.00-9.00-10.00	0.20-0.22-0.24	0.1- 1.5- 2.9	0.5- 1.8-3.0	.49	.49	5	4L	86
	3-33	- 7-	-66-	18-27- 35	1.20-1.40-1.60	1.00-2.00-10.00	0.16-0.19-0.22	0.0- 1.5- 5.9	0.5- 1.3-2.0	.37	.37			
	33-60	- 9-	-57-	18-34- 50	1.40-1.55-1.70	1.00-2.00-10.00	0.13-0.18-0.22	0.0- 4.5- 9.0	0.0- 0.5-1.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E3541B—Williams-Zahl loams, 3 to 6 percent slopes														
Williams	0-6	-41-	-37-	15-22- 27	1.00-1.20-1.40	1.00-9.00-10.00	0.18-0.19-0.20	0.0- 1.5- 2.9	2.5- 4.0-5.0	.24	.24	5	6	48
	6-10	-34-	-37-	24-30- 35	1.20-1.30-1.40	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 3.0-4.0	.28	.28			
	10-15	-34-	-37-	24-30- 35	1.20-1.30-1.40	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 3.0-4.0	.28	.28			
	15-24	-34-	-37-	24-30- 35	1.20-1.30-1.50	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 2.0-4.0	.28	.28			
	24-36	-34-	-37-	20-30- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-1.0	.37	.37			
	36-60	-35-	-33-	20-32- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-0.5	.37	.37			
Zahl	0-5	-41-	-37-	18-22- 27	1.10-1.25-1.40	1.00-9.00-10.00	0.17-0.19-0.20	0.0- 1.5- 2.9	1.0- 2.0-4.0	.32	.32	5	4L	86
	5-20	-34-	-37-	20-30- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 1.0-2.0	.37	.37			
	20-60	-35-	-33-	20-32- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-0.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes														
Zahl	0-5	-41-	-37-	18-22- 27	1.10-1.25-1.40	1.00-9.00-10.00	0.17-0.19-0.20	0.0- 1.5- 2.9	1.0- 2.0-4.0	.28	.28	5	4L	86
	5-20	-34-	-37-	20-30- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 1.0-2.0	.37	.37			
	20-60	-35-	-33-	20-32- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-0.5	.37	.37			
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Maschetah, strongly sloping	0-7	-11-	-67-	20-22- 27	1.10-1.20-1.30	1.00-9.17-10.00	0.20-0.21-0.22	0.0- 1.5- 2.9	2.0- 3.0-4.0	.37	.37	5	4L	86
	7-48	- 7-	-69-	20-24- 35	1.20-1.30-1.40	1.00-2.82-10.00	0.18-0.19-0.20	3.0- 4.5- 5.9	0.5- 1.8-3.0	.37	.37			
	48-90	- 7-	-63-	20-30- 35	1.25-1.35-1.45	1.00-2.82-10.00	0.18-0.19-0.20	3.0- 4.5- 5.9	0.0- 0.3-0.5	.37	.37			
Maschetah, gently sloping	0-7	-11-	-67-	20-22- 27	1.10-1.20-1.30	1.00-9.17-10.00	0.20-0.21-0.22	0.0- 1.5- 2.9	2.0- 3.0-4.0	.37	.37	5	4L	86
	7-48	- 7-	-69-	20-24- 35	1.20-1.30-1.40	1.00-2.82-10.00	0.18-0.19-0.20	3.0- 4.5- 5.9	0.5- 1.8-3.0	.37	.37			
	48-90	- 7-	-63-	20-30- 35	1.25-1.35-1.45	1.00-2.82-10.00	0.18-0.19-0.20	3.0- 4.5- 5.9	0.0- 0.3-0.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes														
Zahl	0-5	-41-	-37-	18-22- 27	1.10-1.25-1.40	1.00-9.00-10.00	0.17-0.19-0.20	0.0- 1.5- 2.9	1.0- 2.0-4.0	.28	.28	5	4L	86
	5-20	-34-	-37-	20-30- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 1.0-2.0	.37	.37			
	20-60	-35-	-33-	20-32- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-0.5	.37	.37			
Cabba	0-3	-26-	-52-	18-22- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.37	.37	2	4L	86
	3-15	-26-	-52-	18-22- 35	1.30-1.40-1.50	1.00-9.17-10.00	0.14-0.16-0.18	0.0- 1.5- 5.9	0.5- 0.8-1.0	.43	.43			
	15-60	-15-	-65-	10-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.08-0.10-0.12	—	0.0- 0.3-0.5	.43	.43			
Williams	0-6	-41-	-37-	15-22- 27	1.00-1.20-1.40	1.00-9.00-10.00	0.18-0.19-0.20	0.0- 1.5- 2.9	2.5- 4.0-5.0	.20	.20	5	6	48
	6-10	-34-	-37-	24-30- 35	1.20-1.30-1.40	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 3.0-4.0	.28	.28			
	10-15	-34-	-37-	24-30- 35	1.20-1.30-1.40	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 3.0-4.0	.28	.28			
	15-24	-34-	-37-	24-30- 35	1.20-1.30-1.50	1.00-9.00-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	1.0- 2.0-4.0	.28	.28			
	24-36	-34-	-37-	20-30- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-1.0	.37	.37			
	36-60	-35-	-33-	20-32- 35	1.30-1.40-1.50	1.00-3.00-10.00	0.14-0.17-0.19	0.0- 3.0- 5.9	0.0- 0.5-0.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes														
Manning	0-5	-70-	-16-	10-14- 18	1.20-1.35-1.50	10.00-28.23-100.00	0.13-0.16-0.18	0.0- 1.5- 2.9	2.0- 3.5-5.0	.15	.15	3	3	86
	5-18	-65-	-20-	10-15- 20	1.30-1.40-1.55	10.00-28.23-100.00	0.13-0.16-0.19	0.0- 1.5- 2.9	1.0- 2.0-3.0	.20	.24			
	18-25	-65-	-20-	10-15- 20	1.35-1.45-1.55	10.00-28.23-100.00	0.12-0.16-0.20	0.0- 1.5- 2.9	1.0- 1.5-2.0	.10	.20			
	25-60	-82-	-13-	1- 5- 10	1.50-1.60-1.70	100.00-282.27-705.00	0.02-0.05-0.08	0.0- 1.5- 2.9	0.0- 0.5-1.0	.10	.20			
Schaller	0-9	-67-	-19-	10-14- 18	1.20-1.35-1.50	10.00-28.23-100.00	0.13-0.14-0.15	0.0- 1.5- 2.9	1.0- 2.0-3.0	.17	.17	2	3	86
	9-15	-68-	-21-	5-11- 18	1.35-1.45-1.55	10.00-28.23-100.00	0.15-0.16-0.17	0.0- 1.5- 2.9	0.0- 1.0-2.0	.20	.20			
	15-60	-84-	-11-	1- 5- 10	1.50-1.60-1.70	10.00-91.74-100.00	0.02-0.03-0.04	0.0- 1.5- 2.9	0.0- 0.3-0.5	.10	.20			
Wabek	0-5	-42-	-38-	15-20- 27	1.10-1.20-1.30	1.00-9.17-10.00	0.20-0.21-0.22	0.0- 1.5- 2.9	1.0- 1.5-2.0	.28	.28	2	6	48
	5-10	-67-	-19-	10-14- 25	1.35-1.45-1.60	10.00-77.63-100.00	0.11-0.13-0.15	0.0- 1.5- 2.9	0.0- 0.5-1.0	.10	.17			
	10-60	-91-	- 4-	1- 5- 10	1.40-1.55-1.70	100.00-282.27-705.00	0.02-0.03-0.04	0.0- 1.5- 2.9	0.0- 0.5-1.0	.10	.10			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
E4729A—Heil silty clay loam, 0 to 1 percent slopes														
Heil	0-3	-17-	-48-	27-35- 40	1.00-1.20-1.40	1.00-2.70-10.00	0.14-0.19-0.23	6.0- 7.5- 8.9	3.0- 4.5-6.0	.32	.32	2	6	48
	3-24	- 5-	-45-	45-50- 60	1.20-1.38-1.55	0.10-0.22-1.00	0.13-0.16-0.19	6.0- 7.5- 8.9	0.0- 0.5-1.0	.37	.37			
	24-38	- 8-	-50-	27-42- 50	1.30-1.45-1.60	0.10-0.71-1.00	0.13-0.16-0.19	6.0- 7.5- 8.9	0.0- 0.3-0.5	.37	.37			
	38-52	- 8-	-50-	27-42- 50	1.30-1.45-1.60	0.10-0.71-1.00	0.13-0.16-0.19	6.0- 7.5- 8.9	0.0- 0.3-0.5	.37	.37			
	52-60	- 8-	-50-	20-42- 50	1.30-1.45-1.60	1.00-7.01-10.00	0.13-0.16-0.19	6.0- 7.5- 8.9	0.0- 0.3-0.5	.32	.32			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes														
Maltese	0-3	10-18- 22	55-60- 70	18-22- 27	1.30-1.40-1.45	4.23-12.25-14.11	0.20-0.21-0.22	1.9- 2.8- 4.4	2.0- 3.0-4.0	.43	.43	2	6	48
	3-5	10-28- 40	35-52- 65	18-20- 27	1.35-1.45-1.50	4.23-9.15-14.11	0.20-0.21-0.22	1.7- 2.3- 4.2	1.0- 2.0-3.0	.49	.49			
	5-17	5-10- 30	20-52- 60	35-38- 50	1.45-1.55-1.65	0.01-0.43-1.41	0.14-0.18-0.20	5.0- 6.5-10.0	1.0- 1.5-2.0	.37	.37			
	17-26	5-15- 30	20-47- 60	35-38- 50	1.45-1.55-1.65	0.01-0.43-1.41	0.12-0.17-0.20	4.0- 6.3-10.0	0.8- 1.0-1.5	.37	.37			
	26-36	10-18- 40	25-45- 55	35-37- 45	1.50-1.60-1.70	0.01-0.43-1.41	0.07-0.12-0.18	4.5- 6.1- 8.5	0.5- 0.8-1.0	.37	.37			
	36-43	5-15- 45	30-53- 80	15-32- 40	1.50-1.60-1.70	0.01-0.38-1.41	0.08-0.12-0.20	0.8- 3.9- 7.2	0.3- 0.5-0.8	.43	.43			
	43-79	5-15- 45	30-55- 80	15-30- 40	1.45-1.55-1.65	0.01-0.22-1.41	0.08-0.13-0.20	0.8- 3.4- 7.2	0.1- 0.3-0.5	.49	.49			
Gerda	0-2	30-36- 45	30-40- 50	18-24- 27	1.35-1.45-1.50	4.23-9.15-14.11	0.20-0.21-0.22	1.9- 3.2- 4.4	2.0- 3.0-4.0	.43	.43	2	6	48
	2-7	5-10- 30	20-52- 60	35-38- 50	1.45-1.55-1.65	0.01-0.28-0.42	0.14-0.18-0.20	4.5- 6.2-10.0	0.5- 1.0-2.0	.37	.37			
	7-19	5-10- 30	20-53- 60	35-37- 50	1.45-1.55-1.65	0.01-0.28-0.42	0.07-0.13-0.18	4.0- 6.0-10.0	0.5- 0.8-1.0	.43	.43			
	19-44	5-15- 30	40-50- 65	30-35- 45	1.50-1.60-1.70	0.01-0.28-0.42	0.07-0.13-0.18	2.5- 5.0- 8.0	0.1- 0.3-0.5	.43	.43			
	44-79	10-26- 55	30-52- 75	15-22- 27	1.45-1.55-1.65	0.01-0.25-1.41	0.09-0.15-0.19	1.0- 2.0- 5.0	0.1- 0.2-0.5	.55	.55			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes														
Rhame	0-6	55-68- 75	14-18- 30	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.13-0.17-0.18	0.9- 1.4- 2.0	1.5- 3.0-4.5	.10	.10	3	3	86
	6-12	55-70- 75	12-16- 30	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	1.0- 1.5-2.0	.17	.17			
	12-18	55-70- 75	12-16- 30	10-14- 18	1.50-1.50-1.55	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	0.5- 1.0-1.3	.20	.20			
	18-28	60-72- 80	10-14- 25	10-14- 18	1.45-1.55-1.65	14.11-28.23-42.34	0.12-0.15-0.17	0.7- 1.4- 1.9	0.3- 0.7-1.0	.24	.24			
	28-35	60-74- 80	10-12- 25	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.10-0.14-0.16	0.5- 1.4- 1.9	0.3- 0.5-1.0	.15	.15			
	35-79	—	—	—	—	1.41-3.85-4.23	—	—	—					
Chinook	0-6	55-65- 75	10-21- 35	10-14- 18	1.35-1.40-1.50	14.11-28.23-42.34	0.16-0.17-0.18	0.9- 1.5- 2.0	1.5- 3.5-5.5	.15	.15	5	3	86
	6-14	55-68- 75	10-18- 35	10-14- 18	1.40-1.50-1.55	14.11-28.23-42.34	0.14-0.16-0.18	0.9- 1.4- 2.0	1.0- 2.0-2.5	.24	.24			
	14-24	55-70- 75	10-16- 35	10-14- 18	1.45-1.50-1.55	14.11-28.23-42.34	0.12-0.14-0.17	0.8- 1.4- 2.0	0.5- 1.0-1.5	.24	.24			
	24-38	60-75- 85	5-13- 35	5-12- 18	1.50-1.55-1.60	14.11-28.23-141.14	0.08-0.13-0.16	0.1- 1.1- 1.8	0.5- 0.8-1.3	.24	.24			
	38-79	60-78- 85	5-12- 35	5-10- 18	1.50-1.50-1.55	14.11-28.23-141.14	0.08-0.13-0.16	0.2- 0.9- 1.8	0.3- 0.5-1.0	.15	.15			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes														
Rhame	0-5	55-68- 75	14-18- 30	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.13-0.17-0.18	0.9- 1.4- 2.0	1.5- 3.0-4.5	.10	.10	3	3	86
	5-9	55-70- 75	12-16- 30	10-14- 18	1.35-1.50-1.55	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	1.0- 1.5-2.0	.17	.17			
	9-16	55-70- 75	12-16- 30	10-14- 18	1.40-1.50-1.60	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	0.5- 1.0-1.3	.20	.20			
	16-23	60-72- 80	10-14- 25	10-14- 18	1.45-1.55-1.65	14.11-28.23-42.34	0.12-0.15-0.17	0.7- 1.4- 1.9	0.3- 0.7-1.0	.24	.24			
	23-31	60-74- 80	10-12- 25	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.10-0.14-0.16	0.5- 1.3- 1.9	0.3- 0.5-1.0	.15	.15			
	31-79	—	—	—	—	1.41-3.85-4.23	—	—	—					
Fleak	0-5	70-83- 90	5-10- 21	3- 7- 10	1.45-1.50-1.60	42.34-91.74-141.14	0.10-0.11-0.12	0.0- 0.6- 1.0	0.8- 2.0-3.5	.20	.20	2	2	134
	5-14	75-85- 90	5-12- 20	1- 4- 7	1.45-1.50-1.55	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.2- 0.4	0.5- 0.8-1.5	.24	.24			
	14-79	—	—	—	—	1.41-3.85-4.23	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes														
Rhame	0-6	55-68- 75	14-18- 30	10-14- 18	1.30-1.40-1.50	14.11-28.23-42.34	0.13-0.17-0.18	0.9- 1.4- 2.0	1.5- 3.0-4.5	.10	.10	3	3	86
	6-10	55-70- 75	12-16- 30	10-14- 18	1.35-1.50-1.55	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	1.0- 1.5-2.0	.17	.17			
	10-16	55-70- 75	12-16- 30	10-14- 18	1.40-1.50-1.60	14.11-28.23-42.34	0.12-0.16-0.17	0.8- 1.4- 2.0	0.5- 1.0-1.3	.20	.20			
	16-23	60-72- 80	10-14- 25	10-14- 18	1.45-1.55-1.65	14.11-28.23-42.34	0.12-0.15-0.17	0.7- 1.4- 1.9	0.3- 0.7-1.0	.24	.24			
	23-31	60-74- 80	10-12- 25	8-14- 18	1.45-1.55-1.60	14.11-28.23-141.14	0.10-0.14-0.16	0.5- 1.3- 1.9	0.3- 0.5-1.0	.15	.15			
	31-79	—	—	—	—	1.41-3.85-4.23	—	—	—					
Arikara, low precipitation	0-1	0- 5- 10	80-90- 95	0- 5- 15	0.20-0.25-0.30	42.34-90.00-141.14	0.30-0.35-0.40	—	90.0-95.0-100.0			5	6	48
	1-6	25-27- 52	28-47- 49	18-26- 27	0.90-1.05-1.15	4.23-12.00-14.11	0.15-0.20-0.20	1.6- 3.1- 3.3	6.0-8.0-12.0	.24	.24			
	6-12	10-25- 52	30-43- 65	18-32- 35	1.30-1.45-1.55	1.41-5.50-14.11	0.15-0.18-0.22	1.9- 5.1- 5.9	1.0- 2.0-3.0	.28	.28			
	12-22	10-26- 52	30-46- 65	18-28- 35	1.30-1.45-1.55	1.41-6.30-14.11	0.15-0.17-0.22	1.8- 4.2- 5.7	1.0- 1.5-2.0	.37	.37			
	22-39	10-29- 52	30-46- 65	18-25- 35	1.35-1.50-1.55	1.41-9.17-14.11	0.15-0.17-0.22	1.6- 3.3- 5.5	0.8- 1.0-1.5	.37	.37			
	39-61	10-30- 65	20-46- 65	15-24- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.14-0.16-0.22	1.1- 3.0- 5.4	0.5- 0.8-1.0	.43	.43			
	61-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Fleak	0-5	70-83- 90	5-10- 21	3- 7- 10	1.45-1.50-1.60	42.34-91.74-141.14	0.10-0.11-0.12	0.0- 0.5- 1.0	0.8- 2.0-3.5	.20	.20	2	2	134
	5-14	75-85- 90	5-12- 20	1- 4- 7	1.45-1.50-1.55	42.34-91.74-141.14	0.06-0.10-0.12	0.0- 0.2- 0.4	0.5- 0.8-1.5	.20	.20			
	14-79	—	—	—	—	1.41-3.85-4.23	—	—	—					
L2145A—Kremlin loam, 0 to 2 percent slopes														
Kremlin	0-6	35-38- 45	30-40- 45	18-22- 27	1.30-1.45-1.55	4.23-9.17-14.11	0.20-0.21-0.22	1.9- 2.9- 4.2	2.0- 3.0-5.0	.32	.32	5	6	48
	6-12	25-32- 50	20-44- 55	18-24- 30	1.30-1.35-1.45	1.41-9.17-14.11	0.15-0.20-0.22	1.9- 3.3- 4.7	1.0- 2.0-3.0	.37	.37			
	12-21	25-30- 50	20-46- 55	18-24- 30	1.35-1.40-1.45	1.41-9.17-14.11	0.15-0.18-0.20	1.8- 3.3- 4.6	1.0- 1.5-2.0	.37	.37			
	21-38	25-35- 65	15-41- 55	18-24- 30	1.40-1.50-1.55	1.41-9.17-42.34	0.13-0.18-0.20	1.6- 2.7- 4.2	0.5- 0.8-1.0	.43	.43			
	38-79	20-36- 60	15-40- 60	18-24- 35	1.35-1.50-1.60	1.41-9.17-42.34	0.13-0.17-0.20	1.5- 2.9- 5.4	0.1- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes														
Rhame	0-8	-71-	-17-	8-13- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 2.0-3.0	.17	.17	3	3	86
	8-19	-71-	-17-	8-13- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.15-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8-1.0	.20	.20			
	19-34	-71-	-17-	8-13- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.14-0.15-0.16	0.0- 1.5- 2.9	0.0- 0.3-0.5	.24	.24			
	34-79	-82-	-13-	1- 5- 10	1.45-1.58-1.70	1.00-7.21-10.00	0.04-0.06-0.08	—	0.0- 0.3-0.5	.49	.49			
Bullock	0-4	-65-	-27-	5- 8- 10	1.35-1.48-1.60	10.00-28.23-100.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5-2.0	.43	.43	2	3	86
	4-10	-56-	-18-	18-26- 35	1.50-1.65-1.80	0.10-0.81-1.00	0.18-0.19-0.20	3.0- 4.5- 5.9	0.8- 1.0-1.5	.37	.37			
	10-15	-42-	-34-	10-24- 30	1.35-1.50-1.65	1.00-1.23-10.00	0.17-0.18-0.19	3.0- 4.5- 5.9	0.3- 0.5-1.0	.37	.37			
	15-23	-64-	-22-	5-15- 25	1.40-1.50-1.60	10.00-23.28-100.00	0.15-0.16-0.17	0.0- 1.5- 2.9	0.0- 0.3-0.5	.24	.24			
	23-60	-82-	-13-	1- 5- 10	1.45-1.58-1.70	0.10-7.21-100.00	0.04-0.06-0.08	—	0.0- 0.3-0.5	.49	.49			
Kremlin	0-11	-40-	-36-	18-24- 27	1.15-1.25-1.35	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	6	48
	11-19	-39-	-37-	18-24- 30	1.25-1.35-1.45	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
	19-60	-39-	-37-	18-24- 30	1.30-1.42-1.55	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes														
Scairt	0-2	-26-	-52-	18-22- 27	1.10-1.20-1.30	1.00-7.75-10.00	0.20-0.22-0.24	0.0- 1.5- 2.9	2.0- 3.0-4.0	.43	.43	2	6	48
	2-6	- 7-	-48-	35-45- 55	1.20-1.30-1.40	0.10-0.28-1.00	0.10-0.13-0.16	6.0- 7.5- 8.9	2.0- 3.0-4.0	.28	.28			
	6-13	-19-	-44-	35-37- 55	1.20-1.40-1.50	0.10-0.28-1.00	0.10-0.13-0.16	6.0- 7.5- 8.9	1.0- 1.5-2.0	.43	.43			
	13-22	-17-	-48-	18-35- 50	1.20-1.40-1.50	1.00-2.80-10.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.5- 0.8-1.0	.43	.43			
	22-28	-17-	-48-	18-35- 50	1.20-1.40-1.50	1.00-2.80-10.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.0- 0.3-0.5	.43	.43			
	28-60	- 2-	-46-	35-52- 90	1.40-1.50-1.60	0.10-0.69-1.00	0.06-0.08-0.10	—	0.0- 0.3-0.5	.32	.32			
Maltese	0-7	-26-	-52-	18-22- 27	1.00-1.10-1.20	1.00-7.76-10.00	0.13-0.14-0.15	0.0- 1.5- 2.9	2.0- 3.0-4.0	.32	.32	2	6	48
	7-10	-27-	-54-	18-20- 27	1.20-1.30-1.40	1.00-7.76-10.00	0.13-0.14-0.15	0.0- 1.5- 2.9	2.0- 3.0-4.0	.43	.43			
	10-16	- 7-	-48-	40-45- 60	1.20-1.30-1.40	0.10-0.71-1.00	0.12-0.13-0.14	6.0- 7.5- 8.9	1.0- 2.0-3.0	.37	.37			
	16-20	- 7-	-48-	35-45- 50	1.30-1.40-1.45	0.10-0.71-1.00	0.12-0.13-0.14	6.0- 7.5- 8.9	1.0- 1.5-2.0	.37	.37			
	20-33	-18-	-44-	35-38- 50	1.30-1.40-1.45	0.10-0.71-1.00	0.12-0.13-0.14	6.0- 7.5- 8.9	1.0- 1.5-2.0	.37	.37			
	33-60	-17-	-48-	15-35- 40	1.30-1.40-1.45	10.00-21.88-100.00	0.12-0.13-0.14	3.0- 4.5- 5.9	0.5- 0.8-1.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Boxwell	0-5	-39-	-37-	18-24- 27	1.20-1.30-1.40	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	3	6	48
	5-14	-39-	-37-	18-24- 30	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.17-0.18	3.0- 4.5- 5.9	1.0- 1.5-2.0	.32	.32			
	14-28	-39-	-37-	18-24- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.5- 0.8-1.0	.37	.37			
	28-79	-40-	-40-	5-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.04-0.07-0.10	—	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes														
Rhame	0-8	-70-	-16-	10-14- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 2.0-3.0	.15	.15	3	3	86
	8-19	-70-	-16-	10-14- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.15-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8-1.0	.20	.20			
	19-34	-70-	-16-	10-14- 18	1.10-1.30-1.50	10.00-28.23-100.00	0.14-0.15-0.16	0.0- 1.5- 2.9	0.0- 0.3-0.5	.24	.24			
	34-79	-82-	-13-	1- 5- 10	1.45-1.58-1.70	0.10-7.21-100.00	0.04-0.06-0.08	—	0.0- 0.3-0.5	.49	.49			
Kremlin	0-11	-39-	-37-	18-24- 27	1.15-1.25-1.35	1.00-9.17-100.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	6	48
	11-19	-39-	-37-	18-24- 30	1.25-1.35-1.45	1.00-9.17-100.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
	19-60	-39-	-37-	18-24- 30	1.30-1.42-1.55	1.00-9.17-100.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
Archin	0-4	-64-	-27-	5-10- 15	1.35-1.50-1.65	14.00-28.00-42.00	0.14-0.16-0.17	0.0- 1.5- 2.9	1.0- 2.0-3.0	.32	.32	2	3	86
	4-6	-45-	-42-	7-14- 20	1.35-1.48-1.60	4.00-9.00-14.00	0.12-0.15-0.17	0.0- 1.5- 2.9	0.5- 1.3-2.0	.49	.49			
	6-17	-39-	-37-	20-24- 35	1.35-1.50-1.65	0.42-1.00-1.40	0.13-0.14-0.15	3.0- 4.5- 5.9	0.5- 0.8-1.0	.37	.37			
	17-28	-42-	-38-	10-20- 30	1.35-1.50-1.65	0.42-1.00-1.40	0.10-0.13-0.15	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
	28-60	-43-	-40-	10-18- 25	1.40-1.50-1.60	1.40-8.00-14.00	0.09-0.12-0.15	0.0- 1.5- 2.9	0.0- 0.3-0.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped														
Cabbart	0-3	-39-	-37-	18-24- 27	1.00-1.10-1.20	1.00-9.17-10.00	0.17-0.19-0.21	0.0- 1.5- 2.9	1.0- 1.5-2.0	.28	.28	2	4L	86
	3-18	-39-	-37-	18-24- 35	1.10-1.20-1.30	1.00-9.17-10.00	0.15-0.17-0.19	3.0- 4.5- 5.9	0.5- 0.8-1.0	.37	.37			
	18-79	-40-	-40-	5-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.04-0.07-0.10	—	0.0- 0.3-0.5	.43	.43			
Kremlin	0-11	-39-	-37-	18-24- 27	1.15-1.25-1.35	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	6	48
	11-19	-39-	-37-	18-24- 30	1.25-1.35-1.45	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
	19-60	-39-	-37-	18-24- 30	1.30-1.42-1.55	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
Boxwell	0-5	-39-	-37-	18-24- 27	1.20-1.30-1.40	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	3	6	48
	5-14	-39-	-37-	18-24- 30	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.17-0.18	3.0- 4.5- 5.9	1.0- 1.5-2.0	.32	.32			
	14-28	-39-	-37-	18-24- 27	1.30-1.40-1.50	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.5- 0.8-1.0	.37	.37			
	28-79	-40-	-40-	5-20- 35	1.40-1.53-1.65	1.00-2.21-10.00	0.04-0.07-0.10	—	0.0- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes														
Boxwell	0-5	25-40- 45	30-38- 50	18-22- 27	1.35-1.40-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.8- 2.8- 4.1	2.0- 3.0-4.0	.28	.28	3	6	48
	5-8	15-36- 45	25-40- 55	18-24- 30	1.30-1.35-1.40	1.41-9.17-14.11	0.15-0.17-0.22	1.8- 3.3- 4.9	1.5- 2.5-3.5	.37	.37			
	8-14	15-36- 45	25-40- 55	18-24- 30	1.30-1.35-1.45	1.41-9.17-14.11	0.15-0.18-0.22	1.6- 3.2- 4.6	1.0- 1.5-2.5	.37	.37			
	14-24	25-35- 45	30-43- 55	18-22- 27	1.40-1.45-1.50	4.23-9.17-14.11	0.15-0.17-0.20	1.2- 1.9- 3.5	0.5- 0.8-1.0	.43	.43			
	24-79	—	—	—	—	0.42-1.25-4.23	—	—	—					
Cabbart	0-4	15-28- 30	50-52- 67	18-20- 27	1.25-1.30-1.35	4.23-9.17-14.11	0.20-0.21-0.24	1.4- 2.3- 3.8	2.0- 3.5-6.0	.37	.37	2	4L	86
	4-11	10-23- 40	25-55- 70	15-22- 35	1.40-1.50-1.55	4.23-9.17-14.11	0.15-0.20-0.22	0.8- 2.1- 5.2	0.5- 1.0-1.5	.55	.55			
	11-18	10-18- 40	25-60- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.6- 1.7- 4.9	0.5- 0.5-1.0	.55	.55			
	18-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Arikara, low precipitation	0-1	0- 5- 10	80-90- 95	0- 5- 15	0.20-0.25-0.30	42.34-90.00-141.14	0.30-0.35-0.40	—	90.0-95.0-100.0			5	6	48
	1-6	25-27- 52	28-47- 49	18-26- 27	0.90-1.05-1.15	4.23-12.00-14.11	0.15-0.20-0.20	1.6- 3.1- 3.3	6.0-8.0-12.0	.24	.24			
	6-12	10-25- 52	30-43- 65	18-32- 35	1.30-1.45-1.55	1.41-5.50-14.11	0.15-0.18-0.22	1.9- 5.1- 5.9	1.0- 2.0-3.0	.28	.28			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	12-22	10-26- 52	30-46- 65	18-28- 35	1.30-1.45-1.55	1.41-6.30-14.11	0.15-0.17-0.22	1.8- 4.2- 5.7	1.0- 1.5-2.0	.37	.37			
	22-39	10-29- 52	30-46- 65	18-25- 35	1.35-1.50-1.55	1.41-9.17-14.11	0.15-0.17-0.22	1.6- 3.3- 5.5	0.8- 1.0-1.5	.37	.37			
	39-61	10-30- 65	20-46- 65	15-24- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.14-0.16-0.22	1.1- 3.0- 5.4	0.5- 0.8-1.0	.43	.43			
	61-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes														
Boxwell	0-6	35-40- 45	30-38- 45	18-22- 27	1.40-1.45-1.55	4.23-9.17-14.11	0.20-0.21-0.22	1.8- 2.9- 4.3	2.0- 3.0-4.0	.32	.32	3	6	48
	6-14	15-36- 45	25-40- 65	18-24- 30	1.30-1.35-1.45	1.41-9.17-14.11	0.17-0.19-0.22	1.7- 3.2- 4.7	1.0- 1.5-2.5	.37	.37			
	14-29	25-35- 45	30-43- 55	18-22- 27	1.40-1.45-1.50	4.23-9.17-14.11	0.16-0.17-0.20	1.2- 1.5- 3.1	0.5- 0.8-1.0	.49	.49			
	29-79	—	—	—	—	0.42-0.75-4.23	—	—	—					
Kremlin	0-6	35-38- 45	30-40- 45	18-22- 27	1.30-1.45-1.55	4.23-9.17-14.11	0.20-0.21-0.22	1.9- 3.0- 4.3	2.0- 3.0-5.0	.32	.32	5	6	48
	6-12	25-32- 50	20-44- 55	18-24- 30	1.30-1.40-1.45	1.41-9.17-14.11	0.15-0.20-0.22	1.9- 3.3- 4.7	1.0- 2.0-3.0	.37	.37			
	12-21	25-30- 50	20-46- 55	18-24- 30	1.35-1.40-1.45	1.41-9.17-14.11	0.15-0.18-0.20	1.8- 3.3- 4.7	1.0- 1.5-2.0	.37	.37			
	21-38	25-35- 65	15-41- 55	18-24- 30	1.40-1.50-1.55	1.41-9.17-42.34	0.13-0.18-0.20	1.4- 2.7- 4.7	0.5- 0.8-1.0	.43	.43			
	38-79	20-36- 60	15-40- 60	18-24- 35	1.35-1.50-1.60	1.41-9.17-42.34	0.13-0.17-0.20	1.5- 2.9- 5.4	0.1- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes														
Boxwell	0-5	25-40- 45	30-38- 50	18-22- 27	1.25-1.40-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.8- 2.8- 3.8	2.0- 3.0-4.0	.28	.28	3	6	48
	5-8	15-36- 45	25-40- 55	18-24- 30	1.30-1.40-1.50	1.41-9.17-14.11	0.15-0.17-0.20	1.8- 3.1- 4.2	1.0- 1.5-2.5	.37	.37			
	8-13	15-36- 45	25-40- 55	18-24- 30	1.35-1.40-1.50	1.41-9.17-14.11	0.15-0.17-0.20	1.8- 3.1- 4.2	0.8- 1.0-1.5	.43	.43			
	13-24	25-35- 45	30-43- 55	18-22- 27	1.35-1.45-1.55	4.23-9.17-14.11	0.15-0.17-0.20	1.2- 1.9- 2.9	0.5- 0.8-1.0	.43	.43			
	24-79	—	—	—	—	0.42-1.25-4.23	—	—	—					
Kremlin	0-7	25-33- 40	35-45- 50	18-22- 27	1.20-1.30-1.45	4.23-9.17-14.11	0.15-0.20-0.20	1.9- 2.9- 3.8	2.0- 3.0-5.0	.32	.32	5	6	48
	7-12	25-29- 50	25-47- 55	18-24- 30	1.20-1.35-1.40	1.41-9.17-14.11	0.15-0.20-0.22	1.9- 3.2- 4.4	1.0- 2.0-3.5	.37	.37			
	12-18	25-28- 50	25-48- 55	18-24- 30	1.20-1.40-1.50	1.41-9.17-14.11	0.15-0.18-0.20	1.8- 3.2- 4.2	1.0- 1.5-2.5	.43	.43			
	18-35	20-28- 55	25-48- 60	18-24- 30	1.20-1.45-1.50	1.41-9.17-14.11	0.15-0.18-0.20	1.6- 2.7- 3.8	0.5- 0.8-1.0	.43	.43			
	35-71	20-37- 55	20-39- 50	18-24- 35	1.30-1.50-1.60	1.41-9.17-14.11	0.14-0.17-0.20	1.6- 2.8- 4.9	0.1- 0.5-1.0	.37	.37			
	71-79	—	—	—	—	0.42-1.25-4.23	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes														
Kirby, channery loam	0-5	30-44- 52	30-36- 47	10-20- 27	1.15-1.30-1.45	4.23-10.20-14.11	0.10-0.12-0.17	0.6- 1.6- 3.4	2.0- 3.5-6.0	.10	.24	1	7	38
	5-14	30-44- 52	30-36- 47	10-20- 35	1.30-1.45-1.50	14.11-28.23-42.34	0.04-0.07-0.15	0.2- 0.8- 3.5	1.0- 2.0-4.0	.05	.24			
	14-79	85-87- 97	2-10- 14	1- 3- 5	1.55-1.60-1.60	141.14-282.27-705.00	0.00-0.02-0.03	0.0- 0.0- 0.1	0.1- 0.3-0.8	.02	.05			
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 1.5- 4.9	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Patent, badland fan	0-3	30-36- 45	30-43- 49	18-21- 27	1.05-1.20-1.40	4.23-9.17-14.11	0.15-0.17-0.20	1.5- 2.2- 3.7	3.0- 4.5-6.0	.37	.37	5	4L	86
	3-7	25-31- 50	30-45- 57	18-24- 27	1.25-1.35-1.45	4.23-9.17-14.11	0.15-0.18-0.22	1.5- 2.5- 3.7	2.0- 3.0-4.0	.37	.37			
	7-79	15-34- 60	25-40- 60	15-26- 35	1.35-1.45-1.55	1.41-9.17-42.34	0.12-0.17-0.20	0.9- 2.6- 5.3	0.8- 1.5-2.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes														
Kirby, channery loam	0-4	-44-	-41-	10-15- 22	1.30-1.45-1.60	10.00-28.23-100.00	0.07-0.10-0.14	0.0- 1.5- 2.9	1.0- 1.5-2.0	.15	.28	1	6	48
	4-12	-44-	-41-	10-15- 22	1.45-1.55-1.65	10.00-91.74-705.00	0.05-0.06-0.06	0.0- 1.5- 2.9	0.5- 0.8-1.0	.05	.28			
	12-60	-95-	- 2-	0- 3- 5	1.00-1.15-1.30	100.00-282.27-705.00	0.01-0.02-0.03	0.0- 1.5- 2.9	0.0- 0.3-0.5	.10	.32			
Scairt	0-2	-26-	-52-	18-22- 27	1.10-1.20-1.30	1.00-7.75-10.00	0.20-0.22-0.24	0.0- 1.5- 2.9	2.0- 3.0-4.0	.43	.43	2	6	48
	2-6	- 7-	-48-	35-45- 55	1.20-1.30-1.40	0.10-0.71-1.00	0.10-0.13-0.16	6.0- 7.5- 8.9	2.0- 3.0-4.0	.28	.28			
	6-13	-19-	-44-	35-37- 55	1.20-1.40-1.50	0.10-0.71-1.00	0.10-0.13-0.16	6.0- 7.5- 8.9	1.0- 1.5-2.0	.43	.43			
	13-22	-17-	-48-	18-35- 50	1.20-1.40-1.50	1.00-2.80-10.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.5- 0.8-1.0	.43	.43			
	22-28	-17-	-48-	18-35- 50	1.20-1.40-1.50	1.00-2.80-10.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.0- 0.3-0.5	.43	.43			
	28-60	- 2-	-46-	35-52- 90	1.40-1.50-1.60	0.10-0.69-1.00	0.06-0.08-0.10	—	0.0- 0.3-0.5	.32	.32			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes														
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 2.0- 4.3	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Cabbart	0-2	23-38- 45	30-42- 50	15-20- 27	1.30-1.40-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.1- 2.2- 3.3	2.0- 3.5-6.0	.32	.32	2	4L	86
	2-10	15-34- 40	25-44- 70	15-22- 35	1.35-1.45-1.55	4.23-9.17-14.11	0.15-0.18-0.22	0.9- 2.0- 4.4	0.5- 1.0-1.5	.55	.55			
	10-14	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 1.9- 4.3	0.5- 0.5-1.0	.55	.55			
	14-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes														
Cabbart	0-2	23-38- 45	30-42- 50	15-20- 27	1.30-1.40-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.1- 2.2- 3.3	2.0- 3.5-6.0	.32	.32	2	4L	86
	2-10	15-34- 40	25-44- 70	15-22- 35	1.35-1.45-1.55	4.23-9.17-14.11	0.15-0.18-0.22	0.9- 2.0- 4.4	0.5- 1.0-1.5	.55	.55			
	10-14	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 1.9- 4.3	0.5- 0.5-1.0	.55	.55			
	14-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 2.0- 4.3	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3161F— Lonna-Cabbart silt loams, 6 to 35 percent slopes														
Lonna	0-3	10-19- 22	51-58- 70	18-23- 27	1.10-1.20-1.35	4.23-9.17-14.11	0.16-0.20-0.22	1.6- 2.7- 4.3	2.0- 3.5-5.0	.32	.32	5	4L	86
	3-11	10-15- 18	50-59- 70	18-26- 35	1.30-1.35-1.40	4.23-9.17-14.11	0.16-0.20-0.22	1.3- 2.7- 5.4	1.0- 2.0-3.0	.43	.43			
	11-34	7-13- 15	52-60- 70	18-27- 35	1.35-1.40-1.50	4.23-7.50-14.11	0.16-0.18-0.22	1.4- 3.0- 5.0	0.5- 0.8-1.0	.49	.49			
	34-79	10-19- 55	35-59- 70	10-22- 35	1.35-1.40-1.45	4.23-9.17-42.34	0.12-0.17-0.22	0.4- 1.8- 5.0	0.3- 0.5-1.0	.49	.49			
Cabbart	0-4	15-28- 30	50-52- 67	18-20- 27	1.25-1.30-1.35	4.23-9.17-14.11	0.20-0.21-0.24	1.4- 2.3- 3.8	2.0- 3.5-6.0	.37	.37	2	4L	86
	4-11	10-23- 40	25-55- 70	15-22- 35	1.40-1.50-1.55	4.23-9.17-14.11	0.15-0.20-0.22	0.8- 2.1- 5.2	0.5- 1.0-1.5	.55	.55			
	11-18	10-18- 40	25-60- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.6- 1.7- 4.9	0.5- 0.5-1.0	.55	.55			
	18-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes														
Patent, badland fan	0-4	30-36- 45	30-43- 49	18-21- 27	1.05-1.15-1.35	4.23-9.17-14.11	0.15-0.17-0.20	1.5- 2.4- 3.4	3.0- 4.5-6.0	.37	.37	5	4L	86
	4-13	25-31- 50	30-45- 57	18-24- 27	1.25-1.30-1.45	4.23-9.17-14.11	0.15-0.18-0.22	1.5- 2.7- 3.4	2.0- 3.0-4.0	.37	.37			
	13-79	15-34- 60	25-40- 60	15-26- 35	1.35-1.45-1.50	1.41-9.17-42.34	0.12-0.17-0.20	0.9- 2.7- 4.7	0.8- 1.5-2.5	.37	.37			
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 2.0- 4.3	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Cabbart	0-2	23-38- 45	30-42- 50	15-20- 27	1.30-1.40-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.1- 2.2- 3.3	2.0- 3.5-6.0	.32	.32	2	4L	86
	2-10	15-34- 40	25-44- 70	15-22- 35	1.35-1.45-1.55	4.23-9.17-14.11	0.15-0.18-0.22	0.9- 2.0- 4.4	0.5- 1.0-1.5	.55	.55			
	10-14	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 1.9- 4.3	0.5- 0.5-1.0	.55	.55			
	14-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes														
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 1.6- 4.9	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Arikara, low precipitation	0-1	0- 5- 10	80-90- 95	0- 5- 15	0.20-0.25-0.30	42.34-90.00-141.14	0.30-0.35-0.40	—	90.0-95.0-100.0			5	6	48
	1-2	25-27- 52	28-47- 49	18-26- 27	0.90-1.05-1.15	4.23-12.00-14.11	0.15-0.20-0.20	1.6- 3.1- 3.3	6.0-8.0-12.0	.20	.20			
	2-14	15-31- 52	30-43- 65	18-26- 35	1.30-1.40-1.50	1.41-9.17-14.11	0.15-0.18-0.22	1.8- 3.8- 5.8	1.0- 2.0-3.0	.32	.32			
	14-39	15-29- 52	30-45- 65	18-26- 35	1.30-1.40-1.50	1.41-9.17-14.11	0.15-0.17-0.22	1.6- 3.5- 5.5	1.0- 1.5-2.0	.37	.37			
	39-61	15-30- 65	20-46- 65	15-24- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.14-0.16-0.22	1.1- 2.9- 5.4	0.5- 0.8-1.0	.43	.43			
	61-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Cabbart	0-4	15-28- 30	50-52- 67	18-20- 27	1.25-1.30-1.35	4.23-9.17-14.11	0.20-0.21-0.24	1.4- 2.3- 3.8	2.0- 3.5-6.0	.37	.37	2	4L	86
	4-11	10-23- 40	25-55- 70	15-22- 35	1.40-1.50-1.55	4.23-9.17-14.11	0.15-0.20-0.22	0.8- 2.1- 5.2	0.5- 1.0-1.5	.55	.55			
	11-18	10-18- 40	25-60- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.6- 1.7- 4.9	0.5- 0.5-1.0	.55	.55			
	18-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3197F—Badland, 9 to 150 percent slopes														
Badland	0-2	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.55	1.41-9.17-14.11	0.15-0.20-0.22	0.8- 2.0- 4.3	0.1- 0.5-1.0	.55	.55	1	4L	86
	2-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes														
Arikara, low precipitation	0-1	0- 5- 10	80-90- 95	0- 5- 15	0.20-0.25-0.30	42.34-90.00-141.14	0.30-0.35-0.40	—	90.0-95.0-100.0			5	6	48
	1-6	25-27- 52	28-47- 49	18-26- 27	0.90-1.05-1.15	4.23-12.00-14.11	0.15-0.20-0.20	1.6- 3.1- 3.3	6.0-8.0-12.0	.24	.24			
	6-12	10-25- 52	30-43- 65	18-32- 35	1.30-1.45-1.55	1.41-5.50-14.11	0.15-0.18-0.22	1.9- 5.1- 5.9	1.0- 2.0-3.0	.28	.28			
	12-22	10-26- 52	30-46- 65	18-28- 35	1.30-1.45-1.55	1.41-6.30-14.11	0.15-0.17-0.22	1.8- 4.2- 5.7	1.0- 1.5-2.0	.37	.37			
	22-39	10-29- 52	30-46- 65	18-25- 35	1.35-1.50-1.55	1.41-9.17-14.11	0.15-0.17-0.22	1.6- 3.3- 5.5	0.8- 1.0-1.5	.37	.37			
	39-61	10-30- 65	20-46- 65	15-24- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.14-0.16-0.22	1.1- 3.0- 5.4	0.5- 0.8-1.0	.43	.43			
	61-79	—	—	—	—	0.42-0.75-1.41	—	—	—					
Cabbart	0-4	23-38- 45	30-42- 50	15-20- 27	1.15-1.35-1.50	4.23-9.17-14.11	0.15-0.18-0.20	1.1- 2.3- 3.7	2.0- 3.5-6.0	.32	.32	2	4L	86
	4-11	15-34- 40	25-44- 70	15-22- 35	1.35-1.45-1.55	4.23-9.17-14.11	0.15-0.18-0.22	0.8- 2.1- 5.2	0.5- 1.0-1.5	.55	.55			
	11-18	15-28- 40	25-50- 70	15-22- 35	1.40-1.45-1.50	1.41-9.17-14.11	0.15-0.20-0.22	0.6- 1.7- 4.9	0.5- 0.5-1.0	.55	.55			
	18-79	—	—	—	—	0.42-0.75-1.41	—	—	—					

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes														
Patent, occasionally flooded	0-7	-39-	-37-	18-24- 27	1.10-1.25-1.40	1.00-9.17-10.00	0.16-0.19-0.22	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	4L	86
	7-60	-39-	-37-	15-24- 35	1.20-1.40-1.60	1.00-9.17-10.00	0.14-0.17-0.19	3.0- 4.5- 5.9	0.5- 0.8-1.0	.32	.32			
Patent, gullied, occasionally flooded	0-1	-39-	-37-	18-24- 27	1.10-1.25-1.40	1.00-9.17-100.00	0.16-0.19-0.22	0.0- 1.5- 2.9	0.3- 0.5-1.0	.24	.24	1	4L	86
	1-60	-39-	-37-	15-24- 35	1.20-1.40-1.60	0.10-0.91-10.00	0.14-0.17-0.19	3.0- 4.5- 5.9	0.0- 0.3-0.5	.37	.37			
Glendive, frequently flooded	0-5	-70-	-16-	10-14- 18	1.40-1.50-1.60	10.00-28.23-100.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.5- 0.8-1.0	.17	.17	5	3	86
	5-16	-45-	-41-	8-14- 18	1.30-1.40-1.50	10.00-28.23-100.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.5- 0.8-1.0	.32	.32			
	16-60	-72-	-16-	5-12- 18	1.30-1.40-1.50	10.00-28.23-100.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.5- 0.8-1.0	.20	.20			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded														
Patent, occasionally flooded	0-7	-39-	-37-	18-24- 27	1.10-1.25-1.40	1.00-9.17-10.00	0.16-0.19-0.22	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	4L	86
	7-60	-39-	-37-	15-24- 35	1.20-1.40-1.60	1.00-9.17-10.00	0.14-0.17-0.19	3.0- 4.5- 5.9	0.5- 0.8-1.0	.32	.32			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes														
Patent, occasionally flooded	0-7	-39-	-37-	18-24- 27	1.10-1.25-1.40	1.00-9.17-10.00	0.16-0.19-0.22	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	4L	86
	7-60	-39-	-37-	15-24- 35	1.20-1.40-1.60	1.00-9.17-10.00	0.14-0.17-0.19	3.0- 4.5- 5.9	0.5- 0.8-1.0	.32	.32			
Vanda	0-4	- 5-	-45-	40-50- 60	1.25-1.35-1.45	0.01-0.20-10.00	0.14-0.15-0.17	6.0- 7.5- 8.9	0.5- 1.3-2.0	.24	.24	5	4	86
	4-60	-23-	-29-	35-48- 60	1.30-1.40-1.50	0.01-0.20-10.00	0.08-0.10-0.12	6.0- 7.5- 8.9	0.0- 0.3-0.5	.28	.28			
Gerda, severely eroded	0-0	-41-	-37-	18-22- 27	1.10-1.20-1.30	1.00-2.70-10.00	0.13-0.14-0.15	0.0- 1.5- 2.9	2.0- 2.5-3.0	.37	.37	2	6	48
	0-6	- 7-	-48-	35-45- 55	1.20-1.30-1.40	0.01-0.28-1.00	0.15-0.16-0.18	6.0- 7.5- 8.9	1.5- 2.0-2.5	.32	.32			
	6-13	- 7-	-48-	35-45- 55	1.25-1.40-1.50	0.01-0.28-1.00	0.14-0.15-0.17	6.0- 7.5- 8.9	1.0- 1.5-2.0	.32	.32			
	13-44	-17-	-48-	30-35- 45	1.30-1.40-1.50	1.00-7.70-10.00	0.16-0.18-0.20	6.0- 7.5- 8.9	1.0- 1.5-2.0	.43	.43			
	44-80	-17-	-48-	15-35- 40	1.30-1.40-1.45	1.00-21.88-100.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.5- 0.8-1.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes														
Kremlin	0-11	-39-	-37-	18-24- 27	1.15-1.25-1.35	1.00-9.17-10.00	0.16-0.18-0.20	0.0- 1.5- 2.9	1.0- 2.0-3.0	.28	.28	5	6	48
	11-19	-39-	-37-	18-24- 30	1.25-1.35-1.45	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
	19-60	-39-	-37-	18-24- 30	1.30-1.42-1.55	1.00-9.17-10.00	0.16-0.18-0.20	3.0- 4.5- 5.9	0.0- 0.5-1.0	.37	.37			
Ethridge	0-3	-25-	-54-	18-22- 27	1.10-1.20-1.30	1.00-9.20-10.00	0.20-0.22-0.24	0.0- 1.5- 2.9	1.0- 2.0-3.0	.43	.43	5	6	48
	3-10	- 7-	-56-	35-37- 50	1.30-1.40-1.50	0.10-0.91-1.00	0.15-0.17-0.19	6.0- 7.5- 8.9	1.0- 1.5-2.0	.32	.32			
	10-23	- 7-	-56-	35-37- 50	1.30-1.40-1.50	0.10-0.91-1.00	0.14-0.16-0.18	6.0- 7.5- 8.9	1.0- 1.5-2.0	.37	.37			
	23-38	- 8-	-57-	27-35- 45	1.30-1.40-1.50	0.10-0.91-1.00	0.14-0.16-0.18	6.0- 7.5- 8.9	0.5- 0.8-1.0	.37	.37			
	38-60	-18-	-58-	20-25- 35	1.30-1.40-1.50	0.10-0.91-1.00	0.14-0.16-0.18	3.0- 4.5- 5.9	0.0- 0.3-0.5	.37	.37			
Gerda	0-2	-41-	-37-	18-22- 27	1.10-1.20-1.30	1.00-2.70-10.00	0.13-0.14-0.15	0.0- 1.5- 2.9	2.0- 3.0-4.0	.37	.37	2	6	48
	2-11	- 7-	-48-	35-45- 55	1.20-1.30-1.40	0.10-0.28-1.00	0.10-0.11-0.12	6.0- 7.5- 8.9	2.0- 3.0-4.0	.32	.32			
	11-19	- 7-	-48-	35-45- 55	1.25-1.40-1.50	0.10-0.28-1.00	0.10-0.11-0.12	6.0- 7.5- 8.9	1.0- 1.5-2.0	.32	.32			
	19-29	-17-	-48-	30-35- 45	1.30-1.40-1.50	1.00-7.70-10.00	0.10-0.11-0.12	6.0- 7.5- 8.9	1.0- 1.5-2.0	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	29-44	- 7-	-48-	30-45- 50	1.30-1.40-1.50	1.00-7.70-10.00	0.10-0.11-0.12	6.0- 7.5- 8.9	0.5- 0.8-1.0	.32	.32			
	44-80	-26-	-52-	15-22- 27	1.30-1.40-1.50	10.00-21.70-100.00	0.09-0.10-0.11	0.0- 1.5- 2.9	0.5- 0.8-1.0	.43	.43			
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded														
Wolf point, occasionally flooded	0-1	-17-	-48-	27-35- 40	1.20-1.30-1.40	0.10-0.92-1.00	0.18-0.19-0.20	6.0- 7.5- 8.9	0.5- 0.8-1.0	.32	.32	5	4L	86
	1-10	-30-	-30-	35-40- 50	1.20-1.30-1.40	0.10-0.92-1.00	0.15-0.16-0.17	6.0- 7.5- 8.9	0.5- 0.8-1.0	.37	.37			
	10-60	- 7-	-48-	30-45- 60	1.20-1.30-1.40	0.10-0.92-1.00	0.11-0.14-0.16	6.0- 7.5- 8.9	0.0- 0.3-0.5	.37	.37			
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded														
Wolf point, wooded, occasionally flooded	0-1	-17-	-48-	27-35- 40	1.20-1.30-1.40	0.10-0.92-1.00	0.18-0.19-0.20	6.0- 7.5- 8.9	0.5- 0.8-1.0	.32	.32	5	4L	86
	1-10	-30-	-30-	35-40- 50	1.20-1.30-1.40	0.10-0.92-1.00	0.15-0.16-0.17	6.0- 7.5- 8.9	0.5- 0.8-1.0	.37	.37			
	10-60	- 7-	-48-	30-45- 60	1.20-1.30-1.40	0.10-0.92-1.00	0.11-0.14-0.16	6.0- 7.5- 8.9	0.0- 0.3-0.5	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded														
Havre, occasionally flooded	0-7	15-25- 30	50-55- 65	18-20- 27	1.40-1.45-1.50	4.23-9.52-14.11	0.22-0.23-0.24	1.5- 2.0- 3.4	1.0- 2.0-3.0	.43	.43	5	4L	86
	7-18	15-35- 60	20-41- 70	10-24- 35	1.40-1.45-1.50	1.41-9.52-42.34	0.14-0.18-0.22	0.5- 2.5- 5.2	0.8- 1.0-2.0	.37	.37			
	18-32	15-26- 60	20-38- 70	10-36- 40	1.40-1.45-1.50	1.41-3.75-42.34	0.14-0.17-0.21	0.5- 5.0- 6.2	0.5- 0.8-1.0	.32	.32			
	32-36	15-30- 45	30-45- 65	18-25- 35	1.40-1.45-1.50	1.41-9.52-14.11	0.14-0.18-0.21	1.5- 2.8- 5.2	0.8- 1.5-2.5	.37	.37			
	36-79	15-45- 60	20-37- 70	10-18- 40	1.40-1.45-1.50	1.41-9.52-42.34	0.12-0.17-0.20	0.3- 1.5- 6.1	0.1- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded														
Havre, rarely flooded, mollic	0-7	30-36- 45	30-40- 50	18-24- 27	1.30-1.45-1.55	4.23-9.52-14.11	0.20-0.21-0.22	1.6- 2.9- 3.6	2.5- 4.0-5.0	.28	.28	5	4L	86
	7-18	15-35- 60	20-41- 70	10-24- 35	1.40-1.45-1.50	1.41-9.52-42.34	0.14-0.18-0.22	0.5- 2.6- 5.2	1.0- 2.0-3.0	.37	.37			
	18-32	15-26- 60	20-38- 70	10-36- 40	1.40-1.45-1.50	1.41-3.75-42.34	0.14-0.17-0.21	0.5- 5.0- 6.2	0.5- 0.8-1.0	.32	.32			
	32-36	15-30- 45	30-45- 65	18-25- 35	1.40-1.45-1.50	1.41-9.52-14.11	0.14-0.18-0.21	1.5- 2.9- 5.2	2.0- 3.0-4.0	.32	.32			
	36-79	15-45- 60	20-37- 70	10-18- 40	1.40-1.45-1.50	1.41-9.52-42.34	0.12-0.17-0.20	0.3- 1.5- 6.1	0.1- 0.3-0.5	.43	.43			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded														
Glendive, channeled, frequently flooded	0-5	55-64- 75	10-22- 35	10-14- 18	1.35-1.40-1.50	14.11-28.13-42.34	0.16-0.17-0.18	0.8- 1.4- 1.8	2.0- 4.0-5.0	.17	.17	4	3	86
	5-24	15-48- 65	15-36- 75	10-16- 20	1.40-1.50-1.60	4.23-12.85-42.34	0.16-0.18-0.20	0.7- 1.5- 2.0	1.0- 1.5-3.0	.49	.49			
	24-43	40-68- 75	10-20- 55	5-12- 18	1.45-1.50-1.60	4.23-36.50-42.34	0.14-0.16-0.20	0.2- 1.2- 1.8	0.3- 1.0-1.5	.20	.20			
	43-79	70-92- 95	2- 3- 15	2- 5- 18	1.55-1.60-1.65	14.11-120.50-141.14	0.04-0.07-0.16	0.0- 0.4- 1.8	0.1- 0.5-1.0	.02	.02			
Fluvaquents, channeled, frequently flooded	0-5	55-68- 75	10-22- 40	5-10- 15	1.40-1.45-1.50	14.11-38.72-42.34	0.15-0.17-0.18	0.2- 0.9- 1.5	1.0- 2.0-3.0	.20	.20	5	3	86
	5-79	20-80- 85	5-12- 75	2- 8- 25	1.40-1.60-1.70	1.41-95.88-141.14	0.06-0.10-0.20	0.0- 0.5- 2.9	0.1- 0.8-2.0	.24	.24			
Havre, channeled, frequently flooded	0-6	35-38- 45	30-42- 45	18-20- 27	1.25-1.35-1.45	4.23-9.52-14.11	0.20-0.21-0.22	1.7- 2.2- 3.7	2.0- 4.0-6.0	.28	.28	5	4L	86
	6-22	15-35- 60	20-41- 70	10-24- 35	1.35-1.45-1.50	1.41-9.52-42.34	0.14-0.18-0.22	0.5- 2.6- 5.2	1.0- 2.0-3.0	.37	.37			
	22-25	15-30- 45	30-45- 65	18-25- 35	1.25-1.35-1.45	1.41-9.52-14.11	0.14-0.18-0.21	1.5- 2.9- 5.2	2.0- 3.0-4.0	.37	.37			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
	25-45	15-30- 60	20-38- 70	10-32- 40	1.40-1.45-1.50	1.41-3.75-42.34	0.14-0.17-0.21	0.5- 4.1- 6.3	0.5- 1.0-1.5	.32	.32			
	45-79	15-45- 60	20-37- 70	10-18- 40	1.40-1.50-1.55	1.41-9.52-42.34	0.12-0.17-0.20	0.3- 1.6- 6.2	0.1- 0.5-1.0	.37	.37			
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded														
Glendive, occasionally flooded	0-7	55-64- 75	10-22- 35	10-14- 18	1.50-1.55-1.60	14.11-28.13-42.34	0.16-0.17-0.18	0.8- 1.4- 1.8	1.0- 2.0-3.0	.20	.20	4	3	86
	7-15	15-48- 65	15-36- 75	10-16- 20	1.45-1.50-1.60	4.23-12.85-42.34	0.16-0.18-0.20	0.8- 1.6- 2.0	0.8- 1.5-2.0	.49	.49			
	15-46	40-68- 75	10-20- 55	5-12- 18	1.45-1.50-1.55	4.23-36.50-42.34	0.15-0.16-0.20	0.2- 1.2- 1.8	0.5- 1.0-1.5	.20	.20			
	46-79	70-85- 95	2-10- 25	2- 5- 18	1.55-1.60-1.65	14.11-85.13-141.14	0.05-0.10-0.15	0.0- 0.3- 1.7	0.1- 0.3-0.5	.05	.05			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded														
Hanly, occasionally flooded	0-4	55-64- 75	10-22- 35	10-14- 18	1.35-1.40-1.45	14.11-28.13-42.34	0.16-0.17-0.18	0.9- 1.4- 1.8	2.0- 3.0-4.0	.17	.17	5	3	86
	4-44	50-85- 90	2- 5- 35	5-10- 18	1.45-1.50-1.60	4.23-110.25-141.14	0.06-0.12-0.18	0.2- 0.9- 1.8	1.0- 2.0-3.0	.02	.02			
	44-79	80-90- 95	2- 5- 15	2- 5- 10	1.55-1.60-1.65	42.34-132.57-141.14	0.05-0.08-0.12	0.0- 0.3- 0.9	0.1- 0.5-1.0	.02	.02			

Physical Soil Properties–McKenzie County, North Dakota														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes														
Tinsley	0-4	-67-	-23-	5-10- 15	1.30-1.40-1.50	10.00-28.23-100.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.7- 1.4-2.0	.10	.20	2	5	56
	4-11	-67-	-19-	10-14- 25	1.35-1.45-1.60	10.00-77.63-100.00	0.11-0.13-0.15	0.0- 1.5- 2.9	0.0- 0.5-1.0	.10	.17			
	11-60	-79-	-17-	0- 5- 10	1.45-1.55-1.65	10.00-91.74-100.00	0.01-0.02-0.02	0.0- 1.5- 2.9	0.0- 0.3-0.5	.05	.17			
Chanta	0-6	-39-	-37-	18-24- 27	1.20-1.30-1.40	1.00-9.17-10.00	0.18-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	3	6	48
	6-22	-39-	-37-	18-24- 30	1.20-1.30-1.40	1.00-9.17-10.00	0.18-0.20-0.21	3.0- 4.5- 5.9	1.0- 1.8-2.0	.28	.32			
	22-26	-66-	-19-	10-15- 20	1.30-1.40-1.50	10.00-23.29-100.00	0.14-0.16-0.18	0.0- 1.5- 2.9	1.0- 1.5-2.0	.28	.32			
	26-60	-94-	- 1-	1- 5- 10	1.40-1.55-1.70	10.00-91.74-100.00	0.03-0.04-0.05	0.0- 1.5- 2.9	0.5- 0.8-1.0	.10	.17			
L4999—Water														
Water	—	—	—	—	—	—	—	—	—					

Soil Qualities and Features

This folder contains tabular reports that present various soil qualities and features. The reports (tables) include all selected map units and components for each map unit. Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Soil Features

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

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

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

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

corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

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

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

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes									
Rhoades	Natric	1- 3-5	5-35	Noncemented	0	0	Low	High	High
Daglum	Natric	2- 5-10	11-35	Noncemented	0	0	Low	High	High
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes									
Dogtooth	Natric	2- 2-4	8-16	Noncemented	0	0	Low	High	High
	Paralithic bedrock	20-28-39	—	Moderately cemented	0	0	Low	High	High
Janesburg	Natric	3- 9-13	13-20	Noncemented	0	0	Low	High	Moderate
	Paralithic bedrock	20-32-39	—	Moderately cemented	0	0	Low	High	Moderate
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes									
Dogtooth	Natric	2- 2-4	8-14	Noncemented	0	0	Low	High	High
	Paralithic bedrock	20-21-39	—	Weakly cemented	0	0	Low	High	High
Janesburg	Natric	3- 8-13	4-20	Noncemented	0	0	Low	High	Moderate
	Paralithic bedrock	20-26-39	—	Weakly cemented	0	0	Low	High	Moderate
Cabba	Paralithic bedrock	10-12-20	—	Very weakly cemented	0	0	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes									
Vebar	Paralithic bedrock	20-29-39	—	Very weakly cemented	0	0	Moderate	Low	Moderate
Cohagen	Paralithic bedrock	10-17-20	—	Very weakly cemented	0	0	Moderate	Moderate	Low
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes									
Vebar	Paralithic bedrock	20-29-39	—	Very weakly cemented	0	0	Moderate	Low	Moderate
Flasher	Paralithic bedrock	10-15-20	—	Very weakly cemented	0	0	Low	Moderate	Low
Tally	Paralithic bedrock	60-70-79	—	Very weakly cemented	0	0	Moderate	Low	Low
E1403D—Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes									
Beisigl	Paralithic bedrock	20-27-40	—	Extremely weakly cemented	—	—	Low	Moderate	Low
Flasher	Paralithic bedrock	7- 10-20	—	Extremely weakly cemented	—	—	Low	Moderate	Low
Telfer		—	—		—	—	Low	Low	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes									
Flasher	Paralithic bedrock	10-14-20	—	Very weakly cemented	0	0	Low	Moderate	Low
Vebar	Paralithic bedrock	20-26-39	—	Very weakly cemented	0	0	Moderate	Low	Moderate
Parshall		—	—		0	0	Moderate	Low	Low
E1805B—Lihen-Parshall complex, 0 to 6 percent slopes									
Lihen		—	—		—	—	Low	Low	Low
Parshall		—	—		—	—	Moderate	Low	Low
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes									
Cabba	Paralithic bedrock	10-12-20	—	Very weakly cemented	0	0	Moderate	Moderate	Low
Chama	Paralithic bedrock	20-28-39	—	Very weakly cemented	0	0	Moderate	Moderate	Low
Shambo	Paralithic bedrock	39-71-79	—	Very weakly cemented	0	0	Moderate	Moderate	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E2725F—Arikara-Shambo-Cabba loams, 9 to 70 percent slopes									
Arikara		—	—		0	—	Moderate	Moderate	Moderate
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Shambo, steep		—	—		—	—	Moderate	Low	Low
E2737C—Chama-Cabba-Sen silt loams, 6 to 9 percent slopes									
Chama	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Sen	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
E2741D—Cabba-Chama-Sen silt loams, 9 to 15 percent slopes									
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Chama	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Sen	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E2913B—Chama-Sen-Cabba silt loams, 3 to 6 percent slopes									
Chama	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Sen	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
E3107F—Cabba-Badland complex, 6 to 70 percent slopes									
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Badland	Paralithic bedrock	0- 2-5	—	Weakly cemented	—	—	Low		
E3161F—Cherry-Cabba silt loams, 9 to 45 percent slopes									
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Cherry		—	—		—	—	Moderate	Moderate	Moderate
Cherry		—	—		—	—	Moderate	Moderate	Moderate
E3541B—Williams-Zahl loams, 3 to 6 percent slopes									
Williams		—	—		0	—	Moderate	Moderate	Low
Zahl		—	—		0	—	Moderate	Moderate	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E3609F—Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes									
Zahl		—	—		0	—	Moderate	Moderate	Low
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Maschetah, strongly sloping		—	—		—	—	Moderate	Moderate	Moderate
Maschetah, gently sloping		—	—		—	—	Moderate	Moderate	Moderate
E3641D—Zahl-Cabba-Williams complex, 9 to 15 percent slopes									
Zahl		—	—		0	—	Moderate	Moderate	Low
Cabba	Paralithic bedrock	10-15-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Williams		—	—		0	—	Moderate	Moderate	Low
E4561F—Manning-Schaller-Wabek complex, 6 to 35 percent slopes									
Manning		—	—		—	—	Low	High	Low
Schaller		—	—		—	—	Low	Low	Low
Wabek		—	—		—	—	Low	Low	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
E4729A—Heil silty clay loam, 0 to 1 percent slopes									
Heil	Natric	1- 3-4	—	Noncemented	—	—	Moderate	High	High
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes									
Maltese	Natric	2- 5-10	13-37	Noncemented	0	0	Low	High	High
Gerda	Natric	0- 2-3	8-37	Noncemented	0	0	Low	High	High
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes									
Rhame	Paralithic bedrock	20-35-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Chinook		—	—		0	0	Moderate	Low	Low
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes									
Rhame	Paralithic bedrock	20-31-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Fleak	Paralithic bedrock	7- 14-20	—	Weakly cemented	0	0	Low	Moderate	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes									
Rhame	Paralithic bedrock	20-31-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Arikara, low precipitation	Paralithic bedrock	39-61-79	—	Weakly cemented	0	0	Moderate	Moderate	Moderate
Fleak	Paralithic bedrock	7- 14-20	—	Weakly cemented	0	0	Low	Moderate	Low
L2145A—Kremlin loam, 0 to 2 percent slopes									
Kremlin		—	—		0	0	Moderate	Moderate	Low
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes									
Rhame	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Low
Bullock	Natric	- 4-	—	Noncemented	0	—	Low	High	High
	Paralithic bedrock	20-23-40	—	Weakly cemented	0	—	Low	High	High
Kremlin		—	—		0	—	Moderate	Moderate	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes									
Scairt	Natric	1- 2-4	—	Noncemented	0	—	Low	High	High
	Paralithic bedrock	20-28-40	—	Weakly cemented	0	—	Low	High	High
Maltese	Natric	8- 10-15	—	Noncemented	0	—	Moderate	High	High
Boxwell	Paralithic bedrock	20-28-40	—	Extremely weakly cemented	0	—	Moderate	Moderate	Moderate
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes									
Rhame	Paralithic bedrock	20-34-40	—	Extremely weakly cemented	0	—	Moderate	Moderate	Low
Kremlin		—	—		0	—	Moderate	Moderate	Low
Archin	Natric	- 6-	—	Noncemented	0	—	Low	High	High
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped									
Cabbart	Paralithic bedrock	10-18-20	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate
Kremlin		—	—		—	—	Moderate	Moderate	Low
Boxwell	Paralithic bedrock	20-28-40	—	Extremely weakly cemented	—	—	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes									
Boxwell	Paralithic bedrock	20-24-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Cabbart	Paralithic bedrock	10-18-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate
Arikara, low precipitation	Paralithic bedrock	39-61-79	—	Weakly cemented	0	0	Moderate	Moderate	Moderate
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes									
Boxwell	Paralithic bedrock	20-29-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Kremlin		—	—		0	0	Moderate	Moderate	Low
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes									
Boxwell	Paralithic bedrock	20-24-39	—	Weakly cemented	0	0	Moderate	Moderate	Low
Kremlin	Paralithic bedrock	60-71-79	—	Very weakly cemented	0	0	Moderate	Moderate	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes									
Kirby, channery loam		—	—		0	0	Moderate	High	Low
Badland	Paralithic bedrock	0- 2-3	76-78	Moderately cemented	0	0			
Patent, badland fan		—	—		0	0	Moderate	Moderate	Moderate
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes									
Kirby, channery loam		—	—		0	—	Low	High	Low
Scairt	Natric	1- 2-4	—	Noncemented	0	—	Low	High	High
	Paralithic bedrock	20-28-40	—	Weakly cemented	0	—	Low	High	High
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes									
Badland	Paralithic bedrock	0- 2-3	—	Moderately cemented	0	0			
Cabbart	Paralithic bedrock	10-14-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes									
Cabbart	Paralithic bedrock	10-14-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate
Badland	Paralithic bedrock	0- 2-3	—	Moderately cemented	0	0			
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes									
Lonna		—	—		0	0	Moderate	Moderate	Moderate
Cabbart	Paralithic bedrock	10-18-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes									
Patent, badland fan		—	—		0	0	Moderate	Moderate	Moderate
Badland	Paralithic bedrock	0- 2-3	—	Moderately cemented	0	0			
Cabbart	Paralithic bedrock	10-14-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes									
Badland	Paralithic bedrock	0- 2-3	—	Moderately cemented	0	0			
Arikara, low precipitation	Paralithic bedrock	39-61-79	—	Weakly cemented	0	0	Moderate	Moderate	Moderate
Cabbart	Paralithic bedrock	10-18-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate
L3197F—Badland, 9 to 150 percent slopes									
Badland	Paralithic bedrock	0- 2-3	—	Weakly cemented	0	0			
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes									
Arikara, low precipitation	Paralithic bedrock	39-61-79	—	Weakly cemented	0	0	Moderate	Moderate	Moderate
Cabbart	Paralithic bedrock	10-18-20	50-69	Weakly cemented	0	0	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes									
Patent, occasionally flooded		—	—		0	—	Moderate	Moderate	Moderate
Patent, gullied, occasionally flooded		—	—		—	—	Moderate	Moderate	Moderate
Glendive, frequently flooded		—	—		0	—	Moderate	Moderate	Moderate
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded									
Patent, occasionally flooded		—	—		—	—	Moderate	Moderate	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes									
Patent, occasionally flooded		—	—		0	—	Moderate	Moderate	Moderate
Vanda		—	—		0	—	Low	High	High
Gerda, severely eroded	Natric	- 0-	—	Noncemented	—	—	Low	High	High
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes									
Kremlin		—	—		—	—	Moderate	Moderate	Low
Ethridge		—	—		—	—	Low	Moderate	Moderate
Gerda	Natric	0- 2-3	—	Noncemented	0	—	Low	High	High
L4111A—Wolf Point silty clay loam, 0 to 2 percent slopes, occasionally flooded									
Wolf point, occasionally flooded		—	—		0	—	Low	High	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L4113A—Wolf Point silty clay loam, wooded, 0 to 2 percent slopes, occasionally flooded									
Wolf point, wooded, occasionally flooded		—	—		0	—	Low	High	Moderate
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded									
Havre, occasionally flooded		—	—		0	0	Moderate	High	Moderate
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded									
Havre, rarely flooded, mollic		—	—		0	0	Moderate	High	Moderate

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded									
Glendive, channeled, frequently flooded		—	—		0	0	Moderate	High	Moderate
Fluvaquents, channeled, frequently flooded		—	—		0	0	Moderate	Moderate	Moderate
Havre, channeled, frequently flooded		—	—		0	0	Moderate	High	Moderate
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded									
Glendive, occasionally flooded		—	—		0	0	Moderate	High	Low
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded									
Hanly, occasionally flooded		—	—		0	0	Low	High	Low

Soil Features–McKenzie County, North Dakota									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes									
Tinsley		—	—		0	—	Low	Moderate	Low
Chanta		—	—		0	—	Moderate	High	Low
L4999—Water									
Water		—	—		—	—			

Soil Locations

This table gives locations to identify the various soils within the map unit. The map unit typically contains more than one soil component. This report is used to identify geomorphic features within the map unit where soil components may occur. The report lists each map unit within the area of interest, the soil components, the assigned component percent within the map unit, The geomorphic type, the geomorphic name, the geomorphic modifier, the hill slope profile, the slope shape across the slope, and the slope shape down the slope. These features are used to assist in locating the components contained within the map nit. For further information on the landform terminology, visit the National Soil Survey Handbook Part 629 at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054230#00

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
E0515B—Rhoades-Daglum complex, 0 to 6 percent slopes							
Rhoades	55	Landform	hillslopes			Concave	Linear
Daglum	33	Landform	hillslopes			Linear	Linear
Belfield	5	Landform	hillslopes			Linear	Linear
Savage	3	Landform	hillslopes			Convex	Linear
Barkof	2	Landform	hillslopes			Convex	Convex
Rhoades, severely eroded	2	Landform	hillslopes			Concave	Concave
E0559B—Dogtooth-Janesburg complex, 0 to 6 percent slopes							
Dogtooth	55	Landform	hillslopes		Backslope	Concave	Linear
Janesburg	33	Landform	hillslopes		Backslope	Linear	Linear
Dogtooth, severely eroded	5	Landform	hillslopes		Backslope	Concave	Concave
Savage	3	Landform	hillslopes		Footslope	Linear	Linear
Barkof	2	Landform	hillslopes		Backslope	Linear	Convex
Wayden	2	Landform	hillslopes		Shoulder	Convex	Convex
E0701F—Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes							
Dogtooth	35	Landform	hillslopes		Backslope	Concave	Linear
Janesburg	25	Landform	hillslopes		Backslope	Linear	Linear
Cabba	22	Landform	hillslopes		Shoulder	Convex	Convex
Barkof	10	Landform	hillslopes		Backslope	Convex	Linear
Harriet, occasionally flooded	5	Landform	drainageways		Toeslope	Concave	Linear
Wayden, severely eroded	3	Landform	hillslopes		Backslope	Linear	Concave

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
E1333C—Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes							
Vebar	50	Landform	hillslopes		Backslope	Linear	Convex
Cohagen	25	Landform	hillslopes		Shoulder	Convex	Convex
Tally	14	Landform	hillslopes		Footslope	Linear	Linear
Beisigl	7	Landform	hillslopes		Backslope	Linear	Convex
Amor	2	Landform	hillslopes		Backslope	Linear	Convex
Arnegard	2	Landform	swales		Toeslope	Concave	Linear
E1355D—Vebar-Flasher-Tally complex, 9 to 15 percent slopes							
Vebar	40	Landform	hillslopes		Backslope	Linear	Convex
Flasher	30	Landform	hillslopes		Shoulder	Convex	Convex
Tally	18	Landform	hillslopes		Footslope	Linear	Linear
Parshall	5	Landform	swales		Toeslope	Concave	Linear
Amor	4	Landform	hillslopes		Backslope	Linear	Convex
Telfer	3	Landform	hillslopes		Backslope	Linear	Linear
E1423F—Flasher-Vebar-Parshall complex, 9 to 35 percent slopes							
Flasher	36	Landform	hillslopes		Shoulder	Convex	Convex
Vebar	22	Landform	hillslopes		Backslope	Linear	Convex
Parshall	15	Landform	hillslopes		Toeslope	Concave	Linear
Beisigl	11	Landform	hillslopes		Backslope	Linear	Convex
Telfer	10	Landform	hillslopes		Backslope	Linear	Convex
Amor	4	Landform	hillslopes		Backslope	Linear	Convex
Rock outcrop, sandstone	2	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
E2617F—Cabba-Chama-Shambo loams, 9 to 50 percent slopes							
Cabba	41	Landform	hillslopes		Shoulder	Convex	Convex
Chama	27	Landform	hillslopes		Backslope	Linear	Convex
Shambo	15	Landform	hillslopes		Footslope	Linear	Linear
Amor	10	Landform	hillslopes		Backslope	Linear	Convex
Arnegard	5	Landform	hillslopes		Toeslope	Concave	Linear
Rock outcrop	2	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex
L0454B—Maltese-Gerda complex, 0 to 6 percent slopes							
Maltese	45	Landform	hillslopes		Toeslope	Linear	Linear
Gerda	35	Landform	hillslopes		Toeslope	Concave	Linear
Ethridge	10	Landform	hillslopes		Footslope	Convex	Linear
Kremlin	7	Landform	hillslopes		Footslope	Convex	Linear
Abor	3	Landform	hillslopes		Backslope	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L1355D—Rhame-Chinook fine sandy loams, 9 to 15 percent slopes							
Rhame	40	Landform	hillslopes		Backslope	Linear	Convex
Chinook	30	Landform	hillslopes		Footslope	Linear	Concave
Blacksheep	12	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex
Tusler	8	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Shoulder	Linear Convex	Convex
Arnegard, overflow	6	Landform	swales		Toeslope	Concave	Linear
Burgraff	4	Landform	hillslopes		Backslope	Linear	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L1425F—Rhame-Fleak complex, 9 to 50 percent slopes							
Rhame	37	Landform	hillslopes		Backslope	Linear	Convex
Fleak	34	Landform	hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Chinook	10	Landform	hillslopes		Footslope	Linear	Concave
Cabbart	6	Landform	hillslopes		Summit	Convex	Convex
Tusler	6	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Shoulder	Linear Convex	Convex
Rock outcrop, sandstone	4	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex
Kremlin	3	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Footslope Toeslope	Concave Linear	Linear Concave

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L1661F—Rhame-Arikara-Fleak complex, 9 to 70 percent slopes							
Rhame	32	Landform	hillslopes		Backslope	Linear	Convex
Arikara, low precipitation	25	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Footslope	Linear	Concave Linear
Fleak	21	Landform	hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Tusler	10	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Shoulder	Convex Linear	Convex
Chinook	6	Landform	hillslopes		Footslope	Linear	Concave
Arnegard, frequently flooded	4	Landform	swales		Toeslope	Concave	Linear
Maltese	2	Landform	hillslopes, hillslopes		Footslope Toeslope	Linear	Concave

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L2145A—Kremlin loam, 0 to 2 percent slopes							
Kremlin	85	Landform	hillslopes		Footslope	Linear	Linear
Chinook	5	Landform	hillslopes		Footslope	Linear	Linear
Belfield, low precipitation	3	Landform	swales		Footslope	Concave	Linear
Haydraw	3	Landform	hillslopes		Footslope	Linear	Convex
Boxwell	2	Landform	hillslopes		Backslope	Linear	Convex
Ethridge	2	Landform	hillslopes		Footslope	Linear	Linear
L2307F—Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes							
Kremlin	15	Landform	ridges		Backslope	Linear	Linear
Maltese	12	Landform	ridges		Backslope	Linear	Convex
Cabbart	3	Landform	ridges, ridges, ridges, ridges		Shoulder Summit	Convex	Convex Linear
Fleak	2	Landform	ridges, ridges, ridges, ridges		Summit Shoulder	Convex	Convex Linear
L2311E—Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes							
Maltese	20	Landform	ridges		Backslope	Convex	Linear
Boxwell	15	Landform	ridges		Backslope	Linear	Convex
Gerda	12	Landform	hills		Footslope	Concave	Concave
Cabbart	10	Landform	ridges, ridges, ridges, ridges		Shoulder Summit	Convex	Convex Linear
Kremlin	6	Landform	ridges		Footslope	Linear	Concave
Rhame	2	Landform	hills		Backslope	Linear	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L2335D—Rhame-Kremlin-Archin complex, 6 to 15 percent slopes							
Rhame	40	Landform	hills		Backslope	Linear	Convex
Kremlin	25	Landform	ridges		Footslope	Linear	Concave
Blacksheep	10	Landform	hills, hills		Shoulder	Convex	Convex Linear
L2621F—Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped							
Cabbart	29	Landform	ridges, ridges, ridges, ridges		Summit Shoulder	Convex	Linear Convex
Kremlin	19	Landform	ridges		Footslope	Linear	Concave
Boxwell	17	Landform	ridges		Backslope	Linear	Convex
Lonna	12	Landform	alluvial fans, alluvial fans, alluvial fans, alluvial fans		Footslope Backslope	Convex Linear	Linear
Fleak	2	Landform	ridges, ridges, ridges, ridges		Shoulder Summit	Convex	Convex Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L2633F—Boxwell-Cabbart-Arikara complex, 9 to 70 percent slopes							
Boxwell	36	Landform	hillslopes		Backslope	Linear	Convex
Cabbart	29	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Arikara, low precipitation	16	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Footslope	Linear	Linear Concave
Lonna	6	Landform	alluvial fans, alluvial fans		Footslope	Convex Linear	Linear
Arnegard, frequently flooded	5	Landform	swales		Toeslope	Concave	Linear
Rhame	5	Landform	hillslopes		Backslope	Linear	Convex
Maltese	3	Landform	hillslopes, hillslopes		Footslope Toeslope	Linear	Concave
L2803B—Boxwell-Kremlin loams, 3 to 6 percent slopes							
Boxwell	63	Landform	hillslopes		Backslope	Linear	Convex
Kremlin	25	Landform	hillslopes		Footslope	Linear	Linear
Arnegard, overflow	5	Landform	swales		Toeslope	Concave	Linear
Burgraff	3	Landform	hillslopes		Backslope	Linear	Convex
Cabbart	2	Landform	hillslopes		Shoulder	Convex	Convex
Rhame	2	Landform	hillslopes		Backslope	Linear	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L2807D—Boxwell-Kremlin loams, 9 to 15 percent slopes							
Boxwell	46	Landform	hillslopes		Backslope	Linear	Convex
Kremlin	32	Landform	hillslopes		Footslope	Linear	Linear
Cabbart	10	Landform	hillslopes		Shoulder	Convex	Convex
Burgraff	8	Landform	hillslopes		Backslope	Convex	Convex
Rhame	4	Landform	hillslopes		Backslope	Linear	Convex
L3007F—Kirby-Badland-Patent complex, 9 to 70 percent slopes							
Kirby, channery loam	38	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex
Badland	25	Landform	hillslopes, hillslopes		Shoulder Backslope	Convex	Linear
Patent, badland fan	20	Landform	alluvial fans		Footslope	Convex	Linear
Cabbart	10	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Lonna	4	Landform	alluvial fans, alluvial fans		Footslope	Convex Linear	Linear
Maltese	3	Landform	alluvial fans, alluvial fans		Footslope Toeslope	Linear	Concave
L3013F—Kirby-Scairt complex, 9 to 70 percent slopes							
Scairt	15	Landform	ridges		Backslope	Concave	Concave
Cabbart	10	Landform	ridges, ridges, ridges, ridges		Shoulder Summit	Convex	Convex Linear
Kremlin	8	Landform	ridges		Footslope	Linear	Concave
Boxwell	5	Landform	ridges		Backslope	Linear	Convex
Maltese	3	Landform	ridges		Backslope	Linear	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3101F—Badland-Cabbart complex, 6 to 70 percent slopes							
Badland	60	Landform	hillslopes, hillslopes		Shoulder Backslope	Convex	Linear
Cabbart	30	Landform	hillslopes		Summit	Convex	Convex
Arikara, low precipitation	3	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Footslope Backslope Toeslope	Linear	Concave Linear
Patent, badland fan	3	Landform	alluvial fans, alluvial fans		Toeslope Footslope	Convex	Linear
Boxwell	2	Landform	hillslopes		Backslope	Linear	Convex
Rock outcrop, porcelainite	2	Landform	hillslopes, hillslopes		Shoulder Summit	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3107F—Cabbart-Badland complex, 6 to 70 percent slopes							
Cabbart	50	Landform	hillslopes		Summit	Convex	Convex
Badland	25	Landform	hillslopes, hillslopes		Shoulder Backslope	Convex	Linear
Patent, badland fan	10	Landform	alluvial fans, alluvial fans		Toeslope Footslope	Convex	Linear
Boxwell	5	Landform	hillslopes		Backslope	Linear	Convex
Kirby, channery loam	4	Landform	hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Kremlin	4	Landform	hillslopes		Footslope	Linear	Linear
Gerda	2	Landform	alluvial fans, alluvial fans		Footslope Toeslope	Concave	Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3161F—Lonna-Cabbart silt loams, 6 to 35 percent slopes							
Lonna	43	Landform	alluvial fans, alluvial fans		Footslope	Convex Linear	Linear
Cabbart	32	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Cambeth	10	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Shoulder Backslope	Linear Convex	Linear
Kremlin	8	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Toeslope Footslope	Concave Linear	Linear Concave

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
Gerda	3	Landform	alluvial fans, alluvial fans		Footslope Toeslope	Concave	Linear
Arikara, low precipitation	2	Landform	hillslopes, hillslopes		Footslope Backslope Toeslope	Linear Concave	Linear Concave
Badland	2	Landform	hillslopes, hillslopes		Shoulder Backslope	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3185F—Patent-Badland-Cabbart complex, 6 to 50 percent slopes							
Patent, badland fan	35	Landform	alluvial fans		Footslope	Convex	Linear
Badland	20	Landform	hillslopes, hillslopes		Shoulder Backslope	Convex	Linear
Cabbart	20	Landform	hillslopes		Summit	Convex	Convex
Lonna	10	Landform	alluvial fans, alluvial fans		Footslope	Linear Convex	Linear
Boxwell	4	Landform	hillslopes		Backslope	Linear	Convex
Gerda	4	Landform	alluvial fans, alluvial fans		Footslope Toeslope	Concave	Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
Patent, frequently flooded, flat bottom draw	3	Landform	drainageways		Toeslope	Concave	Linear
Arikara, low precipitation	2	Landform	hillslopes, hillslopes		Footslope Toeslope Backslope	Linear Concave	Concave Linear
Kirby, channery loam	2	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3191F—Badland-Arikara-Cabbart complex, 15 to 70 percent slopes							
Badland	30	Landform	hillslopes, hillslopes		Backslope Shoulder	Convex	Linear
Arikara, low precipitation	27	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Footslope Backslope	Linear	Linear Concave
Cabbart	17	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Summit Shoulder	Convex	Convex
Patent, badland fan	10	Landform	alluvial fans		Footslope	Convex	Linear
Lonna	6	Landform	hillslopes, hillslopes		Footslope	Convex Linear	Linear Concave
Boxwell	5	Landform	hillslopes		Backslope	Linear	Convex
Patent, frequently flooded, flat bottom draw	5	Landform	drainageways		Toeslope	Concave	Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3197F—Badland, 9 to 150 percent slopes							
Badland	88	Landform	hillslopes, hillslopes		Backslope Shoulder	Convex	Linear
Cabbart	5	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex
Patent, badland fan	5	Landform	alluvial fans, alluvial fans		Toeslope Footslope	Convex	Linear
Rock outcrop, porcelainite	2	Landform	hillslopes, hillslopes		Summit Shoulder	Convex	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3199F—Arikara-Cabbart loams, 15 to 70 percent slopes							
Arikara, low precipitation	62	Landform	hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes, hillslopes		Backslope Footslope	Linear	Linear Concave
Cabbart	19	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Shoulder Summit	Convex	Convex
Lonna	8	Landform	alluvial fans, alluvial fans		Footslope	Linear Convex	Linear
Badland	4	Landform	hillslopes, hillslopes		Backslope Shoulder	Convex	Linear
Patent, frequently flooded, flat bottom draw	3	Landform	drainageways		Toeslope	Concave	Linear
Kremlin	2	Landform	hillslopes, hillslopes, hillslopes, hillslopes		Footslope Toeslope	Linear Concave	Concave Linear
Rhame	2	Landform	hillslopes		Backslope	Linear	Convex

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L3235C—Patent-Patent, gullied, occasionally flooded-Glendive, frequently flooded complex, 0 to 9 percent slopes							
Patent, occasionally flooded	35	Landform	alluvial fans		Footslope	Convex	Linear
Lonna	10	Landform	alluvial fans, alluvial fans, alluvial fans, alluvial fans		Footslope Backslope	Linear Convex	Linear
Sham, occasionally flooded	5	Landform	alluvial fans		Footslope	Convex	Linear
Gerda	3	Landform	hills		Footslope	Concave	Concave
L3241B—Patent loam, 0 to 6 percent slopes, occasionally flooded							
Patent, occasionally flooded	80	Landform	alluvial fans		Footslope	Convex	Linear
Sham, occasionally flooded	8	Landform	alluvial fans		Footslope	Convex	Linear
Benz	5	Landform	alluvial fans		Footslope	Concave	Linear
Lonna	5	Landform	alluvial fans, alluvial fans, alluvial fans, alluvial fans		Footslope Backslope	Linear Convex	Linear
Kremlin	2	Landform	alluvial fans		Footslope	Linear	Linear
L3247C—Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes							
Patent, occasionally flooded	40	Landform	alluvial fans		Footslope	Convex	Linear
Benz	5	Landform	alluvial fans		Footslope	Concave	Linear
L3251B—Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes							
Kremlin	25	Landform	alluvial fans		Footslope	Linear	Linear
Patent, occasionally flooded	5	Landform	alluvial fans		Footslope	Convex	Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L4121A—Havre silt loam, 0 to 2 percent slopes, occasionally flooded							
Havre, occasionally flooded	82	Landform	flood-plain steps			Linear	Linear
Glendive, occasionally flooded	10	Landform	flood-plain steps			Linear	Linear
Lallie, occasionally flooded	3	Landform	oxbows			Concave	Linear
L4133A—Havre loam, mollic surface, 0 to 2 percent slopes, rarely flooded							
Havre, rarely flooded, mollic	86	Landform	flood-plain steps			Linear	Linear
Glendive, rarely flooded	5	Landform	flood-plain steps			Linear	Linear
Lallie, rarely flooded	2	Landform	oxbows			Concave	Linear
Patent, badland fan	2	Landform	alluvial fans			Convex	Linear
L4155A—Glendive-Havre-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded							
Glendive, channeled, frequently flooded	40	Landform	flood plains			Linear	Linear
Havre, channeled, frequently flooded	20	Landform	flood plains			Linear	Linear
Hanly, channeled, frequently flooded	5	Landform	flood plains			Linear	Linear
Patent, occasionally flooded	3	Landform	alluvial fans		Footslope	Convex	Linear
Dogiecreek, frequently flooded	2	Landform	drainageways			Concave	Linear
L4187A—Glendive fine sandy loam, 0 to 2 percent slopes, occasionally flooded							
Glendive, occasionally flooded	75	Landform	flood-plain steps			Linear	Linear
Hanly, occasionally flooded	12	Landform	flood-plain steps			Linear	Linear
Havre, occasionally flooded	8	Landform	flood-plain steps			Linear	Linear

Soil Locations–McKenzie County, North Dakota							
Map symbol and soil name	**Component percentage**	**Geomorphic Type**	**Geomorphic Name**	**Geomorphic Modifier**	**Hill Slope Profile**	**Slope Shape Across**	**Slope Shape Down**
L4209B—Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded							
Hanly, occasionally flooded	80	Landform	flood-plain steps			Linear	Linear
Minnewaukan, frequently flooded	10	Landform	flood-plain steps			Linear	Linear
Glendive, occasionally flooded	5	Landform	flood-plain steps			Linear	Linear
L4567F—Tinsley-Chanta complex, 6 to 35 percent slopes							
Tinsley	53	Landform	escarpments		Shoulder	Convex	Convex
Chanta	17	Landform	paleoterraces, escarpments		Backslope	Linear	Convex
Cozberg	7	Landform	paleoterraces			Linear	Convex
Cabbart	6	Landform	ridges, ridges, ridges, ridges		Summit Shoulder	Convex	Linear Convex
Kremlin	4	Landform	ridges		Backslope	Linear	Linear

References

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

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

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf