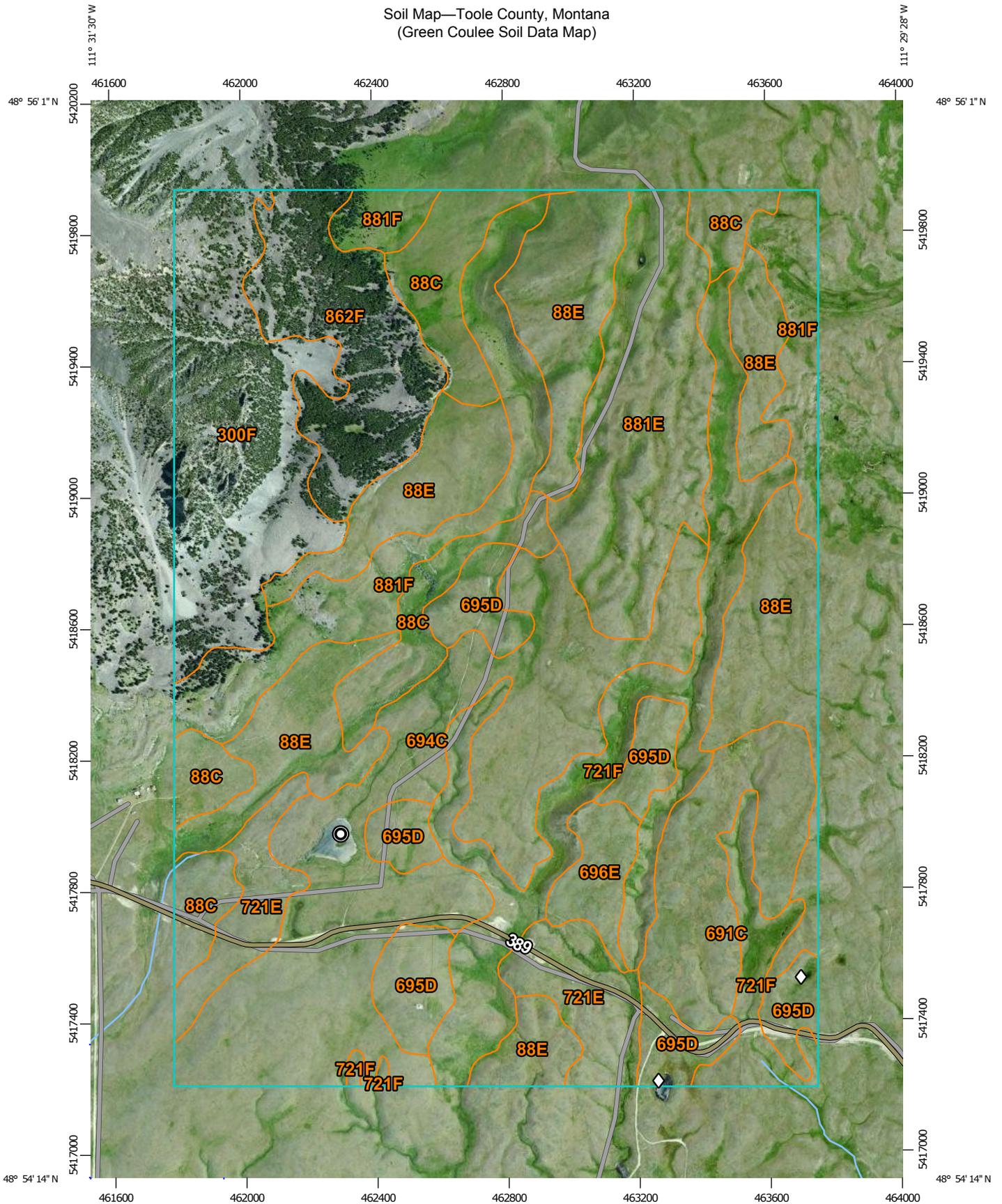
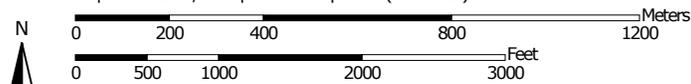


Soil Map—Toole County, Montana
(Green Coulee Soil Data Map)



Map Scale: 1:16,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 12N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

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: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

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

Date(s) aerial images were photographed: Jul 15, 2011—Jul 17, 2011

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

Toole County, Montana (MT101)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
88C	Perma gravelly loam, 2 to 8 percent slopes	96.8	7.3%
88E	Perma gravelly loam, 8 to 25 percent slopes	221.0	16.6%
300F	Rubble land	124.3	9.3%
691C	Vida-Vida, calcareous-Williams clay loams, 3 to 8 percent slopes	68.5	5.1%
694C	Vida-Williams clay loams, 3 to 8 percent slopes	211.8	15.9%
695D	Vida-Williams-Zahill clay loams, 4 to 15 percent slopes	80.8	6.1%
696E	Vida-Zahill clay loams, 8 to 25 percent slopes	19.8	1.5%
721E	Zahill-Zahl complex, 15 to 25 percent slopes	58.6	4.4%
721F	Zahill-Zahl complex, 25 to 60 percent slopes	144.9	10.9%
862F	Stemple, low elevation-Rubble land complex, 25 to 70 percent slopes	79.9	6.0%
881E	Perma-Whitlash cobbly loams, 8 to 25 percent slopes	106.1	8.0%
881F	Perma-Whitlash cobbly loams, 25 to 70 percent slopes	117.7	8.9%
Totals for Area of Interest		1,330.2	100.0%

Toole County, Montana

88C—Perma gravelly loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: cl9n
Elevation: 4,100 to 7,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Perma

Setting

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

A - 0 to 10 inches: gravelly loam
Bw - 10 to 30 inches: very cobbly loam
C - 30 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Minor Components

Slopes more than 8 percent

Percent of map unit: 5 percent
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Whitlash

Percent of map unit: 4 percent

Landform: Mountains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft shallow (sw) rru 46-n 13-19" p.z.

(R046XN250MT)

Shambo

Percent of map unit: 3 percent

Landform: Fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Farnuf

Percent of map unit: 3 percent

Landform: Fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Toole County, Montana

88E—Perma gravelly loam, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: cl9p
Elevation: 4,100 to 7,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Perma

Setting

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

A - 0 to 10 inches: gravelly loam
Bw - 10 to 30 inches: very cobbly loam
C - 30 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Minor Components

Slopes more than 25 percent

Percent of map unit: 5 percent

Ecological site: Draft silty-steep (sistp) rru 46-n 13-19" p.z.
(R046XN594MT)

Whitlash

Percent of map unit: 4 percent

Landform: Mountains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft shallow (sw) rru 46-n 13-19" p.z.
(R046XN250MT)

Farnuf

Percent of map unit: 3 percent

Landform: Fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Shambo

Percent of map unit: 3 percent

Landform: Fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Toole County, Montana

300F—Rubble land

Map Unit Setting

National map unit symbol: cl3x

Elevation: 4,300 to 7,000 feet

Farmland classification: Not prime farmland

Map Unit Composition

Rubble land: 85 percent

Minor components: 15 percent

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

Minor Components

Areas of scant vegetation

Percent of map unit: 15 percent

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Map Unit Description

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 in this report, 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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given 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.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Toole County, Montana

691C—Vida-Vida, calcareous-Williams clay loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: cl7w

Elevation: 3,400 to 4,600 feet

Mean annual precipitation: 13 to 17 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Vida and similar soils: 35 percent

Vida, calcareous, and similar soils: 30 percent
Williams and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vida

Setting

Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 4 inches: clay loam
Bt - 4 to 9 inches: clay loam
Bk - 9 to 30 inches: clay loam
C - 30 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Vida, Calcareous

Setting

Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 4 inches: clay loam
Bt - 4 to 9 inches: clay loam
Bk - 9 to 30 inches: clay loam
C - 30 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Williams

Setting

Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 5 inches: clay loam
Bt - 5 to 13 inches: clay loam
Bk - 13 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Minor Components

Zahill

Percent of map unit: 7 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Slopes more than 8 percent

Percent of map unit: 6 percent

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Nishon

Percent of map unit: 2 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft overflow (ov) rru 46-n 13-19" p.z.
(R046XN248MT)

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Toole County, Montana

862F—Stemple, low elevation-Rubble land complex, 25 to 70 percent slopes

Map Unit Setting

National map unit symbol: cl9j
Elevation: 4,700 to 7,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 50 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

Stemple and similar soils: 50 percent
Rubble land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stemple

Setting

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
E1 - 2 to 10 inches: very cobbly loam
E2 - 10 to 34 inches: extremely channery loam
Bt1 - 34 to 39 inches: extremely channery loam
Bt2 - 39 to 60 inches: extremely channery clay loam

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Slopes less than 25 percent

Percent of map unit: 5 percent

Soils lacking coarse fragments

Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Toole County, Montana

694C—Vida-Williams clay loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: cl7z

Elevation: 3,400 to 4,600 feet

Mean annual precipitation: 13 to 17 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Vida and similar soils: 50 percent

Williams and similar soils: 35 percent

Minor components: 15 percent

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

Description of Vida

Setting

Landform: Till plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Till

Typical profile

Ap - 0 to 4 inches: clay loam

Bt - 4 to 9 inches: clay loam

Bk - 9 to 30 inches: clay loam

C - 30 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

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 in profile: 15 percent

Gypsum, maximum in profile: 5 percent

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

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Williams

Setting

Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 5 inches: clay loam
Bt - 5 to 13 inches: clay loam
Bk - 13 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Minor Components

Slopes more than 8 percent

Percent of map unit: 7 percent
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Slopes less than 3 percent

Percent of map unit: 6 percent
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Nishon

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Draft overflow (ov) rru 46-n 13-19" p.z.
(R046XN248MT)

Data Source Information

Soil Survey Area: Toole County, Montana
Survey Area Data: Version 10, Sep 2, 2014

Toole County, Montana

695D—Vida-Williams-Zahill clay loams, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: cl80
Elevation: 3,400 to 4,600 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Vida and similar soils: 35 percent
Williams and similar soils: 30 percent
Zahill and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vida

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 4 inches: clay loam
Bt - 4 to 9 inches: clay loam
Bk - 9 to 30 inches: clay loam
C - 30 to 60 inches: clay loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Williams

Setting

Landform: Till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Ap - 0 to 5 inches: clay loam
Bt - 5 to 13 inches: clay loam
Bk - 13 to 60 inches: clay loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Zahill

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

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

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Minor Components

Slopes more than 15 percent

Percent of map unit: 13 percent
Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Nishon

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Draft overflow (ov) rru 46-n 13-19" p.z.
(R046XN248MT)

Data Source Information

Soil Survey Area: Toole County, Montana
Survey Area Data: Version 10, Sep 2, 2014

Map Unit Description

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 in this report, 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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given 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.

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

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Toole County, Montana

696E—Vida-Zahill clay loams, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: cl81

Elevation: 3,400 to 4,600 feet

Mean annual precipitation: 13 to 17 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Vida and similar soils: 50 percent

Zahill and similar soils: 35 percent

Minor components: 15 percent

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

Description of Vida

Setting

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Till

Typical profile

Ap - 0 to 4 inches: clay loam

Bt - 4 to 9 inches: clay loam

Bk - 9 to 30 inches: clay loam

C - 30 to 60 inches: clay loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

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 in profile: 15 percent

Gypsum, maximum in profile: 5 percent

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

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Description of Zahill

Setting

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Till

Typical profile

A - 0 to 5 inches: clay loam

Bk - 5 to 20 inches: clay loam

C - 20 to 60 inches: clay loam

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

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 in profile: 15 percent

Gypsum, maximum in profile: 5 percent

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

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: Thin silty (tsi) rru 46-n 15-19" p.z. (R046XN260MT)

Minor Components

Slopes less than 8 percent

Percent of map unit: 8 percent

Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Reeder

Percent of map unit: 7 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

Map Unit Description

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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.

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

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Toole County, Montana

721E—Zahill-Zahl complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: cl89

Elevation: 3,500 to 4,600 feet

Mean annual precipitation: 13 to 17 inches

Mean annual air temperature: 34 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Zahill and similar soils: 60 percent

Zahl and similar soils: 25 percent

*Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Zahill

Setting

*Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till*

Typical profile

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

Properties and qualities

*Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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 in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)*

Interpretive groups

*Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Thin silty (tsi) rru 46-n 15-19" p.z. (R046XN260MT)*

Description of Zahl

Setting

*Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till*

Typical profile

*A1 - 0 to 4 inches: loam
A2 - 4 to 8 inches: clay loam
Bk - 8 to 60 inches: clay loam*

Properties and qualities

*Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained*

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 in profile: 15 percent

Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Ecological site: Draft silty-steep (sistp) rru 46-n 13-19" p.z.
(R046XN594MT)

Minor Components

Doney

Percent of map unit: 5 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Cabba

Percent of map unit: 5 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Draft shallow (sw) rru 46-n 13-19" p.z.
(R046XN250MT)

Dast

Percent of map unit: 5 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Thin sandy (tsy) rru 46-n 15-19" p.z.
(R046XN259MT)

Data Source Information

Soil Survey Area: Toole County, Montana

Survey Area Data: Version 10, Sep 2, 2014

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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.

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

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Toole County, Montana

862F—Stemple, low elevation-Rubble land complex, 25 to 70 percent slopes

Map Unit Setting

National map unit symbol: cl9j

Elevation: 4,700 to 7,000 feet

Mean annual precipitation: 18 to 22 inches

Mean annual air temperature: 36 to 39 degrees F

Frost-free period: 50 to 70 days

Farmland classification: Not prime farmland

Map Unit Composition

Stemple and similar soils: 50 percent

Rubble land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stemple

Setting

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
E1 - 2 to 10 inches: very cobbly loam
E2 - 10 to 34 inches: extremely channery loam
Bt1 - 34 to 39 inches: extremely channery loam
Bt2 - 39 to 60 inches: extremely channery clay loam

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Slopes less than 25 percent

Percent of map unit: 5 percent

Soils lacking coarse fragments

Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: Toole County, Montana
Survey Area Data: Version 10, Sep 2, 2014

Map Unit Description

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Toole County, Montana

881E—Perma-Whitlash cobbly loams, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: cl9l
Elevation: 3,900 to 6,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Perma and similar soils: 45 percent
Whitlash and similar soils: 40 percent

*Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Perma

Setting

*Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium*

Typical profile

*A - 0 to 10 inches: cobbly loam
Bw - 10 to 30 inches: very cobbly loam
C - 30 to 60 inches: extremely gravelly loam*

Properties and qualities

*Slope: 8 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)*

Interpretive groups

*Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)*

Description of Whitlash

Setting

*Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium*

Typical profile

*A - 0 to 9 inches: cobbly loam
Bw - 9 to 19 inches: extremely cobbly loam
R - 19 to 60 inches: unweathered bedrock*

Properties and qualities

*Slope: 8 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None*

Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: Draft shallow (sw) rru 46-n 13-19" p.z.
(R046XN250MT)

Minor Components

Rock outcrop

Percent of map unit: 5 percent

Farnuf

Percent of map unit: 5 percent
Landform: Fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Slopes less than 8 percent

Percent of map unit: 5 percent
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Data Source Information

Soil Survey Area: Toole County, Montana
Survey Area Data: Version 10, Sep 2, 2014

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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 in this report, 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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given 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.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Toole County, Montana

881F—Perma-Whitlash cobbly loams, 25 to 70 percent slopes

Map Unit Setting

National map unit symbol: cl9m
Elevation: 3,900 to 6,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Perma and similar soils: 45 percent
Whitlash and similar soils: 40 percent

*Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Perma

Setting

*Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium*

Typical profile

*A - 0 to 10 inches: cobbly loam
Bw - 10 to 30 inches: very cobbly loam
C - 30 to 60 inches: extremely gravelly loam*

Properties and qualities

*Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)*

Interpretive groups

*Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Draft silty-steep (sistp) rru 46-n 13-19" p.z.
(R046XN594MT)*

Description of Whitlash

Setting

*Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium*

Typical profile

*A - 0 to 9 inches: cobbly loam
Bw - 9 to 19 inches: extremely cobbly loam
R - 19 to 60 inches: unweathered bedrock*

Properties and qualities

*Slope: 25 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches*

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: Draft shallow (sw) rru 46-n 13-19" p.z.
(R046XN250MT)

Minor Components

Farnuf

Percent of map unit: 5 percent
Landform: Fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Draft silty (si) rru 46-c 13-19" p.z. (R046XC508MT)

Slopes less than 25 percent

Percent of map unit: 5 percent
Ecological site: Draft silty (si) rru 46-n 13-19" p.z. (R046XN252MT)

Rock outcrop

Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: Toole County, Montana
Survey Area Data: Version 10, Sep 2, 2014

Montana Species of Concern Green Coulee

SPECIES OCCURRENCE: A polygon feature representing only what is known from direct observation with a defined level of certainty regarding the spatial location of the feature.

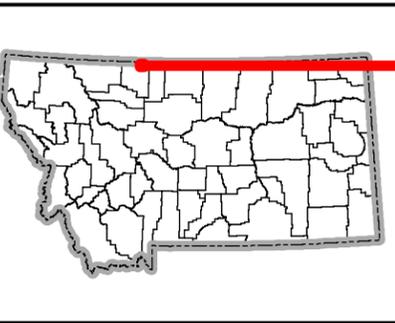
-  Lichens
-  Bryophytes
-  Vascular Plants
-  Invertebrates
-  Amphibians
-  Fish
-  Reptiles
-  Birds
-  Mammals

Sites

-  Sites

Wetland Types

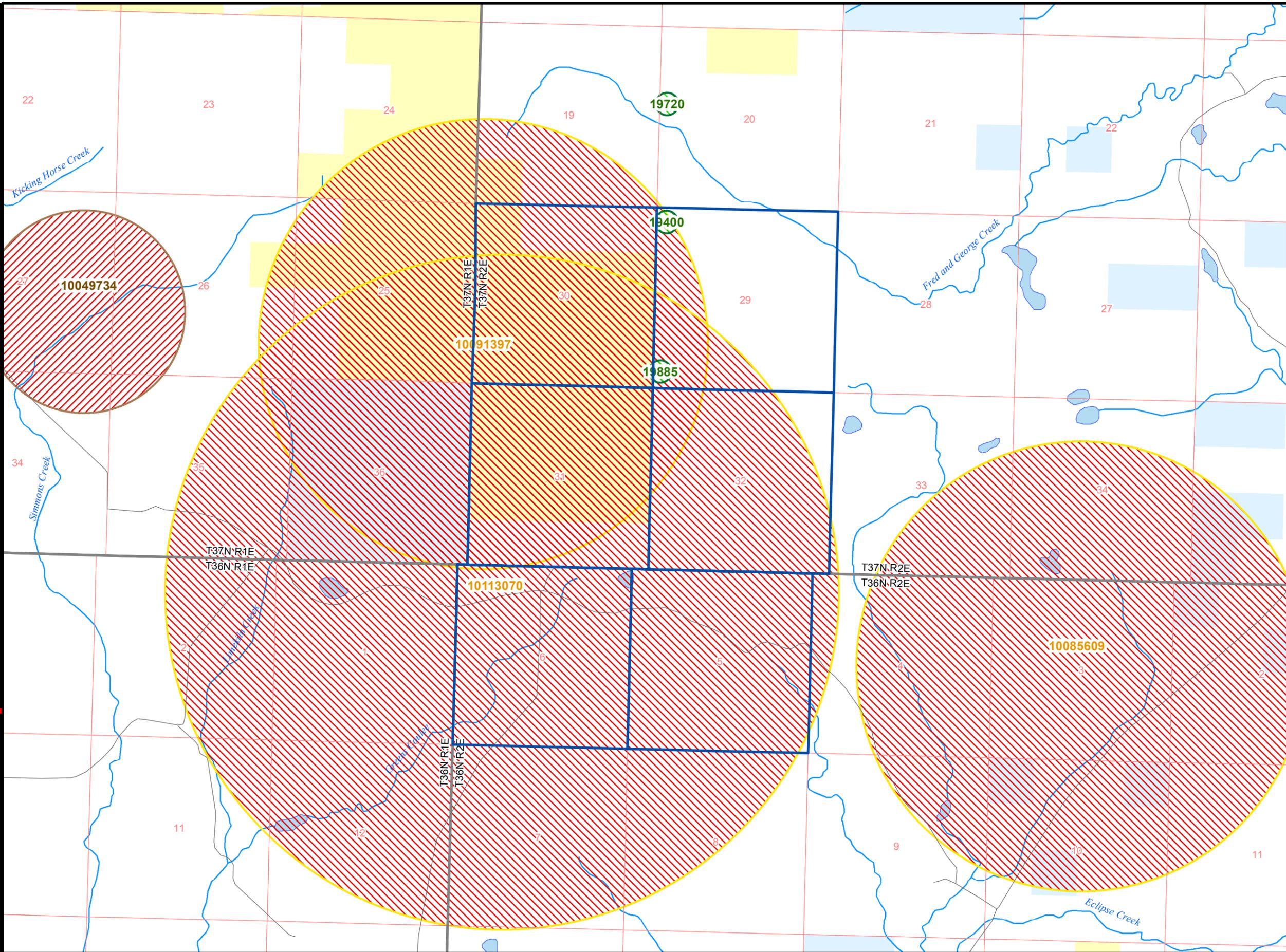
-  Lake
-  River
-  Freshwater Pond
-  Freshwater Emergent Wetland
-  Freshwater Scrub-Shrub Wetland
-  Freshwater Forested Wetland
-  Riparian Emergent
-  Riparian Scrub-Shrub
-  Riparian Forested



Not all legend items may occur on the map.

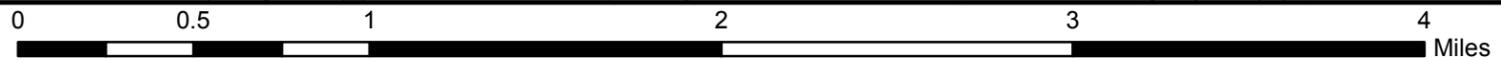
Features shown on this map do not imply public access to any lands.

Land ownership information shown on this map is not suitable for legal purposes.



Natural Resource Information System, Montana State Library
1515 East Sixth Ave., Helena, MT 59620-1800

406 444-5354 <http://mtnhp.org> mtnhp@mt.gov



Map Document: K:\REQUESTS\Requests\15\PRVT\15prvt0165\15prvt0165.mxd (3/4/2015)



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:
Wednesday, March 4, 2015

Ranunculus cardiophyllus

[View Species in MT Field Guide](#)

Common Name: Heart-leaved Buttercup

General Habitat: Grasslands (Moist, Montane)

Description: Vascular Plants

Mapping Delineation:

Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3

Global: G4G5

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#)

Species Occurrences

Species Occurrence Map Label:	19400			
First Observation Date:	06/10/1993	SO Number:	7	Acreage: 8
Last Observation Date:	06/10/1993	SO Rank:	C	
Species Occurrence Map Label:	19720			
First Observation Date:	06/30/1975	SO Number:	2	Acreage: 8
Last Observation Date:	05/30/1993	SO Rank:	BC	
Species Occurrence Map Label:	19885			
First Observation Date:	07/10/1993	SO Number:	10	Acreage: 8
Last Observation Date:	07/10/1993	SO Rank:	C	



Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:
Wednesday, March 4, 2015

Buteo regalis

[View Species in MT Field Guide](#)

Common Name: Ferruginous Hawk **General Habitat:** Sagebrush grassland

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to encompass the average home range size reported for the species and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3B
Global: G4

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#) SENSITIVE

FWP CFWCS Tier: 2

MT PIF Code: 2

Species Occurrences

Species Occurrence Map Label:	10085609		
First Observation Date:	05/17/2005	SO Number:	
Last Observation Date:	05/17/2005	Acreage:	3,105

Aquila chrysaetos

[View Species in MT Field Guide](#)

Common Name: Golden Eagle **General Habitat:** Grasslands

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 3,000 meters in order to be conservative about encompassing the entire breeding territory and area commonly used for reneating and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#) BGEPA; MBTA; BCC

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#) SENSITIVE

FWP CFWCS Tier: 2

MT PIF Code:

Species Occurrences

Species Occurrence Map Label:	10113070		
First Observation Date:	07/12/2011	SO Number:	
Last Observation Date:	07/12/2011	Acreage:	6,987



Natural Resource Information System
Montana State Library
PO Box 201800
Helena, MT 59620-1800
(406)444-3009 mtnhp@mt.gov

Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:
Wednesday, March 4, 2015

Nucifraga columbiana

[View Species in MT Field Guide](#)

Common Name: Clark's Nutcracker

General Habitat: Conifer forest

Description: Birds

Mapping Delineation:

Observations with evidence of breeding activity buffered by a minimum distance of 1,000 meters in order to be conservative about encompassing the spring/summer breeding territories of family groups and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#)

FWP CFWCS Tier: 3

MT PIF Code: 3

Species Occurrences

Species Occurrence Map Label: 10091397

First Observation Date: 06/05/1994

SO Number:

Last Observation Date: 06/05/1994

Acreage: 3,105

FUEL STORAGE GUIDELINE

Contact the county disaster and emergency services person in the county where the opencut operation is located to find out if they have fuel storage requirements in addition to those given below.

Fuel from leaks, spills, and overfills may pollute soil, surface water, and ground water. Because it is difficult and expensive to clean up polluted soil and water, it is best to prevent such pollution from occurring. Secondary containment is a preventative practice used to assure that leaked or spilled fuel does not leave a site. For opencut operations, secondary containment is required for each stationary, single-wall, fuel storage tank set in the permit area.

These guidelines address basic requirements for lined secondary containment structures. Install and maintain these structures as follows:

1. Make the storage capacity at least 110 percent of the volume of the largest fuel tank. Allow for the volume of other solid objects within the containment area.
2. Make the minimum distance between a fuel tank and the toe of interior dike walls 5 horizontal feet. This distance accounts for the squirt factor from an accidental release.
3. Construct dikes with a minimum 2-foot-wide flat top. This provides dike stability and a walking surface for inspection and maintenance work.
4. Make the structure liquid tight by using a 30-mil, continuous, impermeable, product-compatible, synthetic liner.
5. Cover the liner with at least 6 inches of sand or gravel and set the tank legs on pads. This provides protection for the liner.
6. Keep the dispensing hose within the containment area or within a structure that drains to the containment area.
7. Protect structures and storage tanks subject to vehicular damage.
8. Keep the containment storage area clear of combustible materials, drums, and clutter. Keep weeds, trash, and combustible materials 10 feet back from fuel storage tanks and fuel handling equipment.
9. Have a pump or other means available to remove precipitation or recover leaked or spilled fuel from the containment area. Do not use a gravity drain since it may be left open. Dispose of contaminated water and recovered fuel in a lawful manner.
10. Inspect structures and storage tanks frequently to ensure their capacity and integrity. Inspect daily during active operations.
11. Immediately contain leaks and spills and clean them up in a lawful manner. Report a fuel spill that reaches state waters, or that is greater than 25 gallons, to the Montana Spill Hotline (406-841-3911) or the Department (406-431-0014).

In addition, store waste oil, lubricants, antifreeze, solvents, and other flammable and combustible materials or potential contaminants in a proper manner.

**SHUMAKER TRUCKING &
EXCAVATING CONTRACTORS
FORT SHAW QUARRY SITE
T20N, R2W, SECTION 35
CASCADE COUNTY
APRIL 5, 2015**

FORT SHAW MILITARY RESERVATION

PERMITTED AREA = 33.5 ACRES

BONDED AREA = 30.0 ACRES

26 25
35 36

REMOVED
13.1 ACRES

CASCADE COUNTY
STATE OF MONTANA

next 5 years
quarry face

facility and
stockpiles

soil

scale

to Birdtail
Creek Rd

REMOVED
33.0 ACRES

4100'

4000'

3900'

**AERIAL PHOTO = 2013
CONTOUR INTERVAL = 20'**

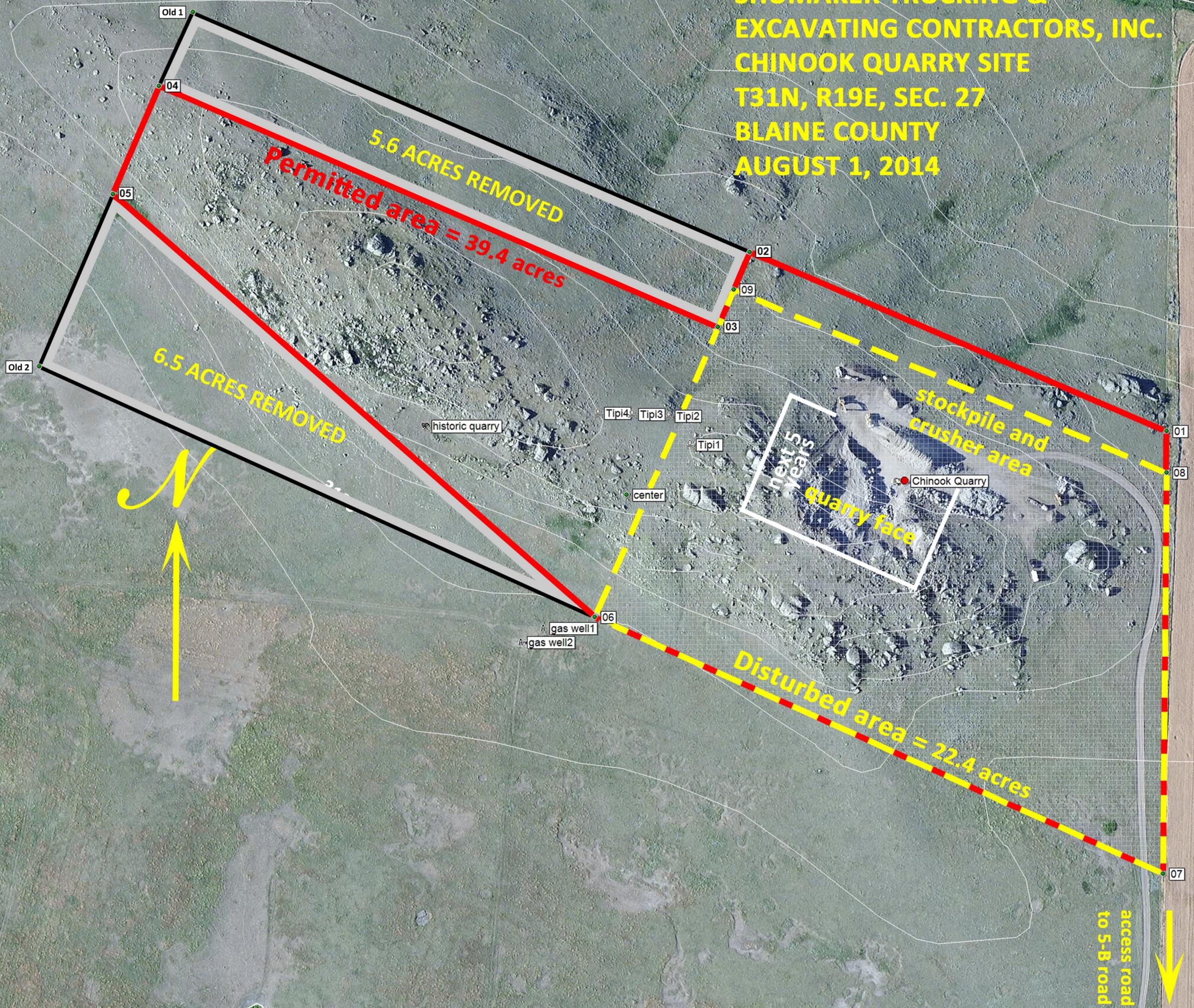
SAMDAHL CONSULTING SERVICES

0 100 200 300 400

FORT SHAW COORDINATES		
Label	Latitude	Longitude
1	47.45141	-111.81847
2	47.45142	-111.82120
3	47.44989	-111.82121
4	47.44708	-111.81590
4	47.44989	-111.82025
5	47.44670	-111.82025
6	47.44642	-111.81590
7	47.44846	-111.81589
8	47.44846	-111.81767
9	47.45119	-111.81855
10	47.44708	-111.81590
10	47.45118	-111.82114
11	47.44989	-111.82114
12	47.44838	-111.81652
13	47.44838	-111.81781
1/2 SEC	47.44416	-111.8159
COMMON CORNER	47.45140	-111.81585
Center	47.44850	-111.81904
Old SW4	47.44418	-111.82126

FORT SHAW COORDINATES		
Label	Latitude	Longitude
1	47.45141	-111.81847
2	47.45142	-111.82120
3	47.44989	-111.82121
4	47.44708	-111.81590
4	47.44989	-111.82025
5	47.44670	-111.82025
6	47.44642	-111.81590
7	47.44846	-111.81589
8	47.44846	-111.81767
9	47.45119	-111.81855
10	47.44708	-111.81590
10	47.45118	-111.82114
11	47.44989	-111.82114
12	47.44838	-111.81652
13	47.44838	-111.81781
1/2 SEC	47.44416	-111.8159
COMMON CORNER	47.45140	-111.81585
Center	47.44850	-111.81904
Old SW4	47.44418	-111.82126

**SHUMAKER TRUCKING &
EXCAVATING CONTRACTORS, INC.
CHINOOK QUARRY SITE
T31N, R19E, SEC. 27
BLAINE COUNTY
AUGUST 1, 2014**



**CONTOUR INTERVAL = 20'
AERIAL PHOTO 2011**

CHINOOK COORDINATES		
Label	Latitude	Longitude
1	48.41298	-109.24877
2	48.41408	-109.25256
2	48.41408	-109.25256
2	48.41338	-109.25905
3	48.41362	-109.25285
3	48.41362	-109.25285
4	48.41509	-109.25794
4	48.41509	-109.25794
5	48.41443	-109.25837
5	48.41443	-109.25837
6	48.41185	-109.25397
6	48.41185	-109.25397
7	48.41028	-109.24880
8	48.41273	-109.24877
9	48.41385	-109.25271
Chinook Quarry	48.41268	-109.25115
gas well1	48.41178	-109.25444
gas well2	48.41169	-109.25464
historic quarry	48.41301	-109.25551
Old Corner 1	48.41555	-109.25764
Old Corner 2	48.41338	-109.25905
Tipi1	48.41290	-109.25310
Tipi2	48.41307	-109.25330
Tipi3	48.41308	-109.25363
Tipi4	48.41309	-109.25394